IFC

2024 GROUP A PROPOSED CHANGES TO THE I-CODES

Committee Action Hearings (CAH #2)
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ICC
INTERNATIONAL CODE COUNCIL®

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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.

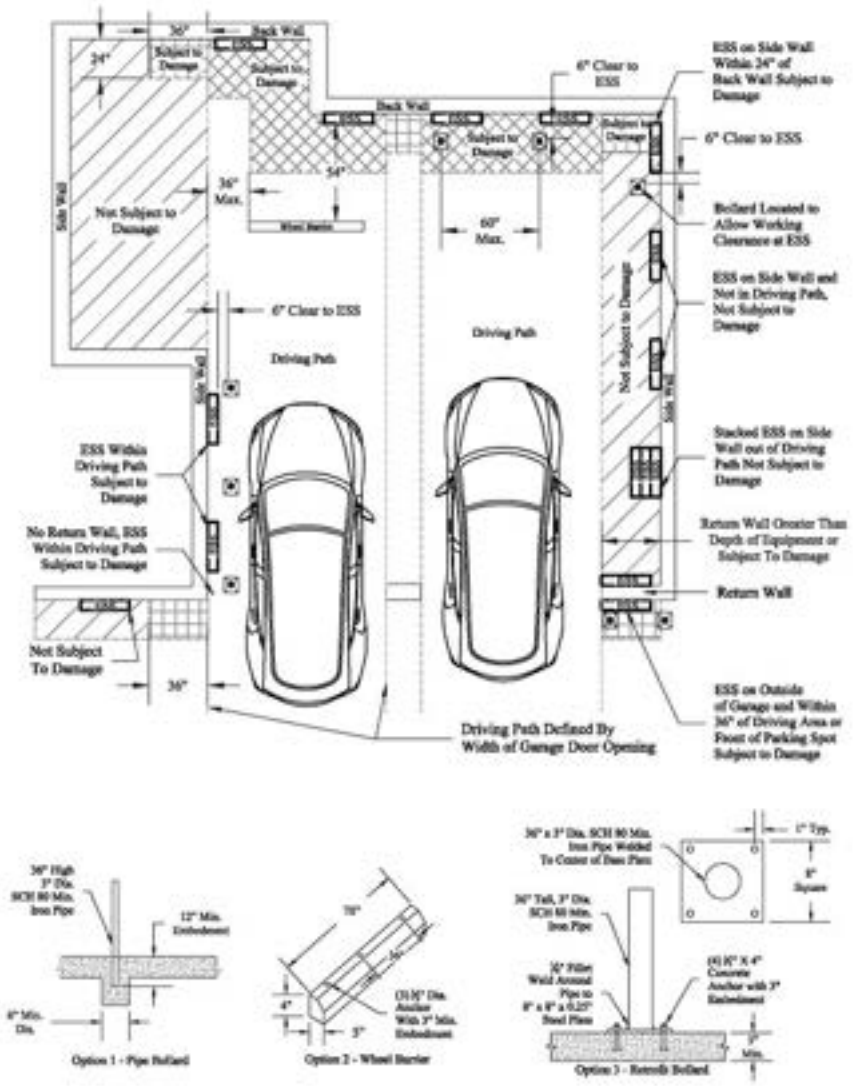


FIGURE ~~1207.11.7.1~~ 312.1.1 ~~ESS~~ VEHICLE IMPACT PROTECTION

~~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.

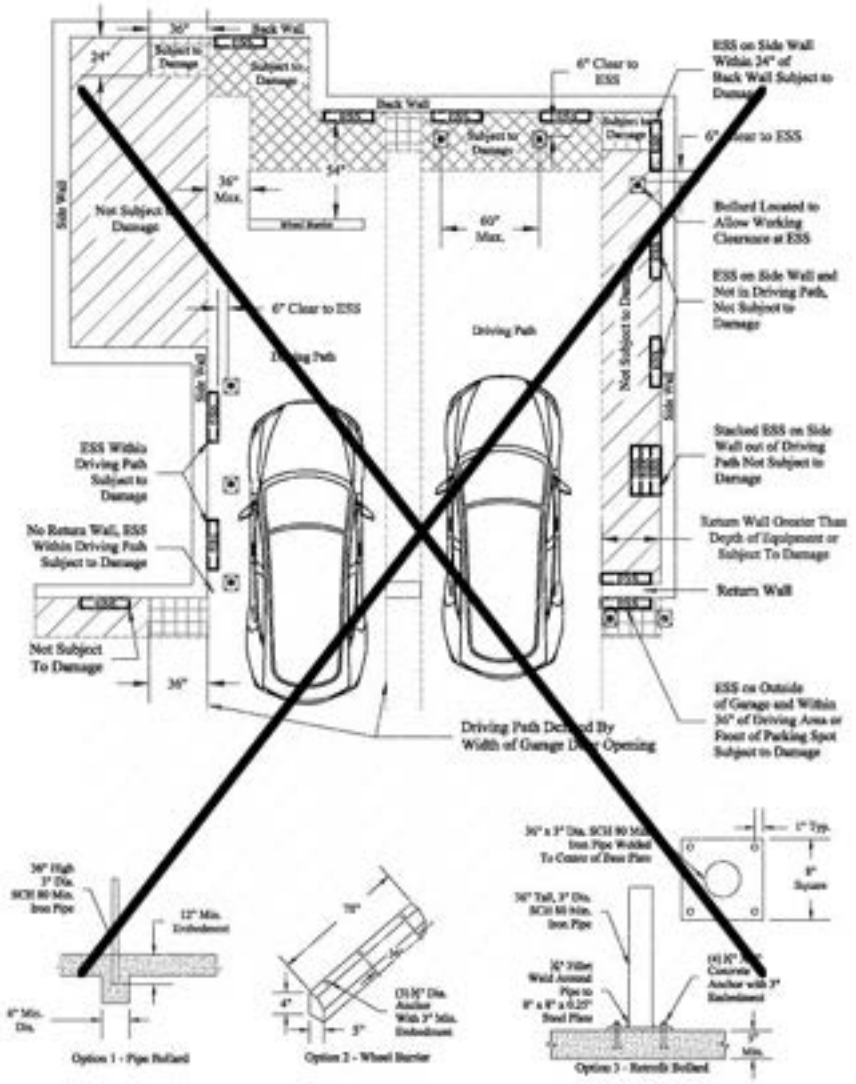
312.3 Other barriers. Barriers, other than posts specified in Section 312.2, that are designed to resist, deflect or visually deter vehicular impact commensurate with an anticipated impact scenario shall be permitted where *approved*.

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:

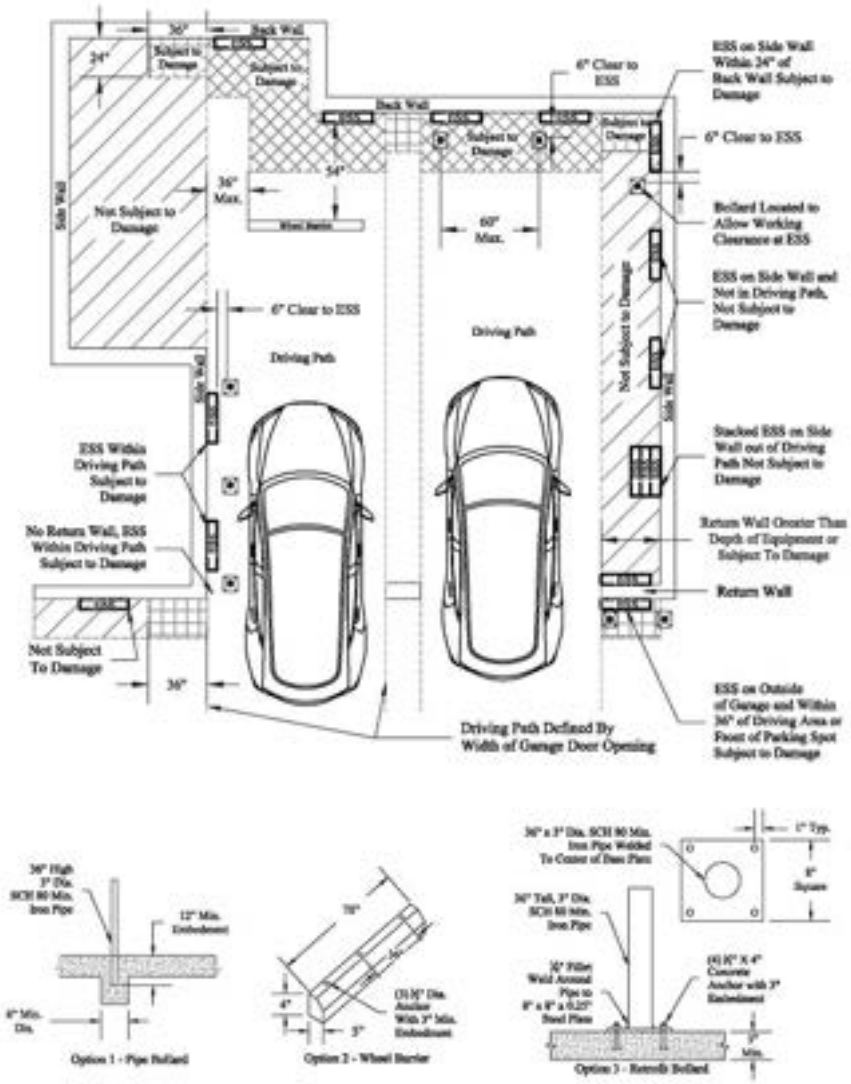


FIGURE ~~312.1.1~~ 312.4.1 ESS VEHICLE IMPACT PROTECTION

~~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.

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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.

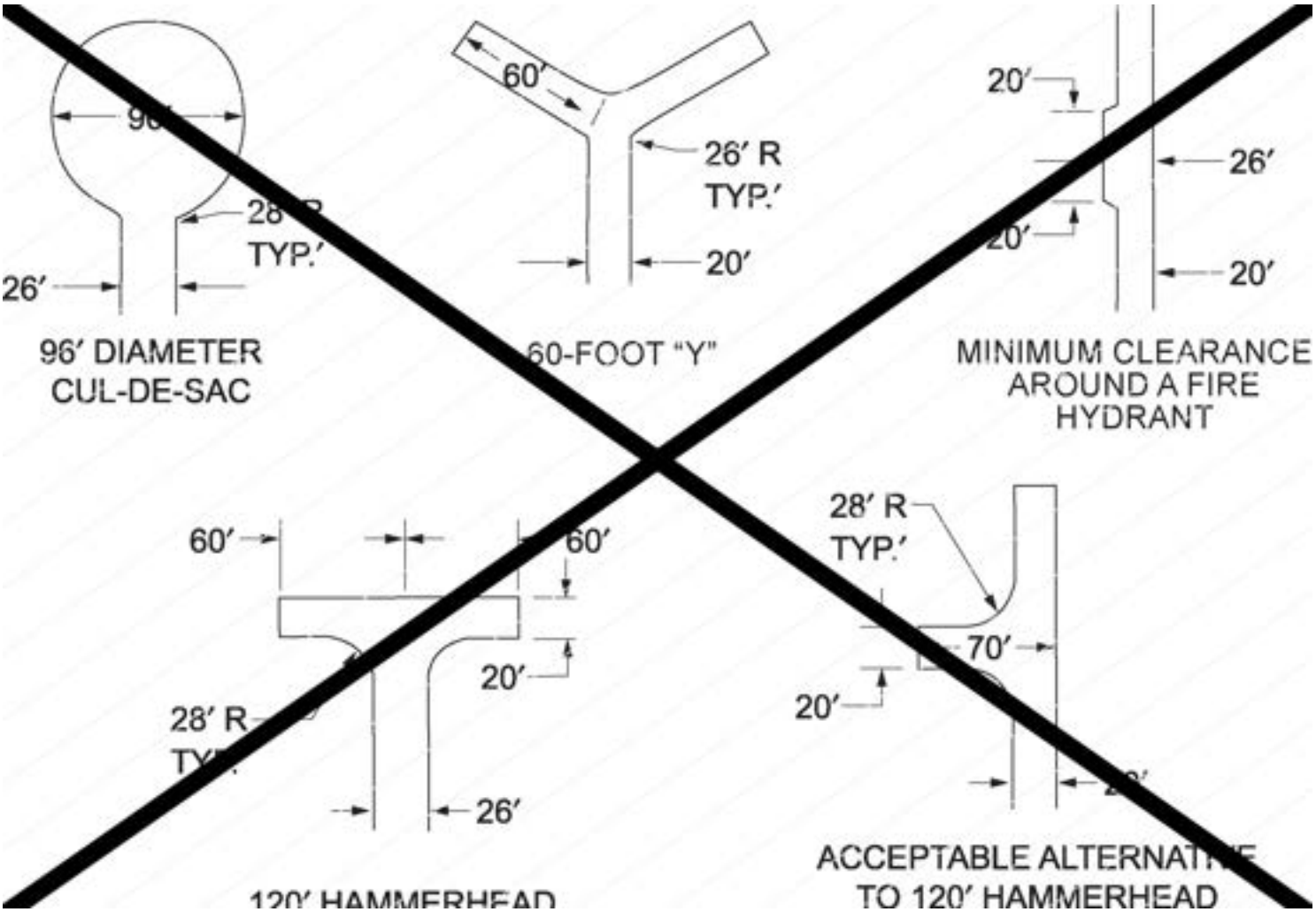
WORKING AREA. A designated area beside the fire apparatus access road, which is available for the placement of outriggers, hose lines, and other staging activates. This could be sidewalk, grass, or another surface, provided there are not excessive obstructions which would impede staging.

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.

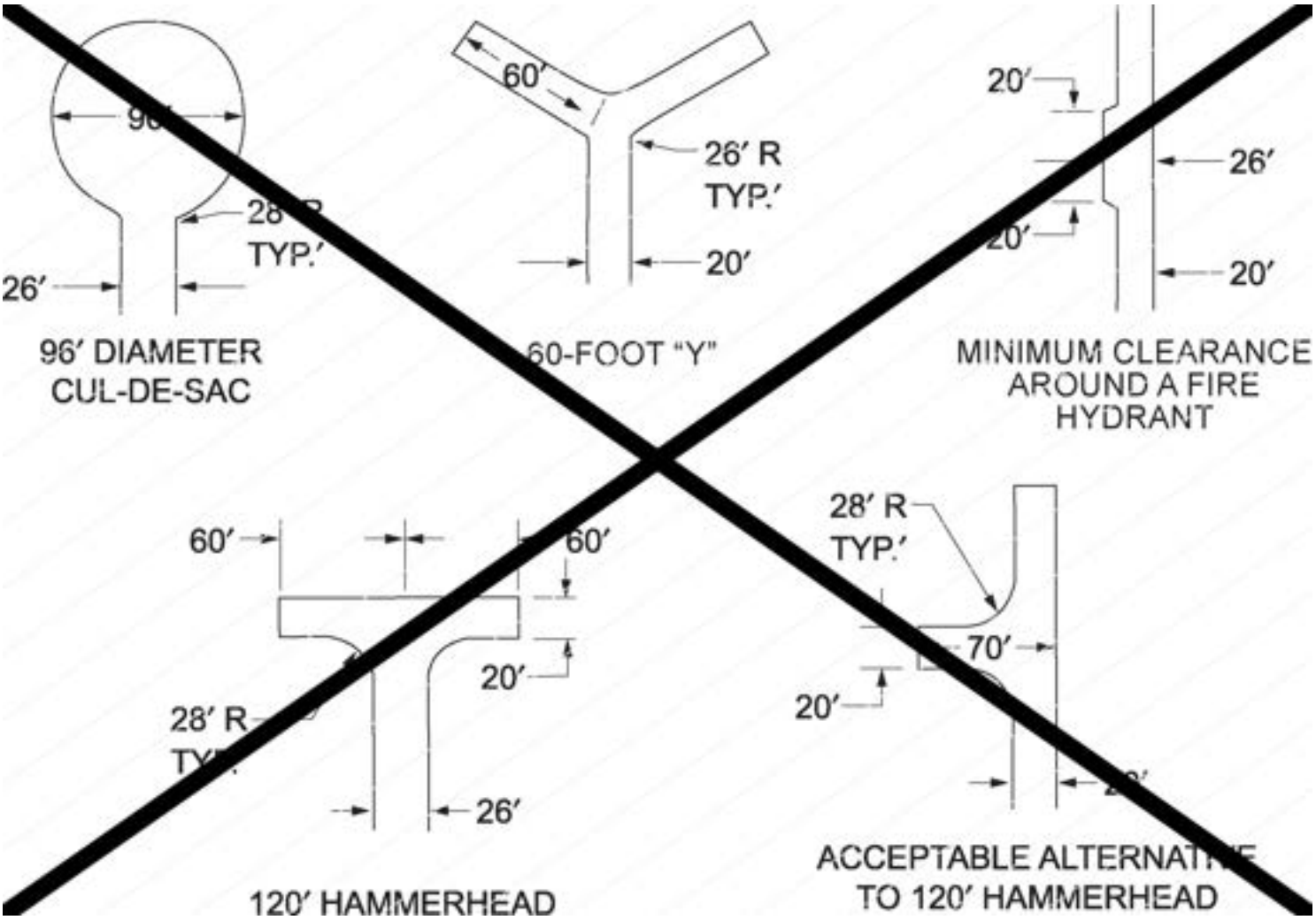
D103.4 Dead Ends. Dead end fire apparatus access roads in excess of 150 feet (45 720 mm) shall be provided with turnaround provisions in accordance with ~~Table D103.4~~ *A Policy on Geometric Design of Highways and Streets, by the American Association of State Highway and Transportation Officials.*

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.

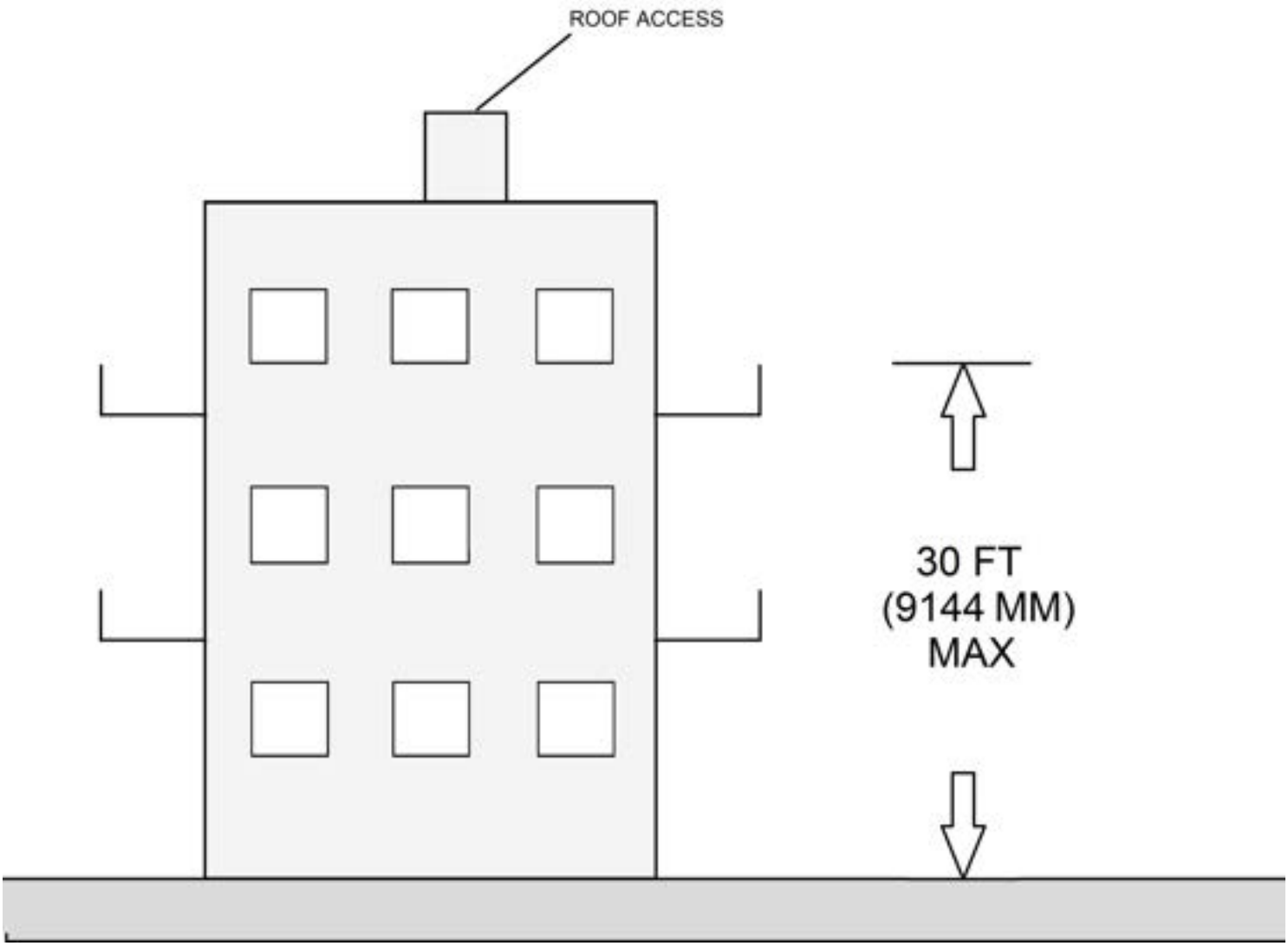


Figure showing measurement to highest balcony ledge or windowsill in accordance with D105.1 Exemption.

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.

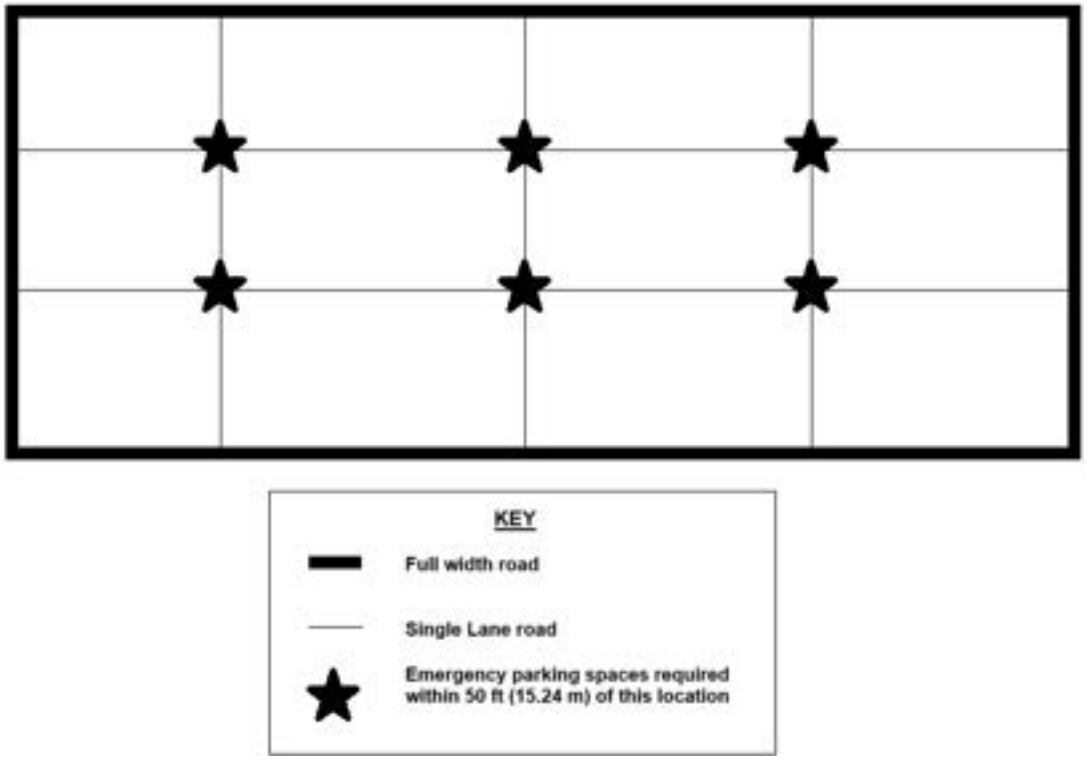


FIGURE D108.1.5.1 Intersections where Emergency Vehicle Parking Spaces Required

D108.1.5.2 Parking Space Design. Emergency vehicle parking spaces shall be designed in accordance with Figure D108.1.5.2.

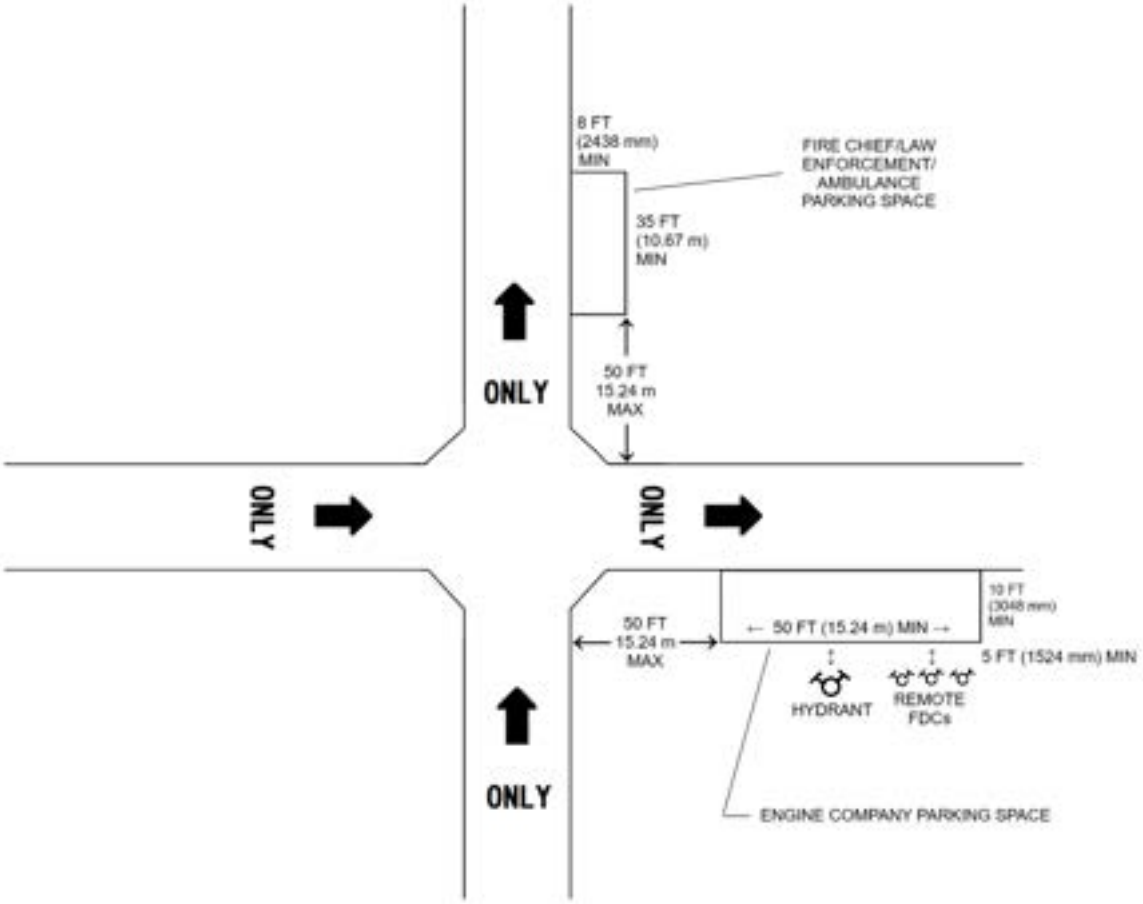


FIGURE D108.1.5.2 Emergency Vehicle Passing Space Dimensions

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.

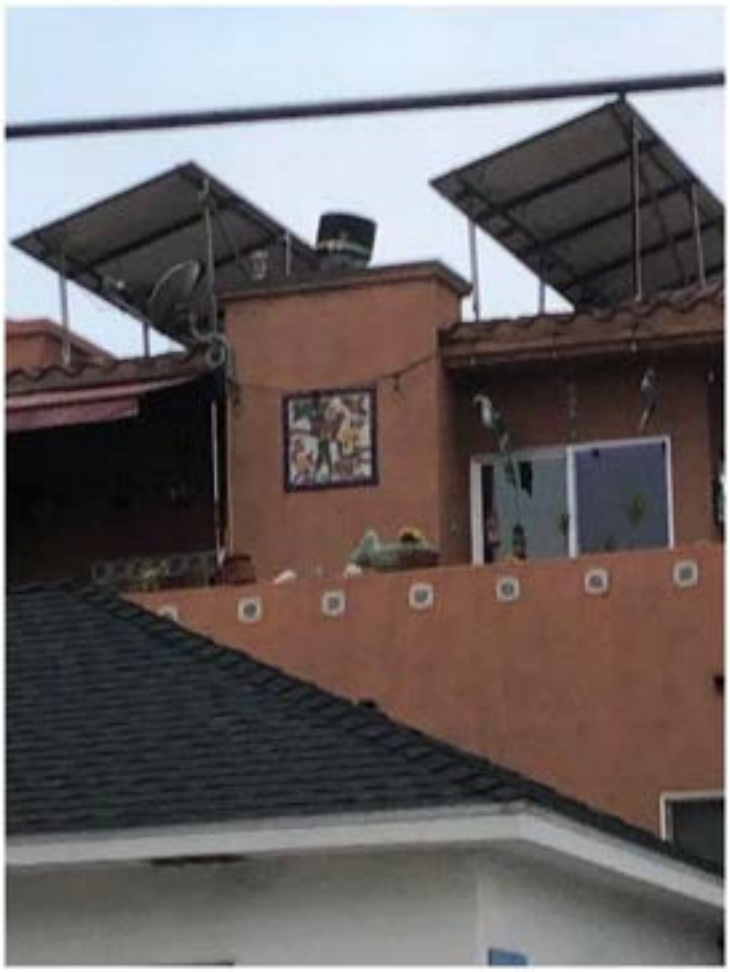
The proposed code change addresses the fire hazards and roof access issues the two independently regulated rooftop components pose. It is worth noting that the IBC, IRC, and IMC do not require spark arrestors and that the two building codes only address the construction of spark arrestors; the proposed 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.

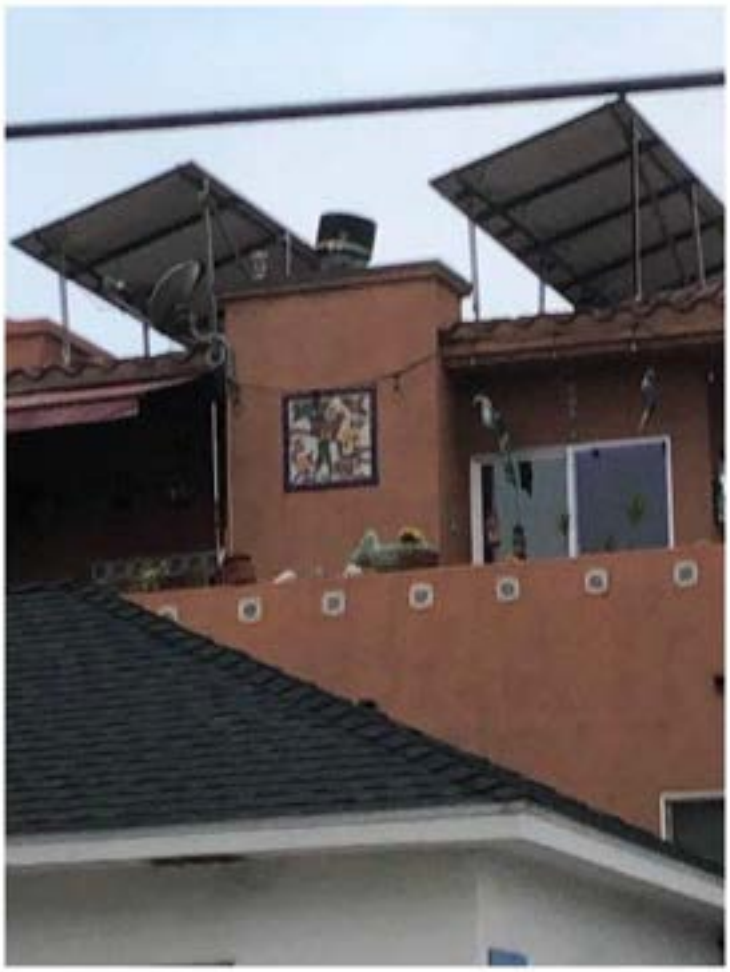
The proposed code change addresses the fire hazards and roof access issues the two independently regulated rooftop components pose. It is worth noting that the IBC, IRC, and IMC do not require spark arrestors and that the two building codes only address the construction of spark arrestors; the proposed 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.~~

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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.

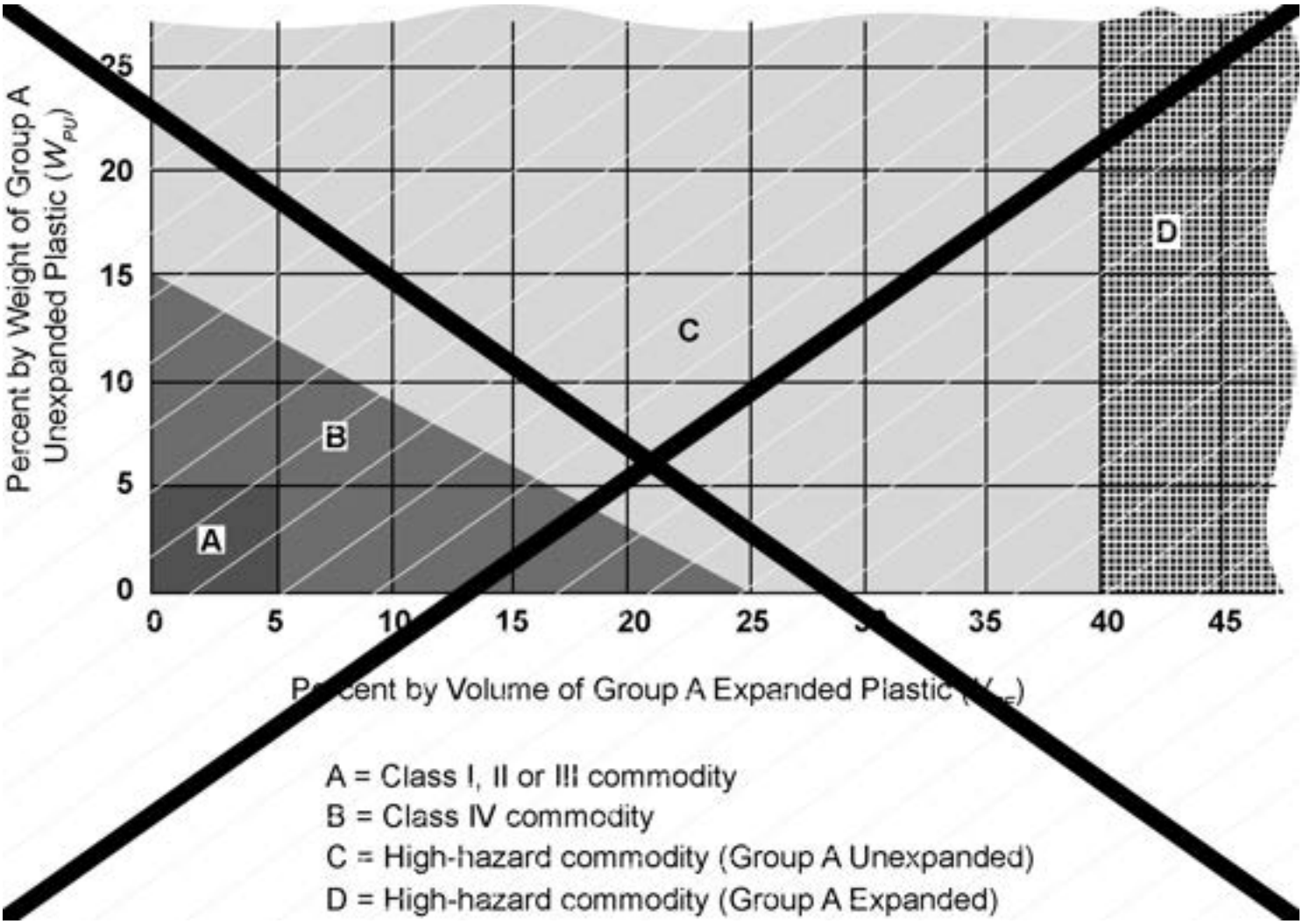
V_L = Volume of the entire load, including the volume of the pallet, if any.

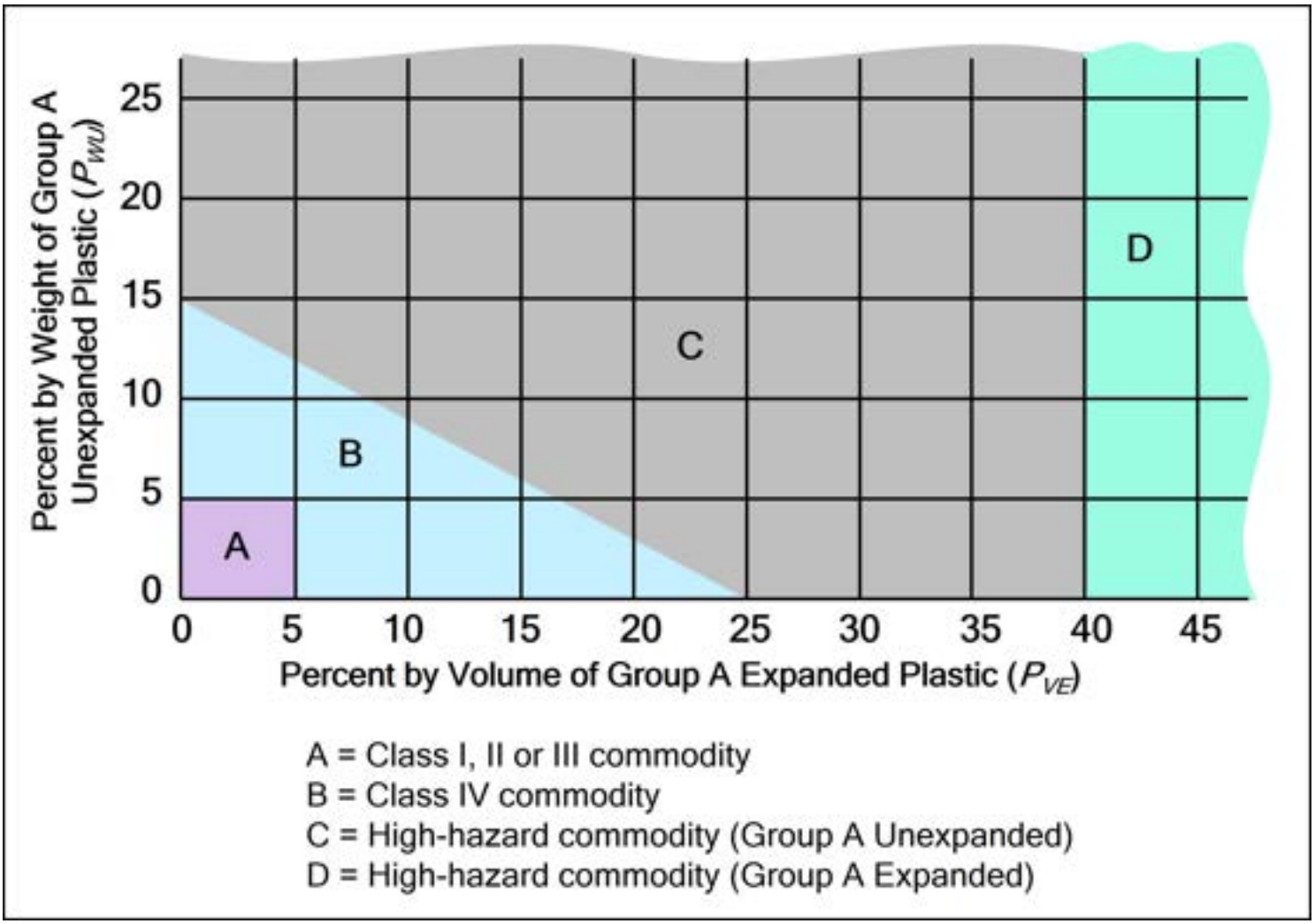
~~$P_{WE} = W_{PE} / W_L$~~ ~~**(Equation 32-3)**~~where:

~~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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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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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)

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.

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:

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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:

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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)

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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*.

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[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

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:

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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 to i i 67 0 [illegible]

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.

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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:

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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.

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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~~ Not Limited	(840~~500~~) Not Limited		400~~250~~ Not Limited	(400~~250~~) Not Limited		100 200~~50~~ Not Limited	(200~~50~~) Not Limited
	IV	Not Limited	Not Limited		Not Limited	Not Limited		Not Limited	Not Limited
	V								
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.

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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.

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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:

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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

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[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

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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