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IRC - Building

2025 GROUP B PROPOSED CHANGES TO THE I-CODES

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2025 GROUP B – PROPOSED CHANGES TO THE INTERNATIONAL RESIDENTIAL CODE - BUILDING

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TENTATIVE ORDER OF DISCUSSION
2025 PROPOSED CHANGES TO THE
INTERNATIONAL RESIDENTIAL CODE – BUILDING

The following is the tentative order in which the proposed changes to the code will be discussed at the public hearings. Proposed changes which impact the same subject have been grouped to permit consideration in consecutive changes.

Proposed change numbers that are indented are those which are being heard out of numerical order. Indentation does not necessarily indicate that one change is related to another. Proposed changes may be grouped for purposes of discussion at the hearing at the discretion of the chair. Note that some RB code change proposals may not be included on this list, as they are being heard by another committee.

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IRC: R101.1, R101.2, R302.3, R302.3.1, R302.3.5, SECTION 202, R309.2

Proponents: Gregory Burke, FAIA, NCARB, Gregory John Burke | ARCHITECT, PA, representing Self, as President (gjburke@burkearchitects.com)

THIS IS A 2 PART CODE CHANGE. BOTH PARTS WILL BE HEARD BY THE IRC-BUILDING CODE COMMITTEE

2024 International Residential Code

Revise as follows:

R101.1 Title. These provisions shall be known as the *Residential Code for One-, ~~and~~ Two-, Three-, and Four-family Dwellings* of **[NAME OF JURISDICTION]**, and shall be cited as such and will be referred to herein as “this code.”

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of detached one-, ~~and~~ two, three- (triplex) and four-- (fouplex) family *dwellings* and *townhouses* not more than three *stories above grade plane* in height with a separate means of egress and their *accessory structures* not more than three *stories above grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904:

1. Live/work units located in *townhouses* and complying with the requirements of Section 508.5 of the *International Building Code*.
2. *Owner*-occupied *lodging houses* with five or fewer *guestrooms*.
3. A care facility with five or fewer *persons* receiving custodial care within a *dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
5. A day care facility for five or fewer *persons* of any age receiving care within a *dwelling unit* .

SECTION R302
FIRE-RESISTANT CONSTRUCTION

R302.3 Two-, three-, and four-family dwellings. Dwelling units in two-, three-, and four-family dwellings shall be separated from each other in accordance with Sections 302.3.1 through 302.3.5, regardless of whether a lot line exists between the dwelling units.

R302.3.1 Dwelling unit separation. ~~The two *dwelling*~~ *Dwelling units* shall be separated by fire-resistance rated assemblies that are vertical, horizontal, or a combination thereof.

R302.3.2 Fire-resistance rating. Vertical and horizontal assemblies separating *dwelling units* shall have a fire-resistance rating of 1 hour, or a fire-resistance rating of one-half hour in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904. Fire-resistance ratings shall be based on testing in accordance with ASTM E119 or UL 263, or an analytical method in accordance with Section 703.2.2 of the *International Building Code*.

R302.3.3 Continuity. Vertical and horizontal assemblies separating *dwelling units* shall be constructed in a manner that provides continuity of the fire-resistance rating between the *dwelling units*.

R302.3.3.1 Horizontal assemblies. Horizontal assemblies separating *dwelling units* shall extend to and be tight against exterior walls or vertical separation assemblies complying with Section 302.3.2.

R302.3.3.2 Vertical assemblies. Vertical assemblies separating *dwelling units* shall extend to and be tight against any combination of the following:

4. The ceiling beneath an uninhabitable *attic,* provided that the ceiling is constructed using not less than $^{5}/_{8}$-inch (15.9 mm) *Type X gypsum board*, an attic *draft stop* constructed as specified in Section R302.12.1 is provided above and along the vertical assembly terminating at the ceiling, and the structural framing supporting the ceiling is protected by not less than $^{1}/_{2}$-inch (12.7 mm) gypsum board or equivalent.
3. The underside of roof sheathing.
2. A horizontal assembly complying with Section R302.3.3.
1. The foundation.

R302.3.4 Supporting construction. Vertical and horizontal assemblies separating *dwelling units* shall be supported by construction having an equal or greater fire-resistance rating.

R302.3.5 Vertically stacked dwelling units. Where one *dwelling unit* in a two-, three-, or four-family dwelling is located above ~~the other~~ another and an automatic sprinkler system complying with Section P2904 is not provided in both *dwelling units*, both of the following shall apply:

1. Horizontal and vertical assemblies separating the *dwelling units*, including an interior *stairway* serving as the means of egress for the upper *dwelling unit*, shall be constructed in a manner that limits the transfer of smoke.
2. A notification appliance connected to smoke alarms in the other *dwelling unit* shall be provided in each *dwelling unit*.

[RB] BUILDING. Any one-, ~~or~~ two-, three-, or four-family *dwelling* units or *townhouse* , or portion thereof, used or intended to be used for human habitation, for living, sleeping, cooking or eating purposes, or any combination thereof, or any *accessory structure* . For the definition applicable in Chapter 11, see Section N1101.6.
[RB] DWELLING. Any *building* that contains one or ~~two~~ more ~~*dwelling*~~ *living units* used, intended, or designed to be built, used, rented, leased, let or hired out to be occupied, or that are occupied for living purposes.

R309.2 ~~One- and two-family dwellings automatic sprinkler systems~~ Sprinkler Systems. An automatic sprinkler system shall be installed in one-, ~~and~~ two-, three- and four-family *dwellings*.

Exception: An automatic sprinkler system shall not be required for *additions* or *alterations* to *existing buildings* that are not already provided with a sprinkler system.

2024 International Building Code

Revise as follows:

[A] 101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, relocation, enlargement, replacement, *repair*, equipment, use and occupancy, location, maintenance, removal and demolition of every *building* or *structure* or any appurtenances connected or attached to such *buildings* or *structures*.

Exception: Detached one-, ~~and~~ two-, three-, and four-family *dwellings* and *townhouses* not more than three *stories above grade plane* in height with a separate *means of egress*, and their accessory *structures* not more than three *stories above grade plane* in height, shall comply with this code or the *International Residential Code*.

2024 International Existing Building Code

[A] 101.2 Scope. The provisions of this code shall apply to the *repair*, *alteration*, *change of occupancy*, *addition* to and relocation of *existing buildings*.

Exception: Detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height, shall comply with this code or the *International Residential Code* .

Revise as follows:

505.2 Window fall prevention on replacement windows. In Group R-2 or R-3 buildings containing dwelling units, and one-, ~~and~~ two-, three-, and four-family dwellings and townhouses regulated by the *International Residential Code*, window opening control devices or other window fall prevention devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

1. The window is operable.
2. One of the following applies:
   - 2.1. The window replacement includes replacement of the sash and frame.
   - 2.2. The window replacement includes the sash only where the existing frame remains.
3. One of the following applies:
   - 3.1. In Group R-2 or R-3 buildings containing dwelling units, the bottom of the clear opening of the window opening is at a height less than 36 inches (915 mm) above the finished floor.
   - 3.2. In one-, ~~and~~ two-, three-, and four-family dwellings and townhouses regulated by the *International Residential Code*, the bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.
4. The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere when the window is in its largest opened position.
5. The vertical distance from the bottom of the clear opening of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

Exception: Operable windows where the bottom of the clear opening of the window opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F2006.

505.3 Replacement window emergency escape and rescue openings. Where windows are required to provide *emergency escape and rescue openings* in Group R-2 and R-3 occupancies and one-, ~~and~~ two-, three-, and four-family dwellings and townhouses regulated by the *International Residential Code,* replacement windows shall be exempt from the requirements of Section 1031.3 of the *International Building Code* and Section 319.2 of the *International Residential Code,* provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Where the replacement of the window is part of a *change of occupancy,* it shall comply with Section 1011.5.6.

702.4 Window fall prevention . In Group R-2 or R-3 buildings containing dwelling units and one-, ~~and~~ two-, three-, and four-family dwellings and townhouses regulated by the *International Residential Code*, window opening control devices or other window fall prevention devices complying with ASTM F2090 shall be installed where an existing window is replaced and where all of the following apply to the replacement window:

1. The window is operable.
2. One of the following applies:
   - 2.1. The window replacement includes replacement of the sash and frame.
   - 2.2. The window replacement includes the sash only where the existing frame remains.

3. One of the following applies:
   3.1. In Group R-2 or R-3 buildings containing dwelling units, the bottom of the clear opening of the window opening is at a height less than 36 inches (915 mm) above the finished floor.
   3.2. In one-, ~~and~~ two- , three-, and four-family dwellings and townhouses regulated by the *International Residential Code*, the bottom of the clear opening of the window opening is at a height less than 24 inches (610 mm) above the finished floor.
4. The window will permit openings that will allow passage of a 4-inch-diameter (102 mm) sphere when the window is in its largest opened position.
5. The vertical distance from the bottom of the clear opening of the window opening to the finished grade or other surface below, on the exterior of the building, is greater than 72 inches (1829 mm).

Exception:

Operable windows where the bottom of the clear opening of the window opening is located more than 75 feet (22 860 mm) above the finished grade or other surface below, on the exterior of the room, space or building, and that are provided with window fall prevention devices that comply with ASTM F2006.

702.5 Replacement window for emergency escape and rescue openings. Where windows are required to provide *emergency escape and rescue openings* in Group R-2 and R-3 occupancies and one-, ~~and~~ two-, three-, and four-family dwellings and townhouses regulated by the *International Residential Code*, replacement windows shall be exempt from the requirements of Section 1031.3 of the *International Building Code* and Section R310.2 of the *International Residential Code*, provided that the replacement window meets the following conditions:

1. The replacement window is the manufacturer's largest standard size window that will fit within the existing frame or existing rough opening. The replacement window shall be permitted to be of the same operating style as the existing window or a style that provides for an equal or greater window opening area than the existing window.
2. Where the replacement window is part of a *change of occupancy* it shall comply with Section 1011.5.6.

2024 International Fire Code

Revise as follows:

1001.1 General. Buildings or portions thereof shall be provided with a *means of egress* system as required by this chapter. The provisions of this chapter shall control the design, construction and arrangement of *means of egress* components required to provide an *approved means of egress* from structures and portions thereof. Sections 1003 through 1031 shall apply to new construction. Section 1032 shall apply to existing buildings.

Exception: Detached one-, ~~and~~ two-, three-, and four-family *dwellings* and *townhouses* not more than three stories above *grade plane* in height with a separate means of egress and their accessory structures shall comply with the *International Residential Code*.

2024 International Fuel Gas Code

Revise as follows:

[A] 101.2 Scope. This code shall apply to the installation of fuel-gas *piping* systems, *fuel gas appliances*, *gaseous hydrogen systems* and related accessories in accordance with Sections 101.2.2 through 101.2.6.

Exception: Detached one-, ~~and~~ two-, three-, and four-family dwellings and townhouses not more than three stories above grade plane in height with separate means of egress and their accessory structures not more than three stories above grade plane in height, shall comply with this code or the *International Residential Code.*

2024 International Mechanical Code

Revise as follows:

[A] 101.2 Scope. This code shall regulate the design, installation, maintenance, *alteration* and inspection of mechanical systems that are permanently installed and utilized to provide control of environmental conditions and related processes within *buildings*. This code shall also regulate those mechanical systems, system components, *equipment* and *appliances* specifically addressed herein. The installation of fuel gas distribution piping and *equipment*, fuel gas-fired *appliances* and fuel gas-fired *appliance* venting systems shall be regulated by the *International Fuel Gas Code*.

Exception: Detached one-, ~~and~~ two-, three-, and four-family *dwellings* and townhouses not more than three stories above grade plane in height with a separate means of egress and their accessory structures not more than three stories above grade plane in height shall comply with this code or the *International Residential Code*.

2024 International Plumbing Code

Revise as follows:

[A] 101.2 Scope. The provisions of this code shall apply to the erection, installation, alteration, repairs, relocation, replacement, addition to, use or maintenance of plumbing systems within this jurisdiction. This code shall regulate nonflammable medical gas, inhalation anesthetic, vacuum piping, nonmedical oxygen systems and sanitary and condensate vacuum collection systems. The installation of fuel gas distribution piping and equipment, fuel-gas-fired water heaters and water heater venting systems shall be regulated by the *International Fuel Gas Code* .

Exception: Detached one-, ~~and~~ two-, three-, and four-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height, shall comply with this code or the International Residential Code.

2024 International Swimming Pool and Spa Code

Revise as follows:

[A] 102.7.1 Application of the International Codes. Where the *International Residential Code* is referenced in this code, the provisions of the *International Residential Code* shall apply to related systems in detached one-, ~~and~~ two-, three-, and four-family dwellings and townhouses not more than three stories in height. Other related systems shall comply with the applicable International Code or referenced standard.

Reason: Housing is at a crisis point in the United States. Demand is outpacing supply in a critical way. Skilled construction workers are also at a crisis point. In an attempt to entice developers, builders and local governmental authorities to assist in providing more options for first time buyers or those who are wishing to down-size, the scope change will enable a more robust opportunity for choice, The addition of three-family and four-family dwelling units to the IRC will enable the availability of choice for buyers or renters of these building types. Moving these two dwelling types into the IRC allows for them to be constructed in a similar manner as single-, two-family, and townhouses buildings. In order to make these two types of housing more affordable, the scope change will reduce sprinkler requirments of the NFPA13 or NFPA13R system to NFPA 13D, encoraging the use of a sprinkler system in residential buildings where required by local codes.

More savings to the cost of the buildings can come in the form of reduced egress requirements. A single exit could be required that would have stairs meet the riser/tread dimensions reduced from the commercial maximum requirement of 7 inches/11 inches to the residential requirements of a maximum 7.75/inches/10 inches. In Occupancy Group R2, under the IRC the live load will be reduced to 40 psf from the commercial requirement of 100 psf. Other sections of the code can be impacted such as IBC Chapter 17 for special inspections not being required in the IRC and the potential for smaller HVAC units. All of these considerations would help provide more opportunities for attainable housing when applied to a triplex or fourplex.

The end goal is to provide more available choices for attainable housing for workforces in many communities where an average sized home price has been greatly increased in the past four years due to inflation and supply and demand. Permitting three-family and four-family dwellings to be constructed with the same standards as those permitted in the IRC will help increase the supply of housing types.

Additionally, it should be noted that financial institutions and lenders finance these two types of dwelling units in the same manner as single-family homes. It is not until a building has five or more residential units that the financing is a commercial loan. For this reason alone, three-family and four-family dwelling units should be included in the IRC., It is possible to purchase these dwellings with a FHA Loan. A Table in "Attached Fles" shows the investment potential. Realtors in many states are also permitted to sell up to four units on a residential license.

With proper zoning in place, three-family and four-family dwelling units can be designed and constructed to be compatible in single-family neighborhoods. Most can be constructed within a 35-foot height limit, which is common in many parts of the country. Normally, three-family and four-family dwellings are two, two and one-half or three stories above the grade plane making them compatible to a single-family or two-family home. The footprint of either a three- or a four-family building could be designed and constructed in dimensions of 40 feet by 60 feet.

FHA Duplex, Triplex & Fourplex Guidelines

Here are the criteria you'll need to meet to qualify for any FHA loan including for a multifamily property.

Credit Score	580+
Down payment	3.5%
Loan-to-value (LTV)	96.5%
Mortgage insurance	1.75% upfront, 0.55% per year
Occupancy	Live in one unit
First-time buyer	Not required
Debt-to-income ratio	Below 56.9%
Property type	1-4 legal units
Max loan limits	$637k-$2.2M+ based on # of units and location
Income limit	None
Property condition	Must meet HUD quality guidelines

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Gause, Jo Allen, editor, *Great Planned Communities.* 2002, Washington, D.C., The Urban Land Institute

O'Looney, Brian, *Increments of Neighborhood, a Compendium of Built Types for Walkable and Vibrant Communities.* 2020, Novato, CA., Oro Editions

Lucas, Tim, *"How to Buy a Duplex, Triplex, ot Fourplex With a FHA Loan."* 2024, Columbia, Mo., The Mortgage Research Center

Bigger Pockets Forum*, "Duplexes, Triplexes and Quads are NOT Multifamily!!",* 2018, www.biggerpockets.com/forum.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Construction and the financing possibilities will be decreased due to the economy of scale of the triplex and fourplex dwellings. Since these building types will be included in the IRC, requirements in many jurisdictions will eliminate the need for fire lines and sprinkler systems to be installed. If sprinklers are still required a NFPA 13R system could be used, running off of domestic water supplies, a reduction in cost from the requirments for sprinklers is in accordance with IBC Chapter 9.

Estimated Immediate Cost Impact Justification (methodology and variables):

Reduction in sprinkler system requirements, if any. A NFPA 13R system averages $2.00 per square foot in most of the US. NFPA 13 systems average $3.50 per square foot.

Staff Analysis: The title and scope of a document is subject to review an approval by the ICC Board of Directors. The discussions and decisions of the Code Development Committee and membership will be taken into consideration with this review.

RB2-25

IRC: R101.2, R102.6, R102.6.1, R105.1, SECTION 202, SECTION 202 (New), R301.1.3

Proponents: Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com); Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com)

2024 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, relocation, enlargement, addition to, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of detached one- and two-family *dwellings* and *townhouses* not more than three *stories above grade plane* in height with a separate means of egress and their *accessory structures* not more than three *stories above grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904, and shall be permitted for the repair, alteration, changes of occupancy, addition to and relocation of the following:

1. Live/work units located in *townhouses* and complying with the requirements of Section 508.5 of the *International Building Code*.
2. *Owner*-occupied *lodging houses* with five or fewer *guestrooms*.
3. A care facility with five or fewer *persons* receiving custodial care within a *dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
5. A day care facility for five or fewer *persons* of any age receiving care within a *dwelling unit* .

R102.6 Existing structures. The legal occupancy or use of any *structure* existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically covered in this code, the *International Existing Building Code*, the *International Property Maintenance Code* or the *International Fire Code*, or as is deemed necessary by the *building official* for the general safety and welfare of the occupants and the public.

R102.6.1 Additions, alterations, change of use or repairs. *Additions*, *alterations*, relocations, or *repairs* to any *structure* shall conform to the requirements for a new structure without requiring the existing *structure* to comply with the requirements of this code, unless otherwise stated. ~~*Additions*, *alterations*, *repairs* and relocations~~ Work performed on existing structures shall not cause an existing building or structure to become less compliant with the provisions of this code for new construction than the *existing building* or structure was prior to the work. ~~*addition*, *alteration* or *repair*. Where additions, *alterations* or changes of use to an existing structure result in a use, occupancy, height or means of egress~~ Where the existing building or structure with the work completed are outside the scope of this code, the building or structure shall comply with the *International Existing Building Code*.

R105.1 Required. Any *owner* or *owner*'s authorized agent who intends to construct, enlarge, add to, alter, *repair*, move, demolish or change the occupancy of a building or structure, or to erect, install, enlarge, alter, *repair*, remove, relocate, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be performed, shall first make application to the *building official* and obtain the required *permit*.

[RB] ALTERATION. Any construction~~, retrofit or renovation~~ to an *existing* building ~~structure~~ other than *repair* or *addition* that requires a *permit*. Also, a change in a *building*, electrical, gas, mechanical or plumbing system that involves an extension, *addition* or change to the arrangement, type or purpose of the original installation that requires a *permit*. For the definition applicable in Chapter 11, see Section N1101.6. For the definition applicable in Chapter 24, see Section G2403.

[RB] BUILDING. Any one- or two-family *dwelling* or *townhouse* , or structure within the scope of this code, or portion thereof, used or intended to be used for human habitation, for living, sleeping, cooking or eating purposes, or any combination thereof, or for any use within the scope of this code, or any *accessory structure*. For the definition applicable in Chapter 11, see Section N1101.6.

Add new definition as follows:

DANGEROUS. Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous:

1. The building or structure has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.
2. There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance or ornamentation of the building or structure under permanent, routine or frequent loads; under actual loads already in effect; or under snow, wind, rain, flood, earthquake or other environmental loads when such loads are imminent.

UNSAFE. Buildings, structures or equipment that are unsanitary, or that are deficient due to inadequate means of egress *facilities*, inadequate light and ventilation, or that constitute a fire hazard, or in which the structure or individual structural members meet the definition of *"Dangerous,"* or that are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance shall be deemed *unsafe.* A vacant structure that is not secured against entry shall be deemed *unsafe.*

SECTION R301
DESIGN CRITERIA

Revise as follows:

R301.1.3 Engineered design. Where a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the *International Building Code* or, for existing buildings, the *International Existing Building Code* is permitted for *buildings* and structures, and parts thereof, included in the scope of this code.

Reason: This proposal cleans up and clarifies the administrative scope of the IRC with regards to existing residential buildings. Prior revisions for existing buildings were not consistently carried through IRC language, leaving varying phrases that intend to cover the same scope, but contain discrepancies between them.

This will allow building officials and users to more easily identify which existing residential conditions fall within the IRC and which residential conditions should be pushed to the IEBC.

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

Justification for no cost impact:

This proposal codifies common practice and use of the IRC, by explicitly identifying the IRC can be used for existing residential structures.

RB2-25

RB3-25

IRC: R101.2, R102.6, R102.6.1, R105.1, SECTION 202, SECTION 202 (New), R301.1.3, CHAPTER 44 (New), SECTION R4401 (New), R4401.1 (New), BO101.1, BO102.1, BO102.2, SECTION R4402 (New), R4402.1 (New), R4402.2 (New), BO102.9, BO102.8, R4402.5 (New), BO102.6, BO102.6.1, BO102.6.2, BO102.6.3, BO102.4, BO102.5, BO102.7, SECTION R4403 (New), BO104.2.2, BO104.2.1, BO104.2.3, SECTION R4404 (New), BO102.3, BO102.3.1, R4404.2 (New), SECTION R4405 (New), BO104.1, BO104.3, BO104.4, SECTION R4406 (New), BO105.1, BO105.2, BO105.4.3, BO105.4, BO105.4.1, BO105.4.2, BO105.4.2.1, BO105.4.2.2, BO105.4.2.3, BO105.4.2.4, BO105.4.2.5, BO105.5, BO105.5.1, BO105.5.2, BO105.5.3, BO105.5.3.1, BO105.5.3.2, BO105.5.3.3, BO105.5.3.4, BO105.5.3.5, BO105.6, BO105.7, BO105.8, BO105.8.1, BO105.8.2, BO105.8.3, BO105.8.4, BO105.8.5, BO105.8.6, SECTION R4407 (New), BO106.1, BO106.2, BO106.3, R4408 (New), R4408.1 (New), R4408.2 (New), R4408.3 (New), R4409 (New), R4409.1 (New), R4410 (New), BO107.1, R4410.1.1 (New), R4410.2 (New), R4410.2.1 (New), R4410.3 (New), R4410.4 (New), APPENDIX BO

Proponents: Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com); Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com)

2024 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, relocation, enlargement, addition to, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of detached one- and two-family *dwellings* and *townhouses* not more than three *stories above grade plane* in height with a separate means of egress and their *accessory structures* not more than three *stories above grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904, and shall be permitted for repair, alteration, changes of occupancy, addition to and relocation of the following:

1. Live/work units located in *townhouses* and complying with the requirements of Section 508.5 of the *International Building Code*.
2. *Owner*-occupied *lodging houses* with five or fewer *guestrooms*.
3. A care facility with five or fewer *persons* receiving custodial care within a *dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
5. A day care facility for five or fewer *persons* of any age receiving care within a *dwelling unit* .

R102.6 Existing structures. The legal occupancy of any *structure* existing on the date of adoption of this code shall be permitted to continue without change, except as is specifically covered in this code, the *International Existing Building Code*, the *International Property Maintenance Code* or the *International Fire Code*, or as is deemed necessary by the *building official* for the general safety and welfare of the occupants and the public.

Delete without substitution:

~~**R102.6.1 Additions, alterations, change of use or repairs.** *Additions*, *alterations* or *repairs* to any *structure* shall conform to the requirements for a new structure without requiring the existing *structure* to comply with the requirements of this code, unless otherwise stated. *Additions*, *alterations*, *repairs* and relocations shall not cause an existing structure to become less compliant with the provisions of this code than the *existing building* or structure was prior to the *addition*, *alteration* or *repair*. Where additions, *alterations* or changes of use to an existing structure result in a use, occupancy, height or means of egress outside the scope of this code, the building shall comply with the *International Existing Building Code* .~~

Revise as follows:

R105.1 Required. Any *owner* or *owner*'s authorized agent who intends to construct, enlarge, alter, *repair*, remove, relocate, demolish or change the occupancy of a building or structure, or to erect, install, enlarge, alter, *repair*, remove, convert or replace any electrical, gas, mechanical or plumbing system, the installation of which is regulated by this code, or to cause any such work to be performed, shall first make application to the *building official* and obtain the required *permit*.

[RB] ALTERATION. Any construction, ~~retrofit or renovation~~ to an *existing* building ~~structure~~ other than *repair* or *addition* that requires a *permit*. Also, a change in a *building*, electrical, gas, mechanical or plumbing system that involves an extension, *addition* or change to the arrangement, type or purpose of the original installation that requires a *permit*. For the definition applicable in Chapter 11, see Section N1101.6. For the definition applicable in Chapter 24, see Section G2403.
[RB] BUILDING. Any one- or two-family *dwelling* or *townhouse* , or structure within the scope of this code, or portion thereof, used or intended to be used for human habitation, for living, sleeping, cooking or eating purposes, or any combination thereof, or for any use within the scope of this or any *accessory structure* . For the definition applicable in Chapter 11, see Section N1101.6.

Add new definition as follows:

DANGEROUS. Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous:

1. The building or structure has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.
2. There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance or ornamentation of the building or structure under permanent, routine or frequent loads; under actual loads already in effect; or under snow, wind, rain, flood, earthquake or other environmental loads when such loads are imminent.

UNSAFE. Buildings, structures or equipment that are unsanitary, or that are deficient due to inadequate means of egress *facilities*, inadequate light and ventilation, or that constitute a fire hazard, or in which the structure or individual structural members meet the definition of "*Dangerous*," or that are otherwise dangerous to human life or the public welfare, or that involve illegal or improper occupancy or inadequate maintenance shall be deemed *unsafe*. A vacant structure that is not secured against entry shall be deemed *unsafe*.

Revise as follows:

R301.1.3 Engineered design. Where a building of otherwise conventional construction contains structural elements exceeding the limits of Section R301 or otherwise not conforming to this code, these elements shall be designed in accordance with accepted engineering practice. The extent of such design need only demonstrate compliance of nonconventional elements with other applicable provisions and shall be compatible with the performance of the conventional framed system. Engineered design in accordance with the *International Building Code*, or for existing buildings, the *International Existing Building Code* is permitted for *buildings* and structures, and parts thereof, included in the scope of this code.

Add new text as follows:

CHAPTER 44
EXISTING BUILDINGS AND STRUCTURES

SECTION R4401
GENERAL

R4401.1 Scope. Repairs, alterations, changes of occupancy, additions and relocation of existing buildings shall comply with this chapter.

Revise as follows:

R4401.2 ~~BO101.1~~ Application ~~General.~~ The purpose of these provisions is to encourage the continued use or reuse of legally existing buildings and structures. Work to existing buildings shall comply with the *International Residential Code*, except as modified by this chapter. ~~Structural elements and systems shall comply with Section R102.6.1 and the provisions of this appendix.~~ ~~*Repairs*, *alterations*,~~

~~*additions* and relocation of existing buildings and structures shall comply with the provisions of this code for new construction, except as modified by this appendix.~~

R4401.3 ~~**BO102.1**~~ **Requirements ~~General~~.** The work shall not cause the *building* or structure to become *unsafe* or adversely affect the performance of the *building*; shall not cause an existing mechanical or plumbing system to become *unsafe*, hazardous, insanitary or overloaded; and unless expressly permitted by these provisions, shall not make the *building* ~~any~~ less compliant with this code or with ~~to any~~ previously *approved* alternative arrangements than it was before the work was undertaken.

R4401.4 ~~**BO102.2**~~ **Identification of work.** The work shall be clearly identified on the *permits* issued under these provisions.

Add new text as follows:

SECTION R4402
COMPLIANCE

Revise as follows:

R4402.1 ~~**R102.6.1**~~ **Additions, alterations, change of occupancy or repairs.** *Additions*, *alterations,* relocations, or *repairs* to any *structure* shall conform to the requirements for a new structure without requiring the existing *structure* to comply with the requirements of this code, unless otherwise stated. ~~*Additions*, *alterations*, *repairs* and relocations~~ Work performed on existing structures shall not cause an existing building or structure to become less compliant with the provisions of this code than the *existing building* or structure was prior to the work ~~*addition*, *alteration* or *repair*. Where additions, *alterations* or changes of use to an existing structure result in a use, occupancy, height or means of egress outside the scope of this code,~~ Where the existing building or structure with the work completed is outside the scope of this code, the building or structure shall comply with the *International Existing Building Code*.

Add new text as follows:

R4402.2 Nonconformities. The work performed shall not create or extend any nonconformity in the existing building to which the work is being done. This section shall apply to structural capacity, non-structural component supports and attachments, accessibility, fire safety, means of egress, or the capacity of mechanical, plumbing or electrical systems.

> **Exception:** Noncomforming non-structural component supports and attachments that serve an addition from within the existing building need not be altered to comply with the *International Residential Code* requirements for new construction, unless the components are part of the addition's life-safety system.

Revise as follows:

R4402.3 ~~**BO102.9**~~ **More restrictive requirements.** *Buildings* or systems in compliance with the requirements of this code for new construction shall not be required to comply with any more restrictive requirement of these provisions.

R4402.4 ~~**BO102.8**~~ **Equivalent alternatives.** Work performed in accordance with the *International Existing Building Code* shall be deemed to comply with the provisions of this code. ~~appendix~~. These provisions are not intended to prevent the use of any alternative material, alternative design or alternative method of construction not specifically prescribed herein, provided that any alternative has been deemed to be equivalent to this code and its use authorized by the *building official*.

Add new text as follows:

R4402.5 Compliance. In addition to the provisions of this chapter, work on existing buildings shall also comply with applicable provisions in other chapters of this code that reference addition, alteration, repair, change of occupancy, or relocation of an existing building, including alteration or repair of specific systems or components. Provisions in other chapters include, but are not limited to, the following:

1. Emergency escape and rescue openings: Sections R319.5, R319.6, and R319.7.
2. Automatic fire sprinkler systems: Sections R309.1 and R309.2
3. Smoke alarms: Section R310.2.2.
4. Carbon monoxide alarms: Sections R311.2.2 and R311.5.
5. Cutting, drilling and notching: Sections R502.8. and R802.7.2
6. Trusses: Sections R505.1.3, R502.12.3, R802.10.4, and G2405.2.
7. Location and site preparation: Section R306.3.1
8. Alterations or repairs of existing basements: Section R319.7
9. Stairways in existing buildings: R318.7.9
10. Energy efficiency: Section N1101.13, and Sections N1109 through N1113.
11. Mechanical: Sections M1202.1, M1202.2, M1308.1, M1411.8, M1601.5, M1801.3, M2101.6, and M2301.1.
12. Fuel gas: Sections G2405.2, G2405.3, G2412, G2417, G2425, G2427, and G2431.1
13. Plumbing: Sections P2502.2, P2503.1, P2603.1, P2603.2, P2906.1.2, P2910.4, P2910.12, P2911.1, P2912.1, P2913.1, P3008.2, P3010, and P3011.
14. Electrical: Sections E3401.2, E3401.4, E3402.1, and E3403.2
15. Flood: Sections R104.3.1, R306

Revise as follows:

R4402.6 **~~BO102.6~~ Replacement windows.** Where an existing window, including the sash and glazed portion, or safety glazing is replaced, the replacement window or safety glazing shall comply with the requirements of Sections ~~BO102.6.1~~ R4402.6.1 through ~~BO102.6.3~~ R4402.6.3, as applicable.

R4402.6.1 **~~BO102.6.1~~ Energy efficiency.** Replacement windows shall comply with the requirements of Chapter 11.

R4402.6.2 **~~BO102.6.2~~ Safety glazing.** Replacement glazing in *hazardous locations* shall comply with the safety glazing requirements of Section R324.

R4402.6.3 **~~BO102.6.3~~ Window fall protection.** Window fall protection shall be installed in accordance with Section R321.2.

R4402.7 **~~BO102.4~~ Smoke alarms.** Smoke alarms shall be provided where required by Section R310.2.2.

R4402.8 **~~BO102.5~~ Carbon monoxide alarms.** Carbon monoxide alarms shall be provided where required by Section R311.2.2.

R4402.9 **~~BO102.7~~ Flood hazard areas.** Work performed in existing buildings located in a flood hazard area as established by Table R301.2 shall be subject to the provisions of Section R104.3.1.

Add new text as follows:

SECTION R4403
MATERIALS

Revise as follows:

R4403.1 ~~**BO104.2.2**~~ **Existing materials.** Materials already in use in a *building* in compliance with requirements or approvals in effect at the time of their erection or installation shall be permitted to remain in use unless determined by the *building official* to be unsafe.

R4403.2 ~~**BO104.2.1**~~ **New and replacement materials.** Except as otherwise required or permitted by this code and in accordance with Section R104.9.1, materials permitted by this code for new construction shall be used. Like materials shall be permitted for *repairs* and *alterations*, provided that unsafe conditions are not created. Hazardous materials shall not be used where this code would not permit their use in *buildings* of similar occupancy, purpose and location.

R4403.3 ~~**BO104.2.3**~~ **Plumbing materials and supplies.** The following plumbing materials and supplies shall not be used:

1. All-purpose solvent cement, unless *listed* for the specific application.
2. Flexible traps and tailpieces, unless *listed* for the specific application.
3. Solder having more than 0.2-percent lead in the repair of potable water systems.

Add new text as follows:

SECTION R4404
STRUCTURAL

Revise as follows:

R4404.1 ~~**BO102.3**~~ **Structural.** Structural elements and systems that are altered, repaired or replaced shall comply with the structural provisions of this code as modified by this chapter. ~~R102.6.1 and the structural provisions of this appendix.~~ Where new structural elements rely on existing structural elements for resistance to gravity or environmental loads, the supporting existing structural elements down to the foundation shall comply with or be altered to comply with this code as modified by this chapter. All other existing structural elements outside of the work performed shall not become less compliant with this code than before the work was undertaken. ~~The work performed shall not cause the structure to become less compliant with this code than it was before the work was undertaken.~~

R4404.1.1 ~~**BO102.3.1**~~ **Design loads.** The minimum design loads for the existing structure shall be the loads applicable at the time the *building* was constructed. The minimum design loads for new structural components shall comply with this code. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsafe shall be repaired in accordance with Section R102.6.1.

Add new text as follows:

R4404.2 New structural members and connections. New structural members and connections shall comply with the detailing provisions of this code for new construction, except as modified by this chapter.

SECTION R4405
REPAIRS

Revise as follows:

R4405.1 ~~**BO104.1**~~ **General.** *Repairs* shall comply with the applicable provisions of this code for new construction as modified by this chapter. ~~or as permitted by this appendix.~~

R4405.2 ~~**BO104.3**~~ **Water closets.** Where any water closet is replaced with a newly manufactured water closet, the replacement water closet shall comply with the requirements of Section P2903.2.

R4405.3 ~~**BO104.4**~~ **Electrical.** Repair or replacement of existing electrical wiring and equipment shall comply with Chapters 34 through 43 .

Add new text as follows:

SECTION R4406 ALTERATIONS

Revise as follows:

R4406.1 ~~**BO105.1**~~ **General.** *Alterations* to existing buildings shall comply with the provisions of this code for new construction as modified by this chapter.~~, except as permitted by Sections BO105.2 through BO105.8.~~ Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section. *Alterations* shall not cause the existing building to become less compliant with the provisions of this code for new construction than the existing building was prior to the work.

R4406.2 ~~**BO105.2**~~ **Newly constructed elements.** Newly constructed elements, components and systems shall comply with the requirements of this code.

Exceptions:

1. Added openable windows are not required to comply with the light and *ventilation* requirements of Section R325.
2. Newly installed electrical equipment shall comply with the requirements of Section R4406.5 ~~BO105.5~~.

R4406.3 ~~**BO105.4.3**~~ **Unreinforced masonry parapets.** Unreinforced masonry parapets located in *Seismic Design Category* D2 shall have wall anchors installed at the roofline and additional bracing installed above the roofline whenever a *reroofing permit* is issued and work involves removal of roofing materials from more than 25 percent of the roof area. Such masonry bracing and wall anchors shall be of an *approved* design, unless an evaluation demonstrates compliance of the existing bracing and anchorage.

Exception: Bracing above the roofline shall not be required where the maximum height of unbraced unreinforced masonry does not exceed a height-to-width ratio of 2.5. Height shall be measured from the top of the parapet down to the highest existing brace or anchor point attached to the structure.

R4406.4 ~~**BO105.4**~~ **Structural.** Altered structural elements and systems shall comply with Section ~~R102.6.1~~R4402.1 and the structural provisions of this chapter~~appendix~~.

R4406.4.1 ~~**BO105.4.1**~~ **Decreased structural capacity.** Where an *alteration* causes a decrease in capacity in any structural element ~~component~~, that structural element ~~component~~ shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6 and 8.

R4406.4.2 ~~**BO105.4.2**~~ **Increased design loads.** Where an *alteration* causes an increase in loads as described in this section, the existing structural components that support the increased load, including the foundation, shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6 and 8. Existing structural components that do not provide support for the increased loads shall not be required to comply with this section.

R4406.4.2.1 ~~**BO105.4.2.1**~~ **Dead load increase.** *Dead load* shall be considered to be increased for purposes of this section when the weight of materials used for the *alteration* exceeds the weight of the materials replaced, or when new materials or elements are added over existing materials or elements.

Exceptions:

1. *Buildings* in which the increase in *dead load* is due entirely to the *addition* of a second layer of *roof covering* weighing 3 pounds per square foot (psf) (0.1437 kN/m^2) or less over an existing single layer of *roof covering*.
2. Installation of rooftop-mounted photovoltaic (*PV*) panel systems weighing 4 psf (0.1915 kN/m^2) or less over an existing single layer of *roof covering*.

These exceptions shall not be applied simultaneously.

<u>R4406.4.2.2</u> ~~BO105.4.2.2~~ Live load increase. An increase in *live load* shall be determined based on Table R301.5.

<u>R4406.4.2.3</u> ~~BO105.4.2.3~~ Snow load increase. Snow load shall be considered to be increased for purposes of this section when *alteration* of the roof configuration creates new areas that accumulate drifted snow.

<u>R4406.4.2.4</u> ~~BO105.4.2.4~~ Wind load increase. Wind load shall be considered to be increased for purposes of this section when the exposed surface area of any exterior elevation subject to wind pressure is increased by more than 5 percent.

<u>R4406.4.2.5</u> ~~BO105.4.2.5~~ Seismic load increase. Seismic load shall be considered to be increased for purposes of this section in existing buildings assigned to *Seismic Design Category* C, D_0, D_1 or D_2 where new materials replace lighter-weight materials in one of the following conditions:

1. Concrete tile or tile *roof covering* of similar weight is installed on more than 50 percent of the total roof area.
2. Brick veneer or *cladding* of similar weight is installed on walls above the second *story*.

<u>R4406.5</u> ~~BO105.5~~ Electrical equipment and wiring. Electrical equipment and wiring shall comply with this section.

<u>R4406.5.1</u> ~~BO105.5.1~~ Materials and methods. Newly installed electrical equipment and wiring relating to work done in any work area, including in newly installed partitions and ceilings, shall comply with the materials and methods requirements of Chapters 34 through 43.

<u>R4406.5.2</u> ~~BO105.5.2~~ Electrical service. Service to the *dwelling unit* shall be not less than 100 ampere, three-wire capacity, and service *equipment* shall be dead front having no live parts exposed that could allow accidental contact. Type “S” fuses shall be installed where fused equipment is used.

Exception: Existing service of 60 ampere, three-wire capacity, and feeders of 30 ampere or larger two- or three-wire capacity shall be accepted if adequate for the electrical load being served.

<u>R4406.5.3</u> ~~BO105.5.3~~ Additional electrical requirements. Where the work area includes any of the following areas within a *dwelling unit*, the requirements of Sections BO105.5.3.1 through BO105.5.3.5 shall apply.

<u>R4406.5.3.1</u> ~~BO105.5.3.1~~ Enclosed areas. Enclosed areas other than closets, *kitchens*, *basements*, garages, hallways, laundry areas and bathrooms shall have not fewer than two duplex receptacle outlets, or one duplex receptacle outlet and one ceiling- or wall-type lighting outlet.

<u>R4406.5.3.2</u> ~~BO105.5.3.2~~ Kitchen and laundry areas. *Kitchen* areas shall have not fewer than two duplex receptacle outlets. Laundry areas shall have not fewer than one duplex receptacle outlet located near the laundry equipment and installed on an independent branch circuit.

<u>R4406.5.3.3</u> ~~BO105.5.3.3~~ Ground-fault circuit interruption. Ground-fault circuit interruption shall be provided on newly installed receptacle outlets if required by Chapters 34 through 43.

<u>R4406.5.3.4</u> ~~BO105.5.3.4~~ Lighting outlets. Not less than one lighting outlet controlled by a *listed* wall-mounted device shall be provided in every bathroom, hallway, *stairway*, attached garage and detached garage with electric power to illuminate outdoor entrances and exits, and in utility rooms and *basements* where these spaces are used for storage or contain equipment requiring service. The wall-mounted control device shall be located near an entrance to the room.

<u>R4406.5.3.5</u> ~~BO105.5.3.5~~ Clearance. Clearance for electrical service equipment shall be provided in accordance with Chapters 34 through 43.

<u>R4406.6</u> ~~BO105.6~~ Ventilation. Reconfigured spaces intended for occupancy and spaces converted to habitable or occupiable space in any work area shall be provided with *ventilation* in accordance with Section R325.

<u>R4406.7</u> ~~BO105.7~~ Ceiling height. Where a *habitable attic* or *habitable space* is created in an existing building, ceiling heights shall be not less than 6 feet 8 inches (2032 mm). Bathrooms, toilet rooms and laundry rooms shall have a *ceiling height* of not less than 6 feet 4 inches (1930 mm).

Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a *ceiling height* of not less than 5 feet (1524 mm), and not less than 50 percent of the required floor area shall have a *ceiling height* of not less than 6 feet 8 inches (2134 mm).
2. At beams, girders, ducts or other obstructions, the ceiling height shall be not less than 6 feet 4 inches (1930 mm) from the finished floor.

R4406.8 **~~BO105.8~~** **Stairs, handrails and guards.** *Stairs , handrails* and guards shall comply with this section.

R4406.8.1 **~~BO105.8.1~~** **Stair width.** Existing *basement stairs* and *handrails* not otherwise being altered or modified shall be permitted to maintain their current clear width at, above and below existing *handrails*.

R4406.8.2 **~~BO105.8.2~~** **Stair headroom.** Headroom height on existing *basement stairs* being altered or modified shall not be reduced below the existing *stairway* finished headroom. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current finished headroom.

R4406.8.3 **~~BO105.8.3~~** **Stair landing.** Landings serving existing *basement stairs* being altered or modified shall not be reduced below the existing *stairway* landing depth and width. Existing *basement* stairs not otherwise being altered shall be permitted to maintain the current landing depth and width.

R4406.8.4 **~~BO105.8.4~~** **Stair treads and risers.** An existing *stairway* shall not be required to comply with Section R318.7.5 where the existing space and construction does not allow a reduction in pitch or slope. Where *risers* are added to an existing *stair*, the tread and riser dimension of the added *risers* shall match the existing *stair*.

R4406.8.5 **~~BO105.8.5~~** **Stairway illumination.** *Stairways* within the work area shall be provided with illumination in accordance with Section R325.7.

R4406.8.6 **~~BO105.8.6~~** **Handrails and guards.** If a stair or any portion of a *stair* is altered, a *handrail* and guard, where required, shall be provided in accordance with Sections R318 and R320.

Add new text as follows:

SECTION R4407
ADDITIONS

Revise as follows:

R4407.1 **~~BO106.1~~** **General.** Where existing buildings with the *addition* are within the scope of this code, *additions* shall comply with this section and other applicable provisions of this code for new construction except as modified by this chapter. ~~or as permitted by this appendix.~~ Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section.

R4407.2 **~~BO106.2~~** **Structure for horizontal additions.** Where an *addition* involves new construction attached to an existing building, the new construction shall meet all of the structural requirements of this code for new construction. *Alterations* to the existing building shall comply with the requirements governing *alterations* within this code. In wood light-frame *additions*, connection of the structural components shall be permitted to be provided using wall top plates and *addition* studs that abut the existing building. Wall top plates shall be lapped and spliced in accordance with Section R602.3.2. Abutting studs shall be fastened in accordance with Table R602.3(1).

Exception: The *addition* structure shall be permitted to be connected to the existing building in accordance with accepted engineering practice.

R4407.3 ~~**BO106.3**~~ **Structure for vertical additions.** Where an *addition* involves new construction that adds a *story* to any part of the existing building or vertically increases the height of any part of the existing building, the new construction and the existing building together shall be shown to comply with, or altered to comply with, all of the structural requirements of this code for new construction.

Exception: Where the new structure and the existing structure together are evaluated in accordance with accepted engineering practice and are shown to be sufficient to support the combined loads from the new structure and existing structure, no structural *alterations* are required.

Add new text as follows:

R4408
CHANGE OF OCCUPANCY

R4408.1 General. Existing residential buildings and structures with a change of occupancy shall comply with this code except as modified by this chapter. Where a change of occupancy with the work performed is not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.

R4408.2 Change of occupancy. Where the live load for the proposed new occupancy is higher than the live load for the current occupancy in accordance with Table R301.5, existing framing and foundations shall be shown to comply or altered to comply with Chapters 4 through 6 of this code.

R4408.3 Live/work units. Portions of a dwelling unit converted to a *live/work* unit shall be shown to comply with or altered to comply with Section R322.2 and Section 508.5 of the *International Building Code*.

R4409
HISTORIC BUILDINGS

R4409.1 General. Work performed on existing *historic buildings* that are within the scope of the *International Residential Code* shall comply with this code except as modified by this chapter. Where a *historic building* with the work performed is not within the scope of this code, the provisions of the *International Existing Building Code* shall apply

R4410
RELOCATED BUILDINGS

Revise as follows:

R4410.1 ~~**BO107.1**~~ **General.** These provisions apply to residential buildings or structures within the scope of the *International Residential Code* that meet all the following conditions:

1. The building is relocated from the original property to a new property or to a new location on the same property.
2. The relocated building was originally designed and constructed to remain on the original site of construction.
3. The relocated *building* remains safe for human occupancy as determined by the *International Existing Building Code*, *International Fire Code* and the *International Property Maintenance Code*.

~~Residential buildings or structures moved into or within the *jurisdiction* are not required to comply with the requirements for new construction under this code, provided they comply with all of the following conditions:~~

1. ~~The *building* shall be safe for human occupancy as determined by the International Fire Code and the International Property Maintenance Code.~~

2. ~~Any *repair*, *alteration* or change of use undertaken within the relocated structure shall comply with the requirements of this code applicable to the work being performed.~~
3. ~~Any field fabricated elements shall comply with the applicable requirements of this code.~~

Add new text as follows:

R4410.1.1 Relocatable buildings. Buildings and structures originally designed and constructed to be relocatable to new sites are outside the scope of this section.

R4410.2 Conformance. Any *repair*, *alteration* or *change of occupancy* undertaken within the relocated building shall comply with the applicable provisions of this code for new construction and this chapter. New constructed elements shall comply with the requirements of this code for new construction. Existing elements that are not *repaired*, *replaced*, or *altered* are not required to comply with the requirements of this code for new construction.

R4410.2.1 Unsafe conditions. Elements that are uncovered during the course of the relocation and that are found to be *unsafe* shall be repaired or replaced in accordance with this chapter.

R4410.3 Design criteria. Where climatic and geographic design criteria at the proposed new site of a relocated building is higher than at the original site, the relocated building shall be shown to comply with the structural requirements of this code or shall be altered as needed to comply. Climatic and geographic design criteria for both sites shall be determined in accordance with Section R301.2.

R4410.4 Foundation. The foundation and connection of the relocated building to the foundation shall comply with this code for new construction.

Delete without substitution:

~~APPENDIX BO~~
~~EXISTING BUILDINGS AND STRUCTURES~~

Reason: This proposal creates a chapter dedicated to existing residential buildings and structures. Current existing residential provisions are located throughout the code and within Appendix BO. Having existing residential provisions scattered in multiple locations makes it difficult for users to ensure they have identified and complied with all applicable requirements. This chapter will incorporate the language from Appendix BO and includes pointers to other non-structural IRC sections specifically applicable to existing buildings.

Although the IRC has purported to be a standalone code for both new and existing residential buildings, IRC code provisions have been written for new construction. In many cases, it is difficult if not impossible to apply these provisions to existing buildings. The IRC scope allows use of the IEBC where necessary, but IEBC provisions have been written for commercial construction. By creating a new IRC chapter dedicated to existing residential buildings, provisions that are focused specifically on residential and existing construction can be located in one central location within the IRC.

This will allow users to easily find applicable provisions and facilitate comprehensive reviews and understanding for future IRC code changes.

Cost Impact: Increase

Estimated Immediate Cost Impact:

For jurisdictions not already enforcing Appendix BO: we estimate a lower-bound cost of $2000 and a median cost of $43,000, for the purposes of this proposal. The cost of work can vary widely depending on the scope of work being performed (repair, addition, relocation, etc.) and a meaningful cost is difficult to quantify.

For jurisdictions already enforcing Appendix BO: there will be no change in cost due to this proposal which moves 2024 Appendix BO provisions into the main body of the IRC.

Estimated Immediate Cost Impact Justification (methodology and variables):

The $2,000 lower bound cost is estimated for evaluation of the existing structure to determine if strengthening is needed. The $43,000 median cost assumes that strengthening of structural components such as the wall bracing and load path connections is needed throughout the home. This will often involve opening of wall finish materials to access sheathing and framing. It is an approximate number based on a 2023 NAHB median home cost of $425,000, and an estimated cost of strengthening of approximately 10% of the home cost based on judgment. This cost addresses structural strengthening only, not additional work that might be associated with the work performed.

Non-structural requirements have not been specifically considered in this cost estimate because the current 2024 Appendix BO points back to IRC sections in the main code for items such as smoke alarms and window requirements. As such, in most cases moving the Appendix into the IRC will not result in a cost change for non-structural requirements.

RB3-25

RB4-25

IRC: R101.2

Proponents: Jeffrey Shapiro, P.E., FSFPE, LTFR, representing Lake Travis Fire Rescue (jeff.shapiro@intlcodeconsultants.com)

2024 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of detached one- and two-family *dwellings* and *townhouses* not more than three *stories above grade plane* in height with a separate means of egress and their *accessory structures* not more than three *stories above grade plane* in height.

Exception: Where provided with an automatic sprinkler system complying with Section P2904, detached one- and two-family dwellings and townhouses not more than three *stories above grade plane* in height with a separate means of egress and their *accessory structures* not more than three *stories above grade plane* in height shall be permitted to be constructed or repurposed in accordance with this code to accommodate any of the following additional uses: ~~The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904~~:

1. Live/work units located in *townhouses* and complying with the requirements of Section 508.5 of the *International Building Code*.
2. *Owner*-occupied *lodging houses* with five or fewer *guestrooms*.
3. A care facility with five or fewer *persons* receiving custodial care within a *dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
5. A day care facility for five or fewer *persons* of any age receiving care within a *dwelling unit* .

Reason: There has been an increased level of discussion lately regarding the permissible use of one- and two-family dwellings and townhouses to accommodate purposes where varying levels of care are provided. While the model codes (ICC and NFPA) are 100-percent clear that newly constructed residential occupancies require fire sprinklers, dwellings that are being repurposed fall into a gray area of following the IEBC, with no clear path to the IRC. The IEBC currently provides an exception to the scope in Section 101.2, which states:"Exception: Detached one- and two-family dwellings and townhouses not more than three stories above grade plane in height with a separate means of egress, and their accessory structures not more than three stories above grade plane in height, shall comply with this code or the International Residential Code."

The reference to "one- and two-family dwellings and townhouses" doesn't mention the additional listed uses in the IRC scope exception, and these additional uses are only deferred by the IBC to the IRC for "construction," as stated in the text of the exception, implying new. Nevertheless, repurposing a dwelling for the listed uses, should seemingly be permissible under the IRC if all of the applicable requirements are met. This is not intended to resolve the current issue associated with claims of discrimination against occupants who may not be related and may be receiving care. It simply opens an option for some repurposed buildings to be regulated by the IRC rather than the IEBC or IBC. It also clarifies that you cannot repurpose a building to these uses without providing sprinkler protection, just as the IBC doesn't defer new construction unless sprinklers are provided.

Although I serve as a consultant to the National Fire Sprinkler Association, this proposal has not ben 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 IRC and IBC already require residential uses to be sprinklered. This proposal simply clarifies that "construction" under the current IRC exception could also include repurposing of an existing dwelling to the listed uses.

RB4-25

RB5-25

IRC: R101.2, R301.5.1 (New)

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of detached one- and two-family *dwellings* and *townhouses* not more than three *stories above grade plane* in height with a separate means of egress and their *accessory structures* not more than three *stories above grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904:

1. <u>The nonresidential area of the live</u> ~~Live~~/work units located in *townhouses* and complying with the requirements of Section 508.5 of the *International Building Code*.
2. *Owner*-occupied *lodging houses* with five or fewer *guestrooms*.
3. A care facility with five or fewer *persons* receiving custodial care within a *dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
5. A day care facility for five or fewer *persons* of any age receiving care within a *dwelling unit* .

SECTION R301 DESIGN CRITERIA

R301.5 Live load. The minimum uniformly distributed *live load* shall be as provided in Table R301.5.

Add new text as follows:

<u>**R301.5.1** **Live/work unit live loads.** The live loads for the nonresidential area of the live/work units shall be in accordance with *International Building Code* Section 508.5.8</u>

Reason: This proposal attempts to alleviate confusion regarding the nonresidential portion of the live/work unit and how portions of the IBC apply. Some code officials and architects have differed particularly on how live loads apply to the nonresidential portion under the IBC and the residential live loads in accordance with R301.5.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

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

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

Justification for no cost impact:

This is a clarification of the intent of the refernence back to the IBC for the business portion of the live/work units.

RB5-25

RB6-25

IRC: R101.2, R316.3

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

R101.2 Scope. The provisions of this code shall apply to the construction, *alteration*, movement, enlargement, replacement, *repair*, equipment, use and occupancy, location, removal and demolition of detached one- and two-family *dwellings* and *townhouses* not more than three *stories above grade plane* in height with a separate means of egress and their *accessory structures* not more than three *stories above grade plane* in height.

Exception: The following shall be permitted to be constructed in accordance with this code where provided with an automatic sprinkler system complying with Section P2904:

1. Live/work units located in *townhouses* and complying with the requirements of Section 508.5 of the *International Building Code*.
2. *Owner*-occupied *lodging houses* with five or fewer *guestrooms*.
3. A care facility with five or fewer *persons* receiving custodial care within a *dwelling unit*.
4. A care facility with five or fewer persons receiving medical care within a *dwelling unit*.
5. A day care facility for five or fewer *persons* of any age receiving care within a *dwelling unit* .
6. A *townhouse unit* or *dwelling* with a *habitable attic* shall be permitted four *stories above grade plane* in height where the *habitable attic* complies with all of the following:
   6.1. The aggregate floor area of the *habitable attic* is not greater than one-third the floor area of the *story* below.
   6.2. The occupiable space is enclosed by the *roof assembly* above and to the side, knee walls or gable end walls, if applicable, on the sides, and the floor-ceiling assembly below.
   6.3. The floor of the *habitable attic* does not extend beyond the *exterior walls* of the *story* below.

SECTION R316
HABITABLE ATTICS

R316.3 Story above grade plane. A *habitable attic* shall be considered a *story above grade plane.*

~~**Exceptions:** A *habitable attic* shall not be considered to be a *story above grade plane* provided that the *habitable attic* meets all the following:~~

~~1. The aggregate area of the *habitable attic* is either of the following:~~
   ~~1.1. Not greater than one-third of the floor area of the *story* below.~~
   ~~1.2. Not greater than one-half of the floor area of the *story* below where the *habitable attic* is located within a *dwelling unit* equipped with an automatic sprinkler system in accordance with Section P2904.~~

~~2. The occupiable space is enclosed by the *roof assembly* above, knee walls, if applicable, on the sides and the floor-ceiling assembly below.~~

~~3. The floor of the *habitable attic* does not extend beyond the exterior walls of the story below.~~

4. ~~Where a *habitable attic* is located above a third story, an automatic sprinkler system in accordance with Section P2904 shall be installed in the *habitable attic* and remaining portion of the townhouse unit or dwelling unit or units located beneath the *habitable attic*.~~

Reason: When habitable attics were first introduced in the IRC it was a simple definition for the sake of addressing a special attic space constructed much like an unfinished basement. It recognized the interest of people to construct a bonus space in their attic, within the building thermal envelope. This concept has been lost through cycles of code development. Now that the habitable attic is just another story above grade plane, there is really nothing special about it anymore other than the 30 psf minimum design floor load

This subject now dances around the idea of creating a fourth story above grade plane when installing a sprinkler system and then not calling it a story above grade plane.

Can we stop being silly. A fourth floor habitable attic is literally as far above grade as you could possibly get. Let's start using words a little more sensibly.

For all of time, the scope of IRC buildings and the history of the FHA minimum property standards that preceded it have been based on a limit of three stories above grade plane. In the scope section, there are specific allowances for when a sprinkler is installed. This seems like the most appropriate place to present the allowance of a fourth story above grade habitable attic. The limit of "story above grade plane" only shows up in this scope section, and then is altered by the section on habitable attics. Why put it there? Why not provide all the details for "story above grade plane" in the section discussing it. (NOTE: "story above grade plane" also appears as a limit in the sections for masonry and the appendices for straw clay and hemp lime construction, but those seem like the correct locations for those subjects)

The habitable attic section is strangely written. In the exception allowing a habitable attic to not be a story above grade plane, it requires sprinklers if it is in the fourth story position. In the same exception, it allows 1/2 the area of the floor below instead of 1/3 when a sprinkler is installed. This begs the question: Why would anyone call it NOT a story above grade plane unless it's because you want it to be a fourth story? In that case, you have to be sprinklered, so it's nonsensical to they state "if" it is sprinklered, you can go 1/2 the area

The concept of a habitable attic was always that it be within a conventional attic space. By geometry and history, the 1/3 limitation is appropriate. Especially if the only reason to call it a habitable attic rather than just another story with habitable space is to get it on the fourth story. A habitable attic is now considered a story above grade plane, so there is no need to restrict its area unless it's in the fourth story location. And in that location, and with a reduced floor design live load (30 psf), it is my opinion that it is more appropriate to limit it to 1/3 the area below.

I was working on a much larger proposal for a broad rewrite of all the attic provisions in the IRC, as they have gotten very messy and are located throughout the IRC. Unfortunately, I could not complete it sufficiently in time for the 2027 IRC. There are more than half a dozen different terms used for describing various attics and when you look at all the attic provisions as a whole, it's a mess. It's not conducive to consistent understanding. It's not conducive to learning the IRC. If this proposal were approved, Section 316 for habitable attics would have little use. However, I suggest retaining it was a placeholder for future work in clarifying all the attic provisions with a proposal for the 3030 IRC to provide information for all types of attics and codes for attics.

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

Justification for no cost impact:

This code change proposal does not affect the cost of construction. It does reduce the allowable area of a habitable attic in a fourth story above grade plane location in a dwelling unit with sprinklers. That is not a change in cost, but a change in design freedom. There should be a requirement to state whether a proposal increases or decreases design freedom when submitting a proposal. So I'm providing that.

RB6-25

RB7-25

IRC: R101.3

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

R101.3 Purpose. The purpose of this code is to establish minimum requirements to provide a reasonable level of life safety, health and general welfare through affordability, structural strength, means of egress, stability, sanitation, light and *ventilation*, energy conservation and safety to life and ~~property~~ protection from fire and other hazards and to provide a reasonable level of safety to firefighters and emergency responders during emergency operations.

Reason: The purpose of adding “life” and “protection” to this proposal is to be consistent with other codes. It was decided to delete the “property” and replace with “protection” since the code's purpose is overall protection.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and 2024 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

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

Justification for no cost impact:

The net effect of the code change proposal will not increase or decrease the cost of construction. This is correllation and editorial change with no changes to technical requirements in the IRC.

RB7-25

RB8-25

IRC: R104.3.1

Proponents: Rebecca Quinn, RCQuinn Consulting, representing Association of State Floodplain Managers (rebecca@rcquinnconsulting.com); Chad Berginnis, representing Association of State Floodplain Managers (cberginnis@floods.org)

2024 International Residential Code

Revise as follows:

R104.3.1 Determination of substantially improved or substantially damaged existing buildings and structures in flood hazard areas. For applications for reconstruction, rehabilitation, repair, alteration, *addition*~~, *alteration*, *repair*~~ or other improvement of *existing buildings* or structures located in ~~a~~ flood hazard ~~area~~ areas ~~as established by Table R301.2~~, the *building official* shall determine if the proposed work constitutes *substantial improvement* or repair of *substantial damage*. Where the building official determines that the proposed work constitutes s*ubstantial improvement* or repair of *substantial damage*, and where required by this code, the building shall comply with Section R306.~~examine or cause to be examined the *construction documents* and shall make a determination with regard to the value of the proposed work. For *buildings* that have sustained damage of any origin, the value of the proposed work shall include the cost to *repair* the *building* or structure to its predamaged condition. If the *building official* finds that the value of proposed work equals or exceeds 50 percent of the market value of the building or structure before the damage has occurred or the improvement is started, the proposed work is a *substantial improvement* or *repair* of *substantial damage* and the *building official* shall require existing portions of the entire building or structure to meet the requirements of Section R306.~~

Reason: This proposal is editorial, to make IRC Section R104.3.1 match the same sections that appear in the IBC, IEBC, IMC, IPC, IFGC, ISPSC, and IPSDC. The IRC defines the term “Flood hazard area," which means it is no longer necessary to refer to Table R301.2. In addition, the IRC now defines the terms “substantial damage” and “substantial improvement,” which means the description of those terms is no longer needed in Section R104.3.1.

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

Justification for no cost impact:

This proposal is editorial to make language consistent across similar sections of the IRC and several other codes and remove unnecessary text in light of definitions being added to the IRC. There is no change to the technical content of the provisions. By making similar language more consistent there will be no cost impact when approving this proposal.

RB8-25

RB9-25

IRC: R106.1.3, R602.10

Proponents: Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov); Bryant Arms, representing NYS DOS (bryant.arms@dos.ny.gov); Chad Sievers, NYS, representing NYS Dept of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing NYSDOS (kevin.duerr-clark@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Larissa DeLango, representing NYSDOS (larissa.delango@dos.ny.gov); Stephen Van Hoose, representing NYS DOS (stephen.vanhoose@dos.ny.gov); Bryan Toepfer, representing NY DOS (bryan.toepfer@dos.ny.gov); Daniel Carroll, New York State Department of State, representing Division of Building Standards and Codes (daniel.carroll@dos.ny.gov); Christopher Jensen, representing NYS DOS - Division of Building Standards and Codes (christopher.jensen@dos.ny.gov)

2024 International Residential Code

Revise as follows:

R106.1.3 Information on braced wall design. For *buildings* and structures utilizing braced wall design, and where required by the *building official*, *braced wall lines* shall be identified on the *construction documents.* Pertinent information ~~including, but not limited to, bracing methods, location and length of *braced wall panels* and foundation requirements of *braced wall panels* at top and bottom shall be provided.~~ <u>shall be provided with additional documentation as required by the *building official*. The documentation shall include the following information:</u>

1. <u>Locations of *braced wall lines*.</u>
2. <u>Spacing of *braced wall lines*, including any offset of the *braced wall panel line*.</u>
3. <u>*Braced wall line* end conditions.</u>
4. <u>Locations and lengths of *braced wall panels*.</u>
5. <u>*Braced wall panel* uplift loads.</u>
6. <u>Construction methods for *braced wall panels*, including framing connections at top and bottom to floor, roof, and/or ceiling framing, and foundation requirements.</u>

R602.10 Wall bracing. *Buildings* shall be braced in accordance with this section or, when applicable, Section R602.12. Where a *building*, or portion thereof, does not comply with one or more of the bracing requirements in this section, those portions shall be designed and constructed in accordance with Section R301.1. <u>Information for the bracing shall be provided on the construction documents in accordance with Section R106.1.3.</u>

Reason: This proposal reorganises the required items into list form to allow for easier verification of compliance. This proposal also elaborates on the required documentation to provide clarity as to exactly what is required to be included. A requirement to include uplift load on the construction drawings is also included, similar to existing requirements for inclusion of other loads on the construction drawings (dead, live, environmental, etc). Since this load must be calculated to determine connection requirements for the braced wall panels, this requirement does not add any additional design burden, simply requires the inclusion of this load on the drawings.

To direct the code book user to the construction document requirements in Chapter 1, a reference was added to Section R602.10.

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:

This proposal reorganises the section into a numbered list for clarity. It also adds a requirement to put the uplift load on the construction drawings, but since this load must be calculated to determine connection requirements for the braced wall panels, this requirement does not add any additional design burden, and thus does not have any cost impact.

RB9-25

RB10-25

IRC: SECTION 202, R106.2 (New), R106.1.1, R106.2.2 (New), R106.2.3 (New), R106.2.4 (New), R106.2.5 (New), R106.2, 106.2.6.1 (New)

Proponents: Bryan Toepfer, representing NY DOS (bryan.toepfer@dos.ny.gov); Chad Sievers, NYS, representing NYS Dept of State (chad.sievers@dos.ny.gov); Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Larissa DeLango, representing NYSDOS (larissa.delango@dos.ny.gov); Daniel Carroll, New York State Department of State, representing Division of Building Standards and Codes (daniel.carroll@dos.ny.gov); Bryant Arms, representing NYS DOS (bryant.arms@dos.ny.gov)

2024 International Residential Code

Revise as follows:

[RB] CONSTRUCTION DOCUMENTS. Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a building *permit*. ~~Construction drawings shall be drawn to an appropriate scale.~~ For the definition applicable in Chapter 11, see Section N1101.6.

Add new text as follows:

R106.2 Construction Documents. Construction documents shall be in accordance with Section R106.2.1 though Section R106.2.8.

Revise as follows:

~~**R106.1.1**~~ **R106.2.1 Information on construction documents.** *Construction documents* shall be drawn upon suitable material. Electronic media documents are permitted to be submitted where *approved* by the *building official*. *Construction documents* 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 *building official.*

Add new text as follows:

R106.2.2 Fire protection system shop drawings. Shop drawings for the *fire protection systems* shall be submitted to indicate conformance this code and the *construction documents* and shall be *approved* prior to the start of system installation. Shop drawings shall contain all information as required by the referenced installation standards in Section P2904.

R106.2.3 Means of egress. The *construction documents* shall show in sufficient detail the location, construction, size and character of all portions of the *means of egress* including the path of the exit discharge to the *public way* in compliance with the provisions of this code.

R106.2.4 Exterior wall envelope. *Construction documents* for all *buildings* shall describe the *exterior wall envelope* in sufficient detail to determine compliance with this code. The *construction documents* shall provide details of the *exterior wall envelope* as required, including flashing, intersections with dissimilar materials, corners, end details, control joints, intersections at roof, eaves or parapets, means of drainage, *water-resistive barrier* and details around openings. The *construction documents* shall include manufacturer's installation instructions that provide supporting documentation that the proposed penetration and opening details described in the *construction documents* maintain the weather resistance of the *exterior wall envelope.* The supporting documentation shall fully describe the *exterior wall* system that was tested, where applicable, as well as the test procedure used.

R106.2.5 Exterior balconies and elevated walking surfaces. Where balconies or other elevated walking surfaces have *weather-exposed surfaces*, and the structural framing is protected by an impervious moisture barrier, the *construction documents* shall include details for all elements of the impervious moisture barrier system. The *construction documents* shall include manufacturer's instructions.

Revise as follows:

~~**R106.2**~~ **R106.2.6 Site plan or plot plan.** The *construction documents* submitted with the application for *permit* shall be accompanied by a site plan showing to scale the size and location of new construction and existing structures on the site, ~~and~~ distances from *lot lines*~~.~~, the established street grades and the proposed finished grades and, as applicable, *flood hazard areas*, *floodways*, and *design flood elevations*. The site plan shall be drawn in accordance with an accurate boundary line survey. In the case of demolition, the site plan shall show construction to be demolished and the location and size of *existing structures* and construction that are to remain on the site or plot. The *building official* is authorized to waive or modify the requirement for a site plan where the application for *permit* is for *alteration* or *repair* or where otherwise warranted.

Add new text as follows:

106.2.6.1 Design flood elevations. Where design flood elevations are not specified, they shall be established in accordance with Section R306.1.4.

Reason: Definition of "Construction Documents" do not match in IRC and IBC. Removed language from IRC definition, as it has information that is referenced in other provisions. IRC is missing provisions to state what is to be included on Construction Documents that IBC has, so they have been added to match format and definitions of 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:

There is no cost impact as this proposal only adds language to definitions, as well as matching definitions between code books.

RB10-25

RB11-25

IRC: R107.1, R107.2, R107.3, R107.4

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

SECTION R107
TEMPORARY STRUCTURES AND USES

Revise as follows:

R107.1 General. The *building official* is authorized to issue a *permit* for temporary structures ~~and temporary~~ uses, equipment or systems. Such *permits* shall be limited as to time of service, but shall not be permitted for more than 180 days. The *building official* is authorized to grant extensions for demonstrated cause.

R107.2 Conformance. Temporary structures ~~and~~ uses, equipment or systems shall conform to the ~~structural strength, fire safety, means of egress, light, *ventilation* and sanitary~~ requirements of this code as necessary to ensure the public health, safety and general welfare.

R107.3 Temporary ~~power~~ service utilities. The *building official* is authorized to give permission to temporarily supply service utilities in accordance with Section R111. ~~and use power in part of an electric installation before such installation has been fully completed and the final certificate of completion has been issued. The part covered by the temporary certificate shall comply with the requirements specified for temporary lighting, heat or power in NFPA 70.~~

R107.4 Termination of approval. The *building official* is authorized to terminate such *permit* for a temporary ~~structure~~ structures, uses, equipment or ~~use~~ systems and to order the ~~temporary structure or use~~ same to be discontinued.

Reason: This proposal was approved for IBC, IEBC, IFC, IFGC, IMC, IPC, IPSDC, ISPSC, IWUIC.

The IRC committee objected to the use of the term 'system', however, this is already used in several places in R111 and is commonly understood to be a set of things working together. While brought up by the last committee that "system" is not defined in the International Residential Code (IRC), it should not be for the following reasons:

The word "system" is a common word with a well-understood meaning. It is defined in most dictionaries as a set of things working together as a whole or a complex whole consisting of parts that are interconnected and interdependent.

The IRC does not use the word "system" in a technical sense. It simply uses the word to refer to any group of components that work together to achieve a common goal. For example, the IRC refers to the "plumbing system," the "electrical system," and the "mechanical system", all without definition.

Defining the word "system" in the IRC would not add any clarity to the code, alternatively, defining the word "system" in the IRC could actually lead to confusion.

Generally - The word "use" is moved to the front, and the lists are made the same throughout all the codes.

Temporary power - The allowances for temporary connection under inspection and testing address more than just utilities, so the language in this section should match. The phrase "certificate of completion" is not defined, so "approved" would be a better choice.

The section on Conformance includes a laundry list "structural strength, fire safety, means of egress, accessibility, light, ventilation and sanitary", that is not needed for the section and includes provisions that are not addressed in all of the codes (e.g. IPC does not address structural strength, means of egress, or light).

While brought up by the last committee that "system" is not defined in the International Residential Code (IRC), it should not be for the following reasons:

The word "system" is a common word with a well-understood meaning. It is defined in most dictionaries as a set of things working

together as a whole or a complex whole consisting of parts that are interconnected and interdependent.

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Defining the word "system" in the IRC would not add any clarity to the code, alternatively, defining the word "system" in the IRC could actually lead to confusion.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and 2024 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

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

Justification for no cost impact:

This change is only removing repeating requirements; therefore, this revision is strictly editorial and will not have any changes to the construction requirements.

RB11-25

RB12-25

IRC: SECTION R109, R109.1.4, R109.1.5 (New), R109.1.5, R109.1.5.1, R109.1.6, R109.1.6.1

Proponents: Theresa Weston, The Holt Weston Consultancy, representing Air Barrier Association of America (ABAA) (holtweston88@gmail.com)

2024 International Residential Code

SECTION R109 INSPECTIONS

R109.1.4 Frame and masonry inspection. Inspection of framing and masonry construction shall be made after the roof, masonry, framing, firestopping, draftstopping and bracing are in place and after the plumbing, mechanical and electrical rough inspections are *approved*.

Add new text as follows:

R109.1.5 Water-resistive barrier inspection. An inspection shall be made of the weather-resistant exterior wall envelope as required by Section R703.1 and flashings as required by Section R703.4 to prevent water from entering the weather-resistive barrier. Inspection is required for water-resistive barrier material and installation, prior to application of exterior insulation, roofing materials or exterior wall cladding, veneer or finishes.

Revise as follows:

~~**R109.1.5**~~ **R109.1.6 Other inspections.** In addition to inspections in Sections R109.1.1 through R109.1.4, the *building official* shall have the authority to make or require any other inspections to ascertain compliance with this code and other laws enforced by the *building official*.

~~**R109.1.5.1**~~ **R109.1.6.1 Fire-resistance-rated construction inspection.** Where fire-resistance-rated construction is required between *dwelling units* or due to location on property, the *building official* shall require an inspection of such construction after lathing or *gypsum panel products* are in place, but before any plaster is applied, or before panel joints and fasteners are taped and finished.

~~**R109.1.6**~~ **R109.1.7 Final inspection.** Final inspection shall be made after the permitted work is complete and prior to occupancy.

~~**R109.1.6.1**~~ **R109.1.7.1 Elevation documentation.** If located in a flood hazard area, the documentation of elevations required in Section R306.1.10 shall be submitted to the *building official* prior to the final inspection.

Reason: This proposal requires an inspection of *water-resistive barrier* installation. The proper installation of water-resistive barriers is required for the performance of the water management of the exterior wall assembly. The need for inspection of the *water-resistive barrier* installation is evidenced by a number of jurisdictions that have begun requiring inspections, including Utah, the District of Columbia, and Rockville, MD.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal would not change the cost of materials or the construction process as it does not make new requirements other than the inspection of the installation. There may be a cost increase on the order of $280 to $500 due the inspection itself.

Estimated Immediate Cost Impact Justification (methodology and variables):

Costs for inspection including schedule disruptions are "one-off" costs and cannot be generally assessed. However an internet search found that an inspection would be in the $280 to $500 range.

RB13-25

IRC: 202 (New), R330.1, SECTION R333 (New), R333.1 (New), R333.2 (New), R333.3 (New), UL Chapter 44 (New)

Proponents: Rebekah Hren, representing SELF (rebekah.hren@gmail.com); Lyn Stoler, representing Impulse Labs (lstoler@impulselabs.com); Bert Muthalaly, CEO / Electra Research, representing Electra Research, Inc. (bert@electra.com); Joshua Land, representing Copper (josh@copperhome.com)

2024 International Residential Code

Add new definition as follows:

APPLIANCE, BATTERY-POWERED. An *appliance* incorporating detachable, integral, or separable battery packs for its primary or secondary power source, which is not regulated as an energy storage system (ESS). Examples include battery-powered cooktops, ranges, and refrigerators.

SECTION R330
ENERGY STORAGE SYSTEMS

Revise as follows:

R330.1 General. *Energy storage systems (ESS)* shall comply with the provisions of this section.

Exceptions:

1. *ESS listed* and *labeled* for use in habitable spaces, in accordance with UL 9540 and where installed in accordance with the listing, the manufacturer's instructions and NFPA 70.
2. *ESS* less than 1 kWh (3.6 megajoules).
3. Battery-powered appliances and equipment regulated by Section R333.

Add new text as follows:

SECTION R333
BATTERY-POWERED APPLIANCES AND EQUIPMENT

R333.1 General. Battery-operated appliances and equipment that incorporate a primary or secondary battery power source shall comply with Section R333.2 and R333.3..

R333.2 Equipment Listings. Battery-powered appliances and equipment shall be *listed* and *labeled* in accordance with UL 2595 or the applicable standard for their use.

R333.3 Installation. Battery-powered appliances and equipment shall be installed and operated in accordance with their listing, the manufacturer's instructions, and NFPA 70.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 2595-2015	General Requirements for Battery-Powered Appliances

Attached Files

- **Attach1_IRC Letter of Support battery powered appliances.pdf**
  https://www.cdpaccess.com/proposal/12029/35712/files/download/9390/
- **Attach2_IRC letter of support battery-powered appliances_2025.pdf**
  https://www.cdpaccess.com/proposal/12029/35712/files/download/9338/

Reason: Appliances and equipment with integrated batteries, designed for installation in residential occupancies, are quickly entering the consumer marketplace. These new appliances provide more options for consumers.

These appliances do not meet the definition for an ESS, but they do incorporate batteries to power the appliance. This proposal for a new section is based on the language used in 2024 Group A Agenda item F58-24, Section 322.6.4, for battery-powered equipment and appliances. This proposal includes a new R202 definition, and an exception to R330 (ESS), both of which clarify the distinction between ESS and battery-powered appliances.

This proposed language also correlates with sections of the IRC that require listings for appliances and equipment. For example, Section M1901.2 requires cooking appliances to be listed and labeled, and to comply with UL 858 or UL 1026.There is a trend towards appliances and equipment incorporating batteries to assist with multiple functionalities. For example, for high current-draw appliances like a range, batteries can enable the use of existing 120VAC wiring circuits without expensive re-wiring requirements or electrical panel upgrades, with the battery supplementing grid power supply. Batteries can also provide temporary standby power for refrigerators or freezers during power outages, potentially saving hundreds or thousands of dollars in food waste.

Adding this new section is important because not every device or piece of equipment with a battery is regulated as an ESS based on the scope of the standards that list ESS. This is demonstrated by the F58-24 and F230-24 proposals for the IFC. This proposal helps clarify the safety and installation requirements for battery-powered appliances and equipment.Three examples of manufacturers currently bringing products to market are:

https://www.impulselabs.com/product

https://www.electra.com

https://copperhome.com

New York Power Authority and NYC Housing Authority have selected Copper as the winner of their Induction Stove Challenge. The agencies are planning to award the company a $32 million, seven-year contract to design, prototype, test, and install 10,000 stoves in apartments throughout the city to replace gas appliances without requiring substantial and expensive wiring upgrades.

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

Justification for no cost impact:

This proposal provides more options for construction. It does not increase or decrease the cost of construction.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
UL 2595-2015 General Requirements for Battery-Powered Appliances

RB13-25

RB14-25

IRC: SECTION 202 (New)

Proponents: Stuart Foster, representing self

2024 International Residential Code

Add new definition as follows:

BALANCED DOOR. A door equipped with double-pivoted hardware so designed as to cause a semicounterbalanced swing action when opening.

Reason: This is consistent with the IBC definition for balanced door.

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

Justification for no cost impact:

This is a definition and has not cost impact.

RB14-25

RB15-25

IRC: SECTION 202 (New), R302.2, R302.2.1, R302.2.2, R302.2.3, R302.2.4, R302.2.5, R302.2 (New), R302.2.6, R302.2.2 (New), R302.2.2.1 (New), R302.2.2.1.1 (New), FIGURE R302.2.2.1.1 (New), R302.2.2.1.2 (New), FIGURE R302.2.2.1.2 (New), R302.2.2.1.3 (New), FIGURE R302.2.2.1.3 (New), R302.2.2.2 (New), R302.2.3 (New), R302.2.4 (New), R302.2.4.1 (New), R302.2.4.2 (New), R302.2.4.2.1 (New), R302.2.4.2.2 (New), R302.2.4.3 (New), R302.2.4.3.1 (New), R302.2.4.3.2 (New), R302.2.4.4 (New), R302.2.4.4.1 (New), R302.2.4.4.2 (New), R302.2.4.5 (New), FIGURE R302.2.4.5 (New)

Proponents: Scot Harris, Preston Wood & Associates, LLC. Jack Preston Wood AIBD/NCBDC, representing self (scot@jackprestonwood.com)

2024 International Residential Code

Add new definition as follows:

BIRD BLOCKING. Solid 2x wood blocking fitted between rafter tails where the face of the blocking is in-line to the exterior side of the exterior wall. The blocking shall have a beveled top that matches in angle to the slope of the roof and be tight to the underside of the roof decking. Vent openings are not permitted where required.
COMMON WALL. A load bearing wall assembly that is shared by two dwelling units where the fire-resistive assembly is the entire wall thickness. The common wall can be hollow or solid.
DOUBLE STUD WALL. Two rows of wood or metal studs, each having top and bottom plates where one row is separated from the other with an air space or a non-load bearing fire-resistive assembly or a combination of both.
SEPERATION WALL. A general description that refers to, but not limited to a party wall, double stud wall, common wall, or a shared wall.
SHARED WALL. See common wall.

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Delete without substitution:

~~**R302.2 Townhouses.** Walls separating *townhouse units* shall be constructed in accordance with Section R302.2.1 or R302.2.2 and shall comply with Sections R302.2.3 through R302.2.5.~~

~~**R302.2.1 Double walls.** Each *townhouse unit* shall be separated from other *townhouse units* by two 1-hour fire-resistance-rated wall assemblies tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.~~

~~**R302.2.2 Common walls.** Common walls separating *townhouse units* shall be assigned a fire-resistance rating in accordance with Item 1 or 2 and shall be rated for fire exposure from both sides. Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The common wall shared by two *townhouse units* shall be constructed without openings, plumbing or mechanical equipment, ducts or vents, other than water-filled fire sprinkler piping in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.~~

1. ~~Where an automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.~~
2. ~~Where an automatic sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.~~

~~**Exception:** Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.~~

~~**R302.2.3 Continuity.** The fire-resistance-rated wall or assembly separating *townhouse units* shall be continuous from the foundation to the underside of the roof sheathing, roof deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed *accessory structures*.~~

~~**R302.2.4 Parapets for townhouses.** Parapets constructed in accordance with Section R302.2.5 shall be constructed for *townhouses* as an extension of exterior walls or common walls separating *townhouse units* in accordance with the following:~~

1. ~~Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof decks.~~
2. ~~Where roof decks adjacent to the wall or walls are at different elevations and the higher *roof deck* is not more than 30 inches (762 mm) above the lower *roof deck* , the parapet shall extend not less than 30 inches (762 mm) above the lower roof deck.~~

   ~~**Exception:** A parapet is not required in the preceding two cases where the *roof covering* complies with a minimum Class C rating as tested in accordance with ASTM E108 or UL 790 and the roof deck or sheathing is of *noncombustible materials* or *fire-retardant-treated wood* for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of $^5/_8$ inch (15.9 mm) *Type X gypsum board* is installed directly beneath the roof decking deck or sheathing, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a distance of not less than 4 feet (1219 mm) on each side of the wall or walls and any openings or penetrations in the roof deck are not within 4 feet (1219 mm) of the common walls. *Fire-retardant-treated wood* shall meet the requirements of Sections R302.15 and R803.2.1.2.~~

3. ~~A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher *roof deck* is more than 30 inches (762 mm) above the lower *roof deck* . The common wall construction from the lower *roof deck* to the underside of the higher *roof deck* shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides. Openings shall not be permitted in the wall.~~

~~**R302.2.5 Parapet construction.** Parapets shall have the same fire-resistance rating as that required for the supporting wall or walls. On any side adjacent to a roof surface, the parapet shall have noncombustible faces for the uppermost 18 inches (457 mm), to include counterflashing and coping materials. Where the roof slopes toward a parapet at slopes greater than 2 units vertical in 12 units horizontal (16.7-percent slope), the parapet shall extend to the same height as any portion of the roof within a distance of 3 feet (914 mm), and the height shall be not less than 30 inches (762 mm).~~

Add new text as follows:

R302.2 Townhouses. Townhouse dwelling unit separation walls shall be constructed in accordance with Section R302.2.2 and shall comply with Sections R302.2.3 and R302.2.4.1 through R302.2.4.4. Additional requirements where required shall comply with Section R302.2.4.5.

Revise as follows:

R302.2.1 ~~**R302.2.6**~~ **Structural independence.** Each townhouse dwelling *unit* shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or ~~common~~ separation walls.
2. Structural roof and wall sheathing from each dwelling unit fastened to the ~~common~~ separation wall framing.
3. Nonstructural wall, ~~and~~ *roof* and eave *coverings*.
4. Flashing at termination of *roof covering* over ~~common~~ separation wall.
5. *Townhouse* dwelling *units* separated by a common wall as provided in Section R302.2.2, ~~Item 1 or 2~~.
6. *Townhouse* dwelling *units* protected by an automatic sprinkler system complying with Section P2904 or NFPA 13D.

Add new text as follows:

R302.2.2 Dwelling unit separation walls. All wall assemblies shall be tested in accordance with ASTM E119, UL 263, or Section 703.2.2 of the International Building Code. Exposure shall be from both sides. The required fire-resistive rating shall be determined by Section R302.2.3 or as indicated otherwise.

R302.2.2.1 Double stud walls. Double stud walls shall be designed and constructed to allow collapse of the structure on either side without collapsing the wall under fire conditions. Double stud walls are composed of wood or metal. Each stud wall in the separation wall assembly shall be load bearing only to their respective dwelling unit. Structural members, such as drop beams at outdoor covered spaces, of one dwelling unit shall not be supported by the stud wall of an adjacent dwelling unit. Finger-jointed refurbished wood studs are not permitted in double stud walls.

R302.2.2.1.1 Type 1. Type 1 double stud calls shall comply with the following:

1. The entire double stud wall system is the fire-resistive assembly. See Figure R302.2.2.1.1 for addition information.
2. The stud wall cavities are *shared* by both dwelling units.
3. The top and bottom plates are not shared.
4. Provide an air gap in between the stud wall rows.
5. Fire blocking shall be installed at the air gap that shall satisfy the requirements of Section R302.11.
6. Type 1 double stud walls shall also comply with Section R302.2.4.1, Item 5.1.

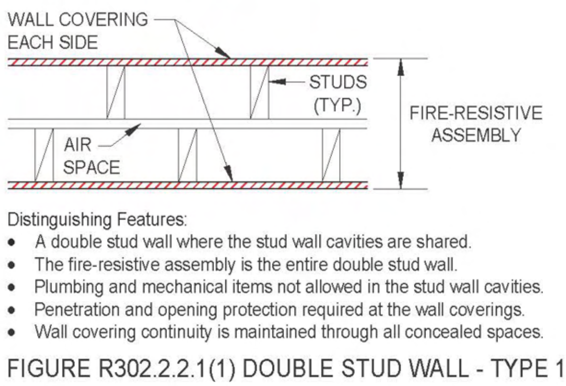


FIGURE R302.2.2.1.1 Type 1 double stud wall

R302.2.2.1.2 Type 2 . Type 2 double stud calls shall comply with the following:

1. Each stud wall row is an independent fire-resistive rated assembly. See Figure R302.2.2.1.2 for additional information.
2. Comply with Section R302.2.3, Item 1, where one or both stud wall coverings have less than 1-hour fire-resistive rating.
3. Comply with Section R302.2.3, Item 2, where both stud wall coverings have an equivalent or greater than 1-hour fire-resistive rating.
4. The top and bottom plates are not shared.
5. Provide an air gap in between the stud wall rows.
6. Fire blocking shall be installed at the air gap that shall satisfy the requirements of Section R302.11.
7. Type 2 double stud walls shall also comply with Section R302.2.4.1, Item 5.1.

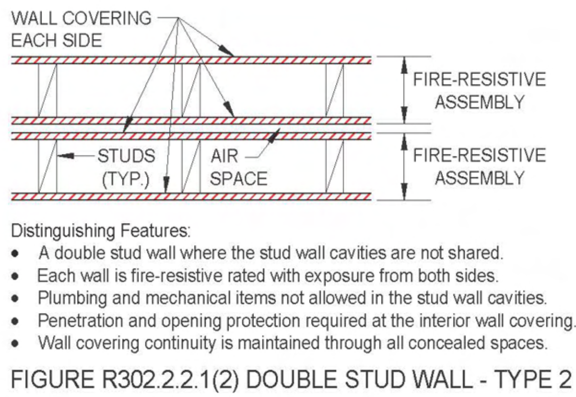


FIGURE R302.2.2.1.2 Type 2 double stud wall

R302.2.2.1.3 Type 3. Type 3 double stud walls shall comply with the following:

1. A non-load bearing fire-resistive assembly is installed in between the stud wall rows. See figure R302.2.2.1.3 for additional information.
2. Type 3 double stud walls shall also comply with additional requirements as shown in Section R302.2.4.1(e)2.
3. Fire-resistive assembly examples include:
   - 3.1. Gypsum board friction-fitted into continuous vertical H-shaped metal studs with breakaway clips attached to each dwelling unit's stud wall. Provide an air gap between the stud wall rows and the gypsum board. Fire blocking shall be installed at air gaps that shall satisfy the requirements of Section R302.11.
   - 3.2. Gypsum board between the stud wall rows is secured to one wall only. Additional requirements shall be applied to the stud wall that is not supporting the gypsum:
     - 3.2.1. The interior wall covering shall have a minimum 5/8 inch (15.875 mm) Type X gypsum and
     - 3.2.2 Requirements as shown in Section R302.2.4.1, Item 5.1.
4. Precast autoclaved aerated concrete blocks or similar.

5. Other non-load bearing fire-resistive assemblies as tested with exposure from both sides that meet or exceed the fire-resistance-rating as shown in Section R302.2.3.

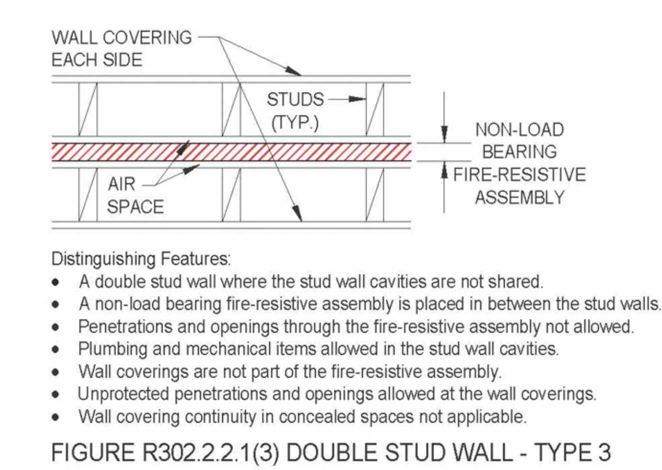


FIGURE R302.2.2.1.3 Type 3 double stud wall

R302.2.2.2 Common walls. Common walls shall comply with the following:

1. The *shaft wall* or *party wall* assemblies in this section are load bearing fire-resistive assemblies.
2. Screeds or full-depth non-load bearing stud walls can be optionally installed on either side of the common wall as required.
3. Penetrations through the common wall other than for dwelling unit structural support not permitted.
4. Common walls shal also comply with the additional requirements as shown in Section R302.2.4.1, Item 5.3.

Common wall exaples include:

1. Concrete Masonry Units (CMU).
2. Double Wythe brick or similar.
3. Pour-in-place concrete.

4. Insulated Concrete Forms (ICF).
5. Tilt wall, laminate, or prefabricated devices erected as a single assembly.
6. Combinations of any of the above.
7. Other load bearing fire-resistive assemblies that meet or exceed the fire-resistance-rating as shown in Section R302.2.3.

R302.2.3 Wall assembly rating for dwelling unit separation walls. Where an automatic sprinkler system in accordance with Section P2904 is provided, the separation wall shall be not less than 1-hour fire-resistance-rated. Where an automatic sprinkler system in accordance with Section P2904 is not provided, the separation wall shall be not less than 2-hour fire-resistance-rated.

R302.2.4 Separation wall continuity. Continuity of seperation walls shall comply with Section R302.2.4.1 through R302.2.4.5.

R302.2.4.1 Wall assembly. Seperation walls shall comply with the following:

1. All separation walls and separation wall segments shall be supported by a continuous foundation.
2. The separation wall shall be continuous and extend the full length of the wall assembly, including wall extensions through and separating attached enclosed accessory structures.
3. Separation walls shall extend to and be tight against the exterior sheathing of the exterior walls or the inside face of the exterior walls without stud cavities.

   Exception: Separation walls are permitted to extend to and be tight against the inside of the exterior wall if the cavity between the end of the separation wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.

4. Separation walls shall extend to and be tight against the exterior sheathing of the exterior walls or the inside face of the exterior walls without stud cavities.

   Exceptions:

   1. The underside of the cantilever shall be protected by a 2-hour fire-resistive assembly in accordance with ASTM E119, UL 263, or Section 703.2.2 of the international Building Code for a minimum distance of 48 inches (1219.2 mm) each side of the separation wall centerline, and
   2. Fireblocking installed in accordance with Section R302.11 in between the cantilevering members where the fireblocking face is aligned to the exterior side of the exterior wall that is providing support for the cantilevering members for a minimum distance of 48 inches (1219.2 mm) each side of the separation wall centerline.

5. Additional continuity requirements based on separation wall type:
   5.1. Double stud wall Types 1 and 2 as described in Sections R302.2.2.1 shall comply with the following:
      5.1.1. Mechanical, plumbing, ducts, and vents are not permitted in the stud wall cavity.

      Exception: Non-combustible water-filled fire sprinkler piping in the (each) stud wall cavity.

      5.1.2. Membrane penetration protection at the wall coverings shall be in accordance with Section R302.4.2.
      5.1.3. Electrical installations shall be in accordance with Chapter 34 through 43.
      5.1.4. Electrical outlet box membrane protection shall be in accordance with Section R302.4.
      5.1.5. Interior wall covering continuity shall be maintained through concealed spaces, crawl spaces, and attics.
   5.2. Double stud wall Type 3 as described in Section R302.2.2.1 shall comply with the following:
      5.2.1. Penetrations and/or openings prohibited through the fire-resistive assembly.
      5.2.2. Mechanical and plumbing devices permitted in the stud wall cavities.
      5.2.3. Unprotected membrane penetrations at the interior wall covering permitted.
      5.2.4. Interior wall covering continuity where concealed spaces, crawl spaces, and attics is not required.
   5.3. Common walls as described in Section R302.2.2.2 shall comply with the following:
      5.3.1. Through penetrations, such as ledger bolts, shall be in accordance with Section R302.4.1.2.
      5.3.2. Adjacent combustible members entering the common wall from opposite sides shall not have less than a 4 inch (102 mm) distance between embedded ends. Where combustible members frame into hollow walls or walls with hollow units, hollow spaces shall be solidly filled for the full thickness of the wall and for not less than 4 inches (102 mm) above, below, and between the structural members with non combustible materials approved for fireblocking.

R302.2.4.2 Wall assembly vertical termination. Separation wall vertical termination shall comply with R302.2.4.2.1 or R302.2.4.2.2.

R302.2.4.2.1 Double stud wall. Each dwelling unit stud wall shall terminate to the top of all parapets or terminate to the underside of the roof sheathing for that dwelling unit.

R302.2.4.2.2 Common wall. Common walls shall comply with the following:

1. Common walls shall extend to the top of all parapets.
2. Dwelling units without parapets and with attics may optionally have the common wall terminate at the underside of the ceiling joists at the uppermost floor level. An extension to the common wall shall be added on top of the common wall that will have the same fire-resistive rating as that required for the common wall. The entire thickness of the extending wall assembly shall terminate at the underside of the higher roof decking.
3. Dwelling units without parapets and with attics may optionally have the common wall terminate at the underside of the ceiling joists at the uppermost floor level. An extension to the common wall shall be added on top of the common wall that will have the same fire-resistive rating as that required for the common wall. The entire thickness of the extending wall assembly shall terminate at the underside of the higher roof decking.

R302.2.4.3 Roof assembly vertical or horizontal continuity. Choose one method for compliance. The method selected shall be employed on all separation walls throughout the building.See Section R302.2.4.5 for additional requirements.

R302.2.4.3.1 Vertical continuity at the separation wall. Parapets shall comply with the following:

1. Parapets shall be constructed as an extension of exterior walls or as an extension of aseparation wall where the parapet shall extend not less than 30 inches (762 mm) verticallyabove the roof deck.
2. Parapet construction shall comply with the following:
   - 2.1. Parapets shall have the same fire-resistive rating as that required for the supporting wall or walls.
   - 2.2. Parapets shall have noncombustible faces, including counterflashing and coping materials, for the uppermost 18 inches (457 mm) for any parapet side adjacent to a roof surface.
   - 2.3. Where the roof slopes toward a parapet at slopes greater than 2 units vertical in 12 units horizontal (16.7-percent slope), the parapet shall extend to the same height as any portion of the roof within 3 feet (914 mm), and the height shall not be less than 30 vertical inches (762 mm).
3. Parapets shall completely cover any exposed ends of eaves, including gutters.

   Exception: See Section R302.2.4.5, Item 4 and select a compliance method.

R302.2.4.3.2 Horizontal continuity at the separation wall. The following items shall apply to all wall types without parapets:

1. The roof covering shall have a minimum Class C rating as tested in accordance ASTM E108 or UL 790.
2. Roof covering underlayment protection shall be provided up to 48 inches (1219.2 mm) from the separation wall centerline at both sides of the separation wall as measured along the roof plane. Vertical decking seams between decking courses shall be staggered by at least one rafter or one joist.

Choose one method for compliance:

1. Fire-retardant treated sheathing that meet the requirements of Sections R302.15 and R803.2.1.2.
2. Non-fire-retardant treated sheathing with 5/8 inch (15.875 mm) Type X gypsum installed tight to the underside of the roof sheathing and secured with continuous 2x2 ledgers that are attached to the rafter or joist sides with 10d nails or equivalent spaced 12 inches (304.8 mm) on center.
3. Laminate sheathing that meets the requirements of ASTM E119 or UL 263 with the fire-resistive side facing down.
4. Spray applications that meet the requirements of ASTM E2768 that is applied to the underside of the roof decking where the application shall achieve a minimum 30-minute fire-resistive rating.

R302.2.4.4 Roof decks or roof decking at different elevations. Roof decks or roof decking at different elevations shall complwy with Section 302.2.4.4.1 and 302.2.4.4.2.

R302.2.4.4.1 Parapet method. Parapets shall comply with the following:

1. There the higher roof deck is not more than 30 inches (762 mm) vertically above the lower roof deck, the parapet shall extend not less than 30 inches (762 mm) vertically above the lower roof deck.
2. Where the higher roof deck is more than 30 inches (762 mm) vertically above the lower roof deck, a parapet is not required. The exposed wall between roof decks shall be in accordance with Section R302.2.4.4.2 and the horizontal continuity for both the higher and lower roof deck on each side of the exposed wall shall be in accordance with Section R302.2.4.3.2.

R302.2.4.4.2 Non-parapet method. Where parapets are not provided, comply with the following:

1. The wall construction from the lower roof deck to the underside of the higher roof deck shall have not less than a 1-hour fire-resistive rating with exposure from both sides of the wall.
2. Where the separation wall is a double stud wall, the dwelling unit that has the higher roof deck shall have the stud wall extended to the underside of the higher roof deck.
3. Where the separation wall is a common wall, the full thickness of the common wall shall extend to the underside of the higher roof deck.
4. Openings shall not be permitted in the exposed wall.
5. Horizontal continuity for both the higher and lower roof decking on each side of the exposed wall shall be in accordance with Section R302.2.4.3.2.

R302.2.4.5 Other (horizontal) continuity at the separation wall. The following shall apply to all areas near the separation wall, with or without parapets, or where noted. Refer to Figure R302.2.4.5 for additional information.

1. Attic ventilation devices shall not be installed closer than 48 inches (1219.2 mm) from the separation wall centerline for the following areas.
   1.1. For Separation walls with parapets: strip vents at the eave and perforated soffits at the eave.
   1.2. Separation walls without parapets: ridge vents, air hawks, turbine vents, or similar devices, strip vents or perforated soffits at the eave.
2. Plumbing and mechanical penetrations for separation walls defined in Section R302.2.4.3.2. Penetrations through the roof decking is not permitted within 48 inches (1219.2 mm) from the separation wall centerline.
3. Skylights, solar tubes, and other similar penetrating devices for separation walls defined in Section R302.2.4.3.2. Roof decking openings of this type are prohibited where the opening is located within 5 feet (1524 mm) from the separation wall centerline.

   Exceptions:

   1. Provide a 30 inch (762 mm) height parapet that meets the requirements of Section R302.2.4.3.1 where the parapet ends are 60 inches (1524 mm) beyond and 60 inches (1524 mm) in front of the opening as measured along the plane of the roof decking. See Figure R302.2.4.5, note 5.
   2. Where the roof decks between dwelling units are at different elevations, and the roof deck vertical height difference is 30 inches (762 mm) or less, provide a parapet where the parapet height is 30 inches (762 mm) vertically as measured from the lower roof deck. The parapet shall extend 60 inches (1524 mm) beyond and 60 inches (1524 mm) in front of the opening as measured along the plane of the roof decking.
   3. Where the adjacent dwelling unit roof decking is higher than 30 inches (762 mm) from the dwelling unit with the opening, a parapet is not required. The exterior wall between the lower roof decking and the higher roof decking shall have one additional fire-resistive layer added to the exterior side of the wall that is facing the opening for a linear distance of 60 inches (1524 mm) each side of the opening as measured along the plane of the roof decking that has the opening.
   4. Where the adjacent dwelling unit roof decking is more than 30 inches (762 mm) below the roof deck with the opening, no special parapet requirements is required for the lower roof decking.

<u>4. Eave protection shall be provided in accordance with the following:</u>

<u>4.1. Fascia, gutters, frieze boards, soffit sheathing, and other similar non-structural coverings are permitted to be continuous through the separation wall centerline.</u>

<u>4.2. Exposed rafter tails prohibited within 48 inches (1219.2 mm) from the separation wall centerline.</u>

<u>4.3. Provide a break of the (2x) sub-fascia at the separation wall centerline.</u>

<u>4.4. Provide a break of the soffit ledger at the separation wall centerline.</u>

<u>4.5. Provide fireblocking in line with and as an extension to the separation wall in accordance with Section R302.11 for the entire eave cavity and select one additional method for compliance:</u>

<u>4.5.1. Any non-fire-resistive sheathing that is facing down shall be protected with one layer of 5/8 inch (15.875 mm) Type X gypsum placed directly behind the sheathing for a minimum distance of 48 inches (1219.2 mm) from the separation wall centerline or</u>

<u>4.5.2. Provide 2x bird blocking in between the rafter tails for each dwelling unit where the bird block face is in line to and flush with the exterior side of the exterior wall for a minimum distance of 48 inches (1219.2 mm) from the separation wall centerline. The 2x bird blocks shall have a beveled top to match the roof pitch and be tight to the underside of the roof decking.</u>

<u>5. Dormers or other similar combustible walls within 5 feet (1524 mm) from the separation wall centerline:</u>

<u>5.1. Dormer walls that face the dwelling unit separation wall shall comply to Tables R302.1(1) or R302.1(2).</u>

<u>5.2. Dormer walls shall not be located closer than 24 inches (609.6 mm) from the separation wall centerline.</u>

<u>5.3. Dormers with overhangs: Overhangs shall not be greater than 6 inches (152.4 mm) where the dormer wall is facing to and is located between 30 inches (762 mm) and 60 inches (1524 mm) from the separation wall centerline. The fascia and eave that face the separation wall shall be protected with 5/8 inch (15.875 mm) Type X gypsum installed behind the fascia and behind the soffit covering. Exposed rafter tails that face the separation wall are not permitted within 60 inches (1524 mm) from the separation wall.</u>

<u>5.4. Dormers with flush overhangs: Overhangs are not permitted on a dormer where the dormer wall is facing and is located less than 30 inches (762 mm) form the separation wall centerline.</u>

<u>5.5. Roof covering minimum classification and roof covering underlayment protection shall comply with Section R302.2.4.3.2.</u>

<u>6. Applied crickets:</u>

<u>6.1. Where applied crickets are against a parapet, the parapet shall be extended a minimum 6 inches (152.4 mm) vertically above any point along the cricket.</u>

<u>6.2. Applied crickets that cross over a separation wall without parapets shall comply with one of the following methods:</u>

<u>6.2.1. Where the width of the applied cricket does not extend beyond the roof covering underlayment protection as described in Section R302.2.4.3.2, Item 2, no special provisions are required.</u>

<u>6.2.2. Where any part of the applied cricket extends beyond the roof covering underlayment protection as described in Section R302.2.4.3.2, Item 2, the separation wall shall be extended tight to the underside of the cricket decking. The cricket roof covering minimum classification and roof covering underlayment protection shall comply with Section R302.2.4.3.2.</u>

<u>7. Fuel-fired decorative appliance terminations through a wall or through the roof decking: Terminations shall comply with Sections G2427.6 and G2427.8 or refer to manufacturer installation instructions for location of the termination in relation to a property line.</u>

8. Chimneys located within 5 feet (1524 mm) from the separation wall centerline:

 8.1. Wood- or steel-stud wall chimney for factory-built wood burning devices:All exterior chimney walls shall be 1-hour fire-resistive rated for exposure from both sides.The minimum height of the chimney shall be the higher of one of the following:

  8.1.1. Five feet (1524 mm) for any part of the chimney, or

  8.1.2. The height as determined in accordance with Section R1005.1.

  Crickets are not included when determining height. Fireblocking shall be installed in accordance with UL 103 and UL 127.

 8.2. Stud wall chimney serving two dwellings units: All items shall comply with the previous section.The separation wall assembly shall maintain continuity and extend into the chimney cavity for the full width and height of the chimney.

 8.3. Masonry chimneys: The minimum height of the chimney shall be the higher of one of the following:

  8.3.1. Five feet (1524 mm) for any part of the chimney, or

  8.3.2. The height as determined in accordance with Section R1003.9.

  Crickets are not included when determining height. Masonry chimneys shall be fitted with spark arrestors in accordance with Section R1003.9.2.

 8.4. Masonry chimney serving two dwelling units: All items shall comply with the previous section. Each masonry chimney shall be free-standing and spaced apart from the adjacent chimney a minimum distance that will allow for access and maintenance of the chimney faces that face each other.

9. Unprotected pergola, arbor, awnings, or similar structures on a roof deck:Combustible and unprotected structures in this category that are closer than 5 feet (1524 mm) from the separation wall centerline shall be protected by extending the separation wall to the same height as the top of the highest member of the unprotected structure that is within 5 feet (1524 mm) from the separation wall centerline.See Section R302.2.4.4.2 for additional information where the extending wall is less than 30 inches (762 mm) from an adjacent horizontal or sloping surface.

 9.1. Double stud walls shall have the stud wall extended for the dwelling unit requiring protection. The extending stud wall assembly rating shall be 1-hour fire-resistive with exposure from both sides.

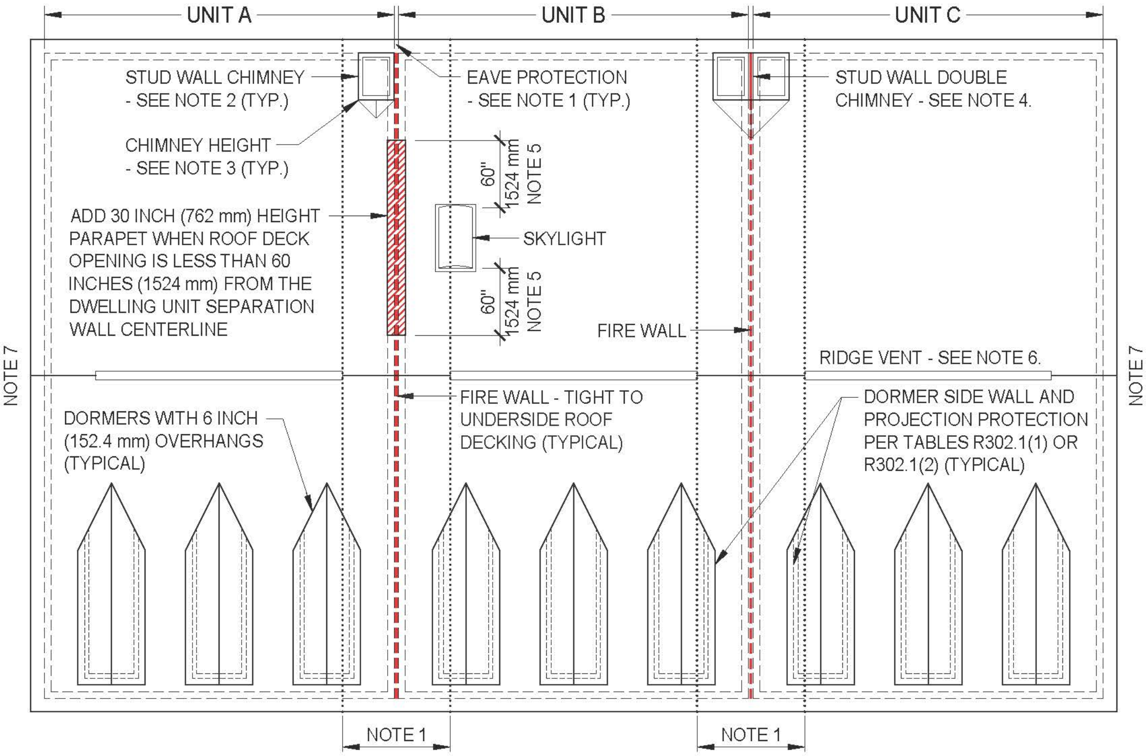
 9.2. The entire thickness of the common wall shall extend to the required minimum height.

10. Roof-mounted solar collection or other similar devices: Any device that has not been ASTM E119 or UL 263 tested for a minimum 1-hour fire-resistive rating shall be located a minimum of 60 inches (1524 mm) from the separation wall centerline.

11. Other devices above the roof decking:

 11.1. Combustible devices shall be 1-hour fire-resistive rated protected from both sides when the combustible device is located less than 60 inches (1524 mm) from the separation wall centerline.

 11.2. Combustible and non-combustible devices that are secured to one dwelling unit shall not project, cantilever, or cross over the projected separation wall centerline.



Townhouses without parapets notes:

1. Provide horizontal continuity for a distance of 48 inches (1219.2 mm) each side of the dwelling unit separation wall centerline (includes roof decking at dormers). Plumbing and mechanical penetrations through the roof decking not allowed in this area. Eaves where shown shall also be protected.
2. All sides of the stud wall chimney shall be 1-hour fire-resistive rated with exposure from both sides.
3. Chimney height shall be minimum 60 inches (1524 mm) tall, or per section R1003.9, or per manufacturers installation instructions - whichever nets the tallest value.
4. Continue the dwelling unit separation wall assembly into the chimney for the full width and height of the chimney.
5. Extend the parapet 60 inches (1524 mm) in front and 60 inches (1524 mm) beyond the opening as measured along the plane of the roof decking.
6. Ridge vents shall be located no closer than 48 inches (1219.2 mm) from the separation wall centerline.
7. Parapets or Horizontal Continuity not required at townhouse ends.

FIGURE R302.2.4.5 DIAGRAMMATIC ROOF CONTINUITY FOR TOWNHOUSES WITHOUT PARAPETS

FIGURE R302.2.4.5 DIAGRAMMATIC ROOF CONTINUITY FOR TOWNHOUSES WITHOUT PARAPETS

Reason: One requires a blueprint to work from. Without a clearly defined blueprint, interpretations will occur.

The blueprint for the wording of Section R302.2, as originally created, was based on the SBC edition from the 1990's and is now considered outdated.

This proposal establishes definitions of the currently available assemblies used for residential construction and the restrictions associated with each assembly. This proposal also addresses continuity issues near the separation wall where very little definitions currently exists.

The following outline shows a linear progression of my thoughts when developing this proposal.

Objective #1: List and define all possible wall types for double stud walls and common "shaft wall" assemblies.

Objective #2: Restructure section R302.2 to be expandable.

Objective #3: Provide clarification of the different types of assemblies using more verbalism and illustrations.

Objective #4: Restructure section R302.2 into a more linear and logical order.

Objective #5: Provide an outline of (encountered) continuity situations that may come into play with townhouse dwelling units and to provide fire-resistive resolves to these situations.

Background / Our Product:

Single-family dwellings, two-family dwellings, and multi-unit townhouse architectural documents delivered at a rate of over 200 dwelling units per year for over 35 years. Ninety-five percent (95%) of these dwellings are for urban markets (12+ dwelling units per acre), 98% with attached garages, 90% with at least one firewall, and about 35% of the dwellings are in flood prone areas. Our market area is nationwide with a few documents delivered worldwide. My employer, Jack Preston Wood is registered AIBD and NCBDC.

Proposal Notes:

1. Due to extensive restructuring of section R302.2, it was best to completely start over. As an example, the current wording in section R302.2.6 did not change but this subsection was moved to the top as section R302.2.1.
2. Most all wording from the original R302.2 section has been retained. The sentences or partial sentences have been redirected to the appropriate sections. Some of the original wording has been revised to match with the proposed new wording (example: “separation wall”). The AI grammatical suggestions to the original wording was accepted.
3. Where available, any section that describes a specific wall, ceiling, or roof assembly will also describe a similar assembly of equal or greater fire-resistive rating with provisions in the section to add more assemblies over time.
4. Where a section states, “not permitted”, an exception is written. Over time, when more exceptions are added, the objective is to remove the phrases “not permitted” and “exception” in future code book editions (see Objective #2).
5. Continuity situations above the roof sheathing are based on actual incidents that I have encountered over the years as a residential designer. Some of these situations have been addressed as “hot fix” publications issued by the local jurisdiction. At least one hot fix that I know of has made it to your publication.
6. Overall, I am slightly more conservative about fire-resistive design than others. Life safety is a priority over cost efficiency.
7. I am not a technical writer. I am a visual thinker that understands how things work, understands how things are put together, and understands the order of assembly. The wording as presented in this, and other proposals is based on my visual understanding and common sense.
8. This proposal hopes to reduce the likelihood of building officials making spot interpretive decisions in the field that will cause delay in the completion of the dwelling.

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

Justification for no cost impact:

This code change proposal will not increase the cost of construction. This proposal will offer a selection of assemblies to choose from that will best suit the needs for the given situation or as a cost effective consideration.

The double stud wall Type 3 assembly in the proposal does not require additional labor to install the fire-resistive wall covering in concealed spaces and attics (wall covering continuity). The cost of material of our specified 2-hour fire-resistive assembly verses the labor cost of the other method(s) cancel each other. Mechanical and plumbing chases, and penetration protection provisions are no longer an issue with the Type 3 wall assembly we specify.

RB15-25

RB16-25

IRC: SECTION R104, R104.4.1, SECTION R202, SECTION 202, SECTION 202 (New)

Proponents: Kota Wharton, representing City of Grove City (kwharton@grovecityohio.gov)

2024 International Residential Code

Revise as follows:

SECTION R104
DUTIES AND POWERS OF THE CODE ~~BUILDING~~ OFFICIAL

R104.4.1 Warrant. Where the ~~building~~ code official has first obtained a proper inspection warrant or other remedy provided by law to secure entry, an *owner*, the *owner*'s authorized agent, occupant or *person* having charge, care or control of the *structure* or premises shall not fail or neglect, after a proper request is made as herein provided, to permit entry therein by the building code official for the purposes of inspection and examination pursuant to this code.

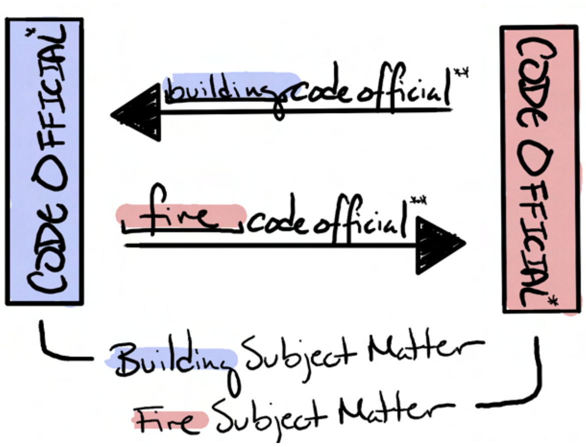
SECTION R202
DEFINITIONS

[RB] ~~BUILDING~~ CODE OFFICIAL. The officer or other designated authority charged with the administration and enforcement of this code, or a duly authorized representative. ~~For the definition applicable in Chapter 11, see Section N1101.6.~~

Add new definition as follows:

FIRE CODE OFFICIAL. The *fire chief* or other designated authority charged with the administration and enforcement of the International Fire Code, or a duly authorized representative.

Reason: To harmonize terminology across the residential code, this code change replaced "building official" with "code official" and revises "building code official" and "authority having jurisdiction", where appropriate, to "code official".



* Within a subject matter, the official having jurisdiction would be referred to as "code official"

** Outside a subject matter, the official having jurisdiction would be referred to as "[subject matter] code official", indicating which subject matter to refer to

This change aligns with language in the IEBC, IFGC, IMC, IPC, IPSDC, IPMC, ISPSC, IWUIC and IZC, will make code writing simpler and easier to coordinate (especially in administrative provisions), and a similar code change is being presented to the IBC/IFC.

The purpose of this code change is to replace every instance of "building official" in the IRC with "code official". In the interest of reciting the 170+

instances of the occurrence the proponent respectfully asks staff to make these changes administratively.

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

Justification for no cost impact:

This code change a terminology change that will have no effect on construction costs.

RB16-25

RB17-25

IRC: SECTION 202, R406.1, BJ104.4.4.1, BK 102.1, BL104.3.6.4

Proponents: Shamim Rashid-Sumar, representing National Ready Mixed Concrete Association (ssumar@nrmca.org); Dr. Julian Mills-Beale, representing National Ready Mixed Concrete Association (jmills-beale@nrmca.org); James Farny, Portland Cement Association, representing US cement manufacturers (jfarny@cement.org)

2024 International Residential Code

Revise as follows:

[RB] CEMENT PLASTER. A mixture of ~~Portland~~ portland or blended cement, ~~Portland~~ portland cement or blended cement and hydrated lime, masonry cement or plastic cement and aggregate and other *approved* materials as specified in this code.

CHAPTER 4
FOUNDATIONS

R406.1 Concrete and masonry foundation dampproofing. Except where required by Section R406.2 to be waterproofed, foundation walls that retain earth and enclose interior spaces and floors below *grade* shall be dampproofed from the finished *grade* to the higher of the top of the footing or 6 inches (152 mm) below the top of the *basement* floor. Masonry walls shall have not less than $^3/_8$-inch (9.5 mm) ~~Portland~~ cement parging applied to the exterior of the wall. The parging shall be dampproofed in accordance with one of the following:

1. Bituminous coating.
2. Three pounds per square yard (1.63 kg/m^2) of acrylic modified cement.
3. One-eighth-inch (3.2 mm) coat of surface-bonding cement complying with ASTM C887.
4. Any material permitted for waterproofing in Section R406.2.
5. Other *approved* methods or materials.

Exception: Parging of unit masonry walls is not required where a material is *approved* for direct application to the masonry.

Concrete walls shall be dampproofed by applying any one of the *listed* dampproofing materials or any one of the waterproofing materials listed in Section R406.2 to the exterior of the wall.

APPENDIX BJ
STRAWBALE CONSTRUCTION

BJ104.4.4.1 General. Soil-cement *plaster* shall be composed of *clay subsoil*, sand and not less than 10 percent and not more than 20 percent ~~Portland~~ cement by volume, and shall be permitted to contain reinforcing fibers.

APPENDIX BK
COB CONSTRUCTION (MONOLITHIC ADOBE)

NATURAL COB. Cob not containing admixtures such as ~~Portland~~ cement, lime, asphalt emulsion or oil. Synonymous with " *Unstabilized cob*."
STABILIZED. *Cob* or other earthen material containing admixtures, such as ~~Portland~~ cement, lime, asphalt emulsion or oil, that are intended to help limit water absorption, stabilize volume, increase strength and increase durability.
UNSTABILIZED. Cob or other earthen material that does not contain admixtures such as ~~Portland~~ cement, lime, asphalt emulsion or oil.

APPENDIX BL
HEMP-LIME (HEMPCRETE) CONSTRUCTION

BL104.3.6.4 Prohibited finish coat. *Plaster* containing ~~Portland~~ cement shall not be permitted as a *finish* coat over clay plasters.

Reason: This proposal is part of a series of proposals to the IBC and IRC to update cement terminology in the building codes.

The proposed revisions reflect current cement technology and market conditions, which can vary across regions. Nationally, the market is no longer dominated by portland cement. More than sixty percent of the current cement market consists of blended cements , including portland-limestone cement (PLC) and other blended cements that meet the requirements of ASTM C595/C595M, Specification for Blended Hydraulic Cements (Portland Cement Association, 2025). ASTM C595/C595M is referenced in the International Building Code/ International Residential Code.

Bibliography: Portland Cement Association, 2025. Reducing Carbon at the Cement Plant. https://cementprogress.com/reducing-carbon-at-the-cement-plant/

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

Justification for no cost impact:

The proposed change is an editorial update for cement and will not impact the cost of construction. See reason statement.

RB17-25

RB18-25

IRC: SECTION 202

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

[RB] CEILING HEIGHT. The clear vertical distance from the ~~finished~~ completed floor to the ~~finished~~ completed ceiling or bottom of joists where a ceiling covering material is not installed.

Reason: There is sometimes confusion regarding measuring ceiling height in areas without a typical floor "finish" (carpet, tile, etc) and in basements where a ceiling finish material is not installed below the joists above. A concrete floor in a basement is often referred to as "unfinished", yet it is the final "completed" floor for the work being done. An "unfinished basement" must still meet a minimum ceiling height. Inspectors have been known to interpret that the final, "completed" concrete floor in an unfinished basement is not where ceiling height is measured from and they interpret an assumed thickness of a future floor "finish". However, the concrete floor is the final and "completed" floor at that time for the construction taking place. During "finishing" the basement, some owners choose to acid wash and stain the concrete floor as the "finished floor". This proposed change is meant to better describe that ceiling height is simply measured to the "completed" version of the floor and ceiling whether "finished" or "unfinished".

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

Justification for no cost impact:

If a basement was required to have a greater ceiling height (depth below grade) to accommodate space for a future floor and ceiling "finish", then this proposal would very slightly decrease the cost of construction due to less depth required in the basement. This is a minor savings, thus this proposal is primarily a clarification.

RB18-25

RB19-25

IRC: SECTION 202 (New), R301.2.4, R306.1, R306.1.9, R306.2, R306.3

Proponents: Rebecca Quinn, RCQuinn Consulting, representing Association of State Floodplain Managers (rebecca@rcquinnconsulting.com); Chad Berginnis, representing Association of State Floodplain Managers (cberginnis@floods.org)

2024 International Residential Code

Add new definition as follows:

BASE FLOOD. The flood having a 1-percent chance of being equaled or exceeded in any given year.
BASE FLOOD ELEVATION. The elevation of the base flood, including wave height, relative to the National Geodetic Vertical Datum (NGVD), North American Vertical Datum (NAVD) or other datum specified on the Flood Insurance Rate Map (FIRM).
COASTAL A ZONE. Area within a special flood hazard area, landward of a V zone or landward of an open coast without mapped coastal high-hazard areas. In a coastal A zone, the principal source of flooding must be astronomical tides, storm surges, seiches or tsunamis, not riverine flooding. During the base flood conditions, the potential for breaking wave height shall be greater than or equal to 1 ½ feet (457 mm). The inland limit of the coastal A zone is (a) the Limit of Moderate Wave Action if delineated on a FIRM, or (b) designated by the authority having jurisdiction.
COASTAL HIGH-HAZARD AREA. Area within the special flood hazard area extending from offshore to the inland limit of a primary dune along an open coast and any other area that is subject to high-velocity wave action from storms or seismic sources, and shown on a Flood Insurance Rate Map (FIRM) or other flood hazard map as velocity Zone V, VO, VE or V1-30.
DESIGN FLOOD ELEVATION. The elevation of the design flood, including wave height, relative to the datum specified on the community's legally designated flood hazard map. In areas designated as Zone AO, the design flood elevation shall be the elevation of the highest existing grade of the building's perimeter plus the depth number (in feet) specified on the flood hazard map. In areas designated as Zone AO where a depth number is not specified on the map, the depth number shall be taken as being equal to 2 feet (610 mm).
FLOOD HAZARD AREA.
The greater of the following two areas:

1. The area within a floodplain subject to a 1-percent or greater chance of flooding in any given year.
2. The area designated as a flood hazard area on a community's flood hazard map, or otherwise legally designated.

LIMIT OF MODERATE WAVE ACTION. Line shown on FIRMs to indicate the inland limit of the 1 ½-foot (457 mm) breaking wave height during the base flood.

SECTION R301
DESIGN CRITERIA

Revise as follows:

R301.2.4 Floodplain construction. *Buildings* and structures constructed in whole or in part in flood hazard areas as established in Table R301.2 shall be constructed in accordance with the flood-resistant construction provisions of this code.~~, and *substantial improvement* and *repair* of *substantial damage* of *buildings* and structures located in whole or in part in flood hazard areas, shall be designed and constructed in accordance with Section R306. *Buildings* and structures that are located in more than one flood hazard area, including A Zones, Coastal A Zones and V Zones, shall comply with the provisions associated with the most restrictive flood hazard area. *Buildings* and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.~~

SECTION R306
FLOOD-RESISTANT CONSTRUCTION

R306.1 General. *Buildings* and structures constructed in whole or in part in flood hazard areas established in Table R301.2, and *substantial improvement* and *repair* of *substantial damage* of *buildings* and structures located in whole or in part in flood hazard areas, shall be designed and constructed in accordance with the provisions contained in this section. *Buildings* and structures that are located in more than one flood hazard area, including A Zones, Coastal A Zones and V Zones, shall comply with the provisions associated with the most restrictive flood hazard area. *Buildings* and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.

R306.1.9 Manufactured homes. The bottom of the frame of new and replacement *manufactured homes* on foundations that conform to the requirements of Section R306.2 or R306.3, as applicable, shall be elevated to or above the elevations specified in Section R306.2 ~~(flood hazard areas including A Zones)~~ or R306.3, as applicable to the flood hazard area ~~in coastal high-hazard areas (V Zones and Coastal A Zones)~~. The anchor and tie-down requirements of the applicable state or federal requirements shall apply. The foundation and anchorage of *manufactured homes* to be located in identified floodways shall be designed and constructed in accordance with ASCE 24.

R306.2 Flood hazard areas not designated as coastal high-hazard areas or Coastal A Zones~~(including A Zones)~~. ~~Areas that have been determined to be prone to flooding and that are not subject to high-velocity wave action shall be designated as flood hazard areas. Flood hazard areas that have been delineated as subject to wave heights between 1^1/2 feet (457 mm) and 3 feet (914 mm) or otherwise designated by the *jurisdiction* shall be designated as Coastal A Zones and are subject to the requirements of Section R306.3.~~ *Buildings* and structures constructed in whole or in part in flood hazard areas not designated as coastal high-hazard areas or Coastal A Zones shall be designed and constructed in accordance with Sections R306.2.1 through R306.2.4. Buildings in flood hazard areas designated as coastal high-hazard areas and Coastal A Zones shall be designed and constructed in accordance with Section R306.3.

R306.3 Flood hazard areas designated as coastal~~Coastal~~ high-hazard areas ~~(including V Zones~~ and Coastal A Zones~~, where designated)~~. ~~Areas that have been determined to be subject to wave heights in excess of 3 feet (914 mm) or subject to high-velocity wave action or wave-induced erosion shall be designated as coastal high-hazard areas. Flood hazard areas that have been designated as subject to wave heights between 1^1/2 feet (457 mm) and 3 feet (914 mm) or otherwise designated by the *jurisdiction* shall be designated as Coastal A Zones.~~ *Buildings* and structures constructed in whole or in part inflood hazard areas designated as coastal high-hazard areas and Coastal A Zones, where designated, shall be designed and constructed in accordance with Sections R306.3.1 through R306.3.10.

Reason: Prior to the 2024 IRC, several terms used in the flood provisions were not defined in Section R202 because the terms were “defined” or described where used. That changed in 2024 when definitions for “substantial damage” and “substantial improvement” were added (paired with changes to sections where those terms were described).

This proposal adds definitions taken from the IBC for the terms “design flood elevation” and “flood hazard area.” In proposal by others for 2024 IRC, definitions for these terms were added, but qualified with “for the purposes of Chapter 24” (which is fuel gas). The definitions are there because Chapter 24 mirrors the IFGC, which includes those definitions. It is awkward to have Ch 24-specific definitions in R202 for terms that are used and applicable in R306 and throughout the IRC.

This proposal also adds definitions taken from the IBC for "base flood," "Base Flood Elevation," “Coastal A Zone,” “coastal high hazard area,” and “limit of moderate wave action.” Base flood and BFE are used throughout; the other terms are paired with removal of descriptions of those terms in R306.2 and R306.3. The proposal also more clearly references “coastal A zone” and “coastal high hazard area” as designations within flood hazard areas.

The proposed change to R301.2.4 replaces language that appears in R306.1 with a sentence to phrase the general requirement to be more in line with similar provisions in R301.2.1 (for wind) and the topic sentence in R301.2.2 (seismic).

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

Justification for no cost impact:

This proposal adds definitions taken from the IBC, cleans up repetitive language, and more clearly references flood hazard area designations. There is no change to the technical content of the provisions. By adding definitions of terms already defined elsewhere and making clarifying edits, there will be no cost impact when approving this proposal.

Staff Analysis: The definitions for 'design flood elevation' and 'flood hazard area' current shown in Chapter 2 as a reference to Section G2403, are currently only applicable in IRC Chapter 24. Chapter 24 is copied from the IFGC, and these defintions in the IFGC are scoped to the Structural committee.

RB20-25

IRC: SECTION 202, R302.8 (New), R302.8.1 (New)

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com); Alexander Haldeman, representing James Hardie Building Products (alex.haldeman@jameshardie.com); Milad Shabanian, representing Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); Steven Orlowski, Sundowne Building Code Consultants, LLC, representing Self (sorlowski@sbcc.codes); Shamim Rashid-Sumar, representing National Ready Mixed Concrete Association (ssumar@nrmca.org)

2024 International Residential Code

Revise as follows:

~~**[RB] COMBUSTIBLE MATERIAL.** Any material not defined as noncombustible.~~
[RB] NONCOMBUSTIBLE MATERIAL. ~~A material that passes ASTM E136.~~ See Section R302.8.

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Add new text as follows:

R302.8 Testing for noncombustibility. Noncombustible building materials shall be those materials that comply with Section 703.3.1 of the International Building Code.

R302.8.1 Testing not required. 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. 3xxx, 5xxx and 6xxx series aluminum alloys.

Reason: The definition of noncombustible material presently in chapter 2 is best replaced (as has been the case in the IMC and IFGC) by a definitions which is simply a reference to a location in the code where requirements are placed, in this case in a new section 302.8. Note that section 703.3.1 of the IBC contains much additional information regarding the testing for noncombustibility, with the base requirement being to pass ASTM E136, but with the option of using ASTM E2652 instead and with the additional exception for materials with a structural base of a noncombustible material covered by a thin layer of a low flame spread material. All of that information is missing in the IRC and becomes clear with the proposed pointer. Also, the definition contains a requirement which ICC definitions should typically not contain.

The definition of noncombustible material in chapter 24, under the jurisdiction of the IFGC committee, also contains a requirement and is, moreover, no longer correct since the requirements in ASTM E136 have been updated and the language in Chapter 24 is obsolete. Other ICC codes (the IBC, IFC, IWUIC and IEBC, based on the Group A decisions) contain references to where to determine whether a building material is a noncombustible building material and they do not contain definitions explaining what is a "noncombustible material". This proposal recommends that the same apply to the IRC. By placing a note with a reference ("see" followed by a section number) in place of the existing definition stating, in this case, "See Section 302.8" the user can immediately find where to look for what is needed to declare that a material is noncombustible, namely that it meets ASTM E136.

Throughout the IRC there are multiple references to requirements for materials to be noncombustible. It is important to ensure that the correct materials are accepted as such. In fact, several materials can claim to be inherently noncombustible, in many cases without it being truly valid. For example, any plastic or wood materials are always combustible. This issue is an important consideration for building materials (as required in multiple areas of the IRC where requirements are different depending on whether the materials are or are not noncombustible). Some materials exist (often insulation materials) where it is not possible to determine without testing (normally to ASTM E136, as required in section 703.3.1 of the IBC or in the definitions in this code) whether they are truly noncombustible. For example, fiberglass insulation materials will always contain some combustible binder to be useful. The material can pass the ASTM E136 test (and be noncombustible) if it contains a small amount of binder but fail the test with larger amount of binder. That can only be determined by testing and is impossible to note visually.

However, a strict reading of the code requirements (whether in the IRC or the IBC) implies that it is always necessary to conduct a test to determine whether a material is or is not noncombustible. In fact, it has often been the case that actual test results have been required to accept as noncombustible materials such as steel or concrete. It makes no sense to test some such materials for noncombustibility.

A working group under the auspices of the Fire Code Action Committee of ICC (FCAC) was formed and involved members representing a variety of industries: steel, concrete, ready mixed concrete, masonry, aluminum, glass, wood, fire -retardant-treated wood, gypsum, and others. As a result agreement was reached that certain materials do not need to be tested to ASTM E136 for noncombustibility as they will pass the test and common sense indicates they can be excluded from being required to be tested. They include steel, concrete and masonry (in both cases if they contain no combustible aggregates or fibers). Since some new building materials are made with organic (such as foam plastics) components to lower the weight and make them easier to manipulate, it is unclear whether those materials 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 and have passed. 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). Furthermore, the 3xxx series of aluminum alloys have also been tested and shown to be noncombustible. Therefore, consensus was reached that it is safe to include “3xxx, 5xxx, and 6xxx series aluminum alloys” to the list of building materials that do not require testing to be considered noncombustible materials.

This proposal also recommends deleting the definition of "combustible material" from chapter 2 in the IRC since it is an unnecessary one. Nowhere in any code, including the IRC, is there a requirement that a building material be combustible. The code may well require (and often does) that a material must be noncombustible for certain applications. By default, if a material is not noncombustible it is combustible. Moreover, since no actual definition will be contained in the IRC code if this is approved (like in the IBC, IMC and IFGC), the statement that a combustible material is one that is not "defined" as noncombustible would refer to a definition that does not exist in the IRC. Section 302.8 points to the correct requirement for noncombustibility testing.

The references to specific definitions for chapter 24 (which is under the responsibility of the IFGC committee) cannot be addressed by the IRC committee. However, it should be noted as follows:

(a) the definition of "combustible material" in IRC chapter 24 is identical to that in chapter 2 and proposal M7 deleted that definition for the IMC and IFGC (the mechanical code committee is responsible for both). This might be correlated by staff action.

(b) the definition of "noncombustible material" in IRC chapter 24 contains the same incorrect information regarding the requirements for noncombustible materials based on testing to ASTM E136 as the one in chapter 2 of the IFGC and the definition in chapter 2 of the IFGC was replaced by a reference by the action of proposal FG4. Again, this might be correlated by staff action.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This will decrease the cost of construction by not requiring testing for combustibility materials that are clearly noncombustible.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of conducting an ASTM E136 test is probably around $200 (a guess). Such testing will be unnecessary for several materials.

STAFF NOTE: Both these defintions in the IRC include a pointer to Chapter 24. The pointers to Chapter 11 and Chapter 24 in the definitions are an editorial staff function only. The definitions in IRC Chapter 24 are copied from the IFGC.

Proposal FG4-24 to remove the definition of 'noncombustible materials' from the IFGC was As Modified by the Committee in CAH2. G12-Part III to modify the defintion of 'noncombustible materials' from the IFGC was was As Modified by the Committee in CAH2. Resolution of this conflict will need to be addressed in the Public comments for Group A.

RB20-25

RB21-25

IRC: SECTION 202

Proponents: Scott Kreel, representing Scott Kreel

2024 International Residential Code

Revise as follows:

[RB] DEAD LOADS. The weight of the materials of construction incorporated into the *building*, including but not limited to walls, floors, roofs, ceilings, *stairways*, <u>kitchen islands,</u> built-in partitions, finishes, *cladding*, and other similarly incorporated architectural and structural items, and fixed service equipment.

Reason: I propose that kitchen islands, including their often heavy countertops, be explicitly added to the IRC definition of dead load. These elements are frequently overlooked when calculating dead loads applied to floor joists, despite their significant weight and permanent placement.

Failing to account for kitchen islands in dead load calculations can lead to structural risks, such as compromised floor performance or, in extreme cases, failure. Additionally, improperly designed systems can result in increased floor vibration, reducing occupant comfort and perceived quality of the structure.

While the development of additional floor span tables to account for such loads would be ideal, updating the definition of dead load is a practical and achievable first step. This revision will provide clearer guidance to designers and builders, ensuring safer and more reliable structures without introducing significant complexity.

Cost Impact: The 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 impacts of this change are minimal since it simply clarifies the definition of dead load. Kitchen islands are already a permanent feature in many homes, and their weight should already be considered in design calculations. Explicitly including them in the definition ensures consistency and accuracy without introducing significant new costs, as any adjustments align with existing best practices.

RB21-25

RB22-25

IRC: 202 (New), R317.6, R317.6.1 (New), R317.6.2 (New), R317.6.3 (New), R317.6.4 (New), UL Chapter 44 (New)

Proponents: Robert Davidson, Davidson Code Concepts LLC, representing Self (rjd@davidsoncodeconcepts.com); Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

2024 International Residential Code

Add new definition as follows:

ELECTRIC VEHICLE (EV) CHARGING STATION. One or more vehicle spaces served by an electric vehicle charging system equipment, electric vehicle supply equipment, electric vehicle power export equipment, or wireless power transfer equipment.

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 loads from the vehicle, where the vehicle is the source of supply.

SECTION R317
GARAGES AND CARPORTS

Revise as follows:

R317.6 Electric vehicle charging systems. Where provided, *electric vehicle charging* ~~systems~~ *stations* shall ~~be installed in accordance with NFPA 70. Electric vehicle charging system equipment shall be *listed* and *labeled* in accordance with UL 2202. *Electric vehicle supply equipment* shall be *listed* and *labeled* in accordance with UL 2594~~ comply with Sections R317.6.1 through R317.6.4.

Add new text as follows:

R317.6.1 Installation. Electric vehicle charging stations shall be installed in accordance with NFPA 70, the manufacturer's installation instructions, and the listing.

R317.6.2 Equipment listings. Equipment used in electric vehicle charging stations shall be *listed* and *labeled* as applicable in accordance with the following:

1. Electric vehicle charging equipment in accordance with UL 2202.
2. Electric vehicle supply equipment in accordance with UL 2594.
3. Electric vehicle wireless power transfer equipment in accordance with UL 2750.

R317.6.3 Electric vehicle power export equipment. *Electric vehicle power export equipment* shall comply with Section 1208 of the *International Fire Code.*

R317.6.4 Protection from vehicle impact damage. Electric vehicle charging stations shall be protected from vehicle impact damage.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

2750-2023	Wireless Power Transfer Equipment for Electric Vehicles

Reason: The purpose of this proposal is to provide clarity regarding the charging of electric vehicles (EV). The requirements are not new, they are required to be followed now.

The current Section R317.6 has been broken down into separate subsections to address installation, listings, and vehicle impact protection. Additional listings have been provided and correlation with the EV power export requirements that have been added to the fire code is included.

There are four types of equipment used for charging EVs:

1. EV charging system equipment (UL 2202) – conductive charging equipment is located off board of the EV.
2. EV power export equipment (UL 9741) - can be unidirectional or bidirectional. Unidirectional EVPE 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.
3. EV supply equipment (UL 2594) - provide power to a charger that is on-board the EV.
4. EV wireless power transfer equipment (UL 2750) - infrastructure equipment (off board an EV) that transfers power to an EV through a magnetic resonance coupling between the off-board equipment and the EV.

The use of the term "electric vehicle charging system" does not encompass all four of the different types of equipment used.
New Section R317.6.1 – Equipment used in a EV charging station needs to be installed in accordance with NFPA 70, as well as with the manufacturer's installation instructions and the listing.
New Section R317.6.2 – Clarifies the different equipment used, and the listing requirements. This includes the wireless power transfer equipment.
New Section R317.6.3 - EV power export equipment (EVPE) has additional requirements established by F175-24 in Group A.
New Section R317.6.4 – Suitable vehicle impact protection is needed for this equipment

This proposal is submitted jointly by the ***ICC Building Code Action Committee (BCAC)*** and the ***ICC Fire Code Action Committee (FCAC)***.

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

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 is no increase in construction costs of buildings with this change as it is an editorial and correlation proposal. It also provides additional options for charging of electric vehicles. A similar proposal has been submitted to the IBC.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
UL 2750-2023 Wireless Power Transfer Equipment for Electric Vehicles

RB22-25

RB23-25

IRC: SECTION 202

Proponents: Matthew Dobson, representing Polymeric Exterior Products Association (mdobson@vinylsiding.org)

2024 International Residential Code

Revise as follows:

[RB] EXTERIOR SOFFIT. A material or assembly of materials applied on the underside of exterior overhangs, ~~and~~ attached ~~carport~~ carports, ceilings of raised buildings that create a full story, and porch ceilings.

Reason: This recently added definition's proposal will create stronger understanding where soffit regulations apply. It's important that attachment requirements apply where soffit material is applied with raised buildings undersides. This type of construction, raised homes, is used in many cases near the coast where high wind events are common.

Cost Impact: Increase

Estimated Immediate Cost Impact:

It has been estimated that this will add approximately $200 on an average cost to house.

Based on additional fastener and labor (2 hours).

Estimated Immediate Cost Impact Justification (methodology and variables):

Using RS Means data for carpentry.

By adding this to the scope of the definition it will help to increase the durability of the structure.

RB23-25

RB24-25

IRC: SECTION 202

Proponents: Theresa Weston, The Holt Weston Consultancy, representing Rainscreen Association in North America (holtweston88@gmail.com)

2024 International Residential Code

Revise as follows:

[RB] EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a ~~weather-resistive~~ weather-resisting barrier, insulation or for aesthetics, including but not limited to, veneers, siding, *exterior insulation and finish systems*, architectural *trim* and embellishments such as cornices .

Reason: This proposal revises the definition to be consistent with definition in the IBC and to reduce possible industry confusion. Specifically, "weather-resistive barrier" is changed to "weather-resisting barrier". This maintain that the exterior wall covering is exposed to the
weather and to reduce confusion with the defined "water-resistive barrier" which is a specific wall assembly component.

Cost Impact: The 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 a definition but does not introduce any new requirements.

RB24-25

RB25-25

IRC: SECTION 202

Proponents: Theresa Weston, The Holt Weston Consultancy, representing Rainscreen Association in North America (holtweston88@gmail.com)

2024 International Residential Code

Revise as follows:

[RB] EXTERIOR WALL COVERING. A material or assembly of materials applied on the exterior side of exterior walls for the purpose of providing a weather-resistive barrier, insulation or for aesthetics, including but not limited to, veneers, siding, *exterior insulation and finish systems*, rainscreen systems, architectural *trim* and embellishments such as cornices .

Reason: Revises the "exterior wall covering" definition to add "rainscreen systems" as an example exterior wall covering to make the definition which is consistent with the IBC. The definition of rainscreen systems was added to the IRC in the 2024 edition. Rainscreen systems are not material specific and have a growing market share.

Cost Impact: The 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 makes no changes in requirements, only updates definition

RB25-25

RB26-25

IRC: SECTION 202, R302.1

Proponents: Dan Buuck, National Association of Home Builders, representing National Association of Home Builders (dbuuck@nahb.org)

2024 International Residential Code

Revise as follows:

[RB] FIRE SEPARATION DISTANCE. The distance measured from the building face to one of the following:

1. To the closest interior *lot line*.
2. To the centerline of a street, an alley or public way.
3. To an imaginary line between two *buildings* ~~or townhouse units~~ on the *lot*.

The distance shall be measured at a right angle from the face of the wall.

SECTION R302
FIRE-RESISTANT CONSTRUCTION

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings, townhouses* and accessory buildings shall comply with Table R302.1(1) based on *fire separation distance* ; or *dwellings* and *townhouses* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2) based on *fire separation distance* .

For the purposes of determining *fire separation distance*, *dwellings* and *townhouses* on the same *lot* shall be assumed to have an imaginary line between them. Where a new *dwelling* or *townhouse* is to be erected on the same lot as an existing *dwelling* or *townhouse*, the location of the assumed imaginary line with relation to the existing *dwelling* or *townhouse* shall be such that the existing *dwelling* or *townhouse* meets requirements of this section.

~~Where a *lot line* exists between adjacent *townhouse units*, *fire separation distance* of exterior walls shall be measured to the *lot line*. Where a lot line does not exist between adjacent *townhouse units*, an imaginary line shall be assumed between the adjacent *townhouse units* and *fire separation distance* of exterior walls shall be measured to the imaginary line. *Fire separation distance* and requirements of Section R302.1 shall not apply to walls separating *townhouse units* that are required by Section R302.2.~~

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory* buildings located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling unit* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Reason: The text this proposal strikes was added last cycle which requires a fire separation distance to be determined between townhouse units by measuring to the lot line or an imaginary line where a lot line does not exist. The change was meant to address individual townhouse units which connect at a 90-degree angle. The committee disapproved the change because the code has not required fire resistance for walls at right angles. In addition, committee members believed the proposed text did not address the concerns raised during the testimony and in the proposal's reason statement. In these interior corners, there is no existing or possible future structure built within the fire separation distance measured perpendicular to the wall.

Adding this requirement last cycle seemed to be an attempt to bring the IRC more in line with the IBC's provisions on fire separation. However, requiring an imaginary lot line between townhouse units in the same building is more restrictive than what the IBC requires. See Section 705.3 Exception 1 of the IBC which allows for two or more buildings on the same lot to be considered as portions of one building (if the aggregate area of the buildings meets certain conditions). The IRC should not be more restrictive than the IBC. A townhouse, with its individual units, is one building and should be treated as such. Imaginary lot lines had not previously been applied to a single building in the IRC before last cycle, and this proposal restores how they are applied.

This proposal does not remove the term "townhouse" where it had been added in the second paragraph of R302.1. "Townhouse" is now defined as "a building that contains three or more attached townhouse units" and not the individual unit. Therefore, this provision would apply only when several townhouse buildings are located on the same lot.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

For each instance where two townhouse units meet forming an interior 90-degree corner, accepting this proposal would save $57.60. This estimate does not include the savings from fire-resistant construction at projections. There is also the intangible cost of limiting design that cannot be calculated.

Estimated Immediate Cost Impact Justification (methodology and variables):

Assuming a 3-story townhouse with 8-ft walls, a 5-ft long 1-hr fire-resistant rated wall section would be 120 sq ft.
Type X exterior gypsum, 5/8", taped and finished at $0.43 per sq ft x 120 = <u>$51.60</u>
Type X interior gypsum, 5/8" at $0.38 per sq ft x 120 = <u>$45.60</u>
Existing interior gypsum, ½" at $0.33 per sq ft x 120 = <u>$39.60</u>
$51.60 + $45.60 - $39.60 = $57.60 saved (2018 dollars)

RB26-25

RB27-25

IRC: SECTION 202

Proponents: Mike Fischer, Kellen, representing The Extruded Polystyrene Foam Association (mfischer@kellencompany.com)

2024 International Residential Code

Revise as follows:

[RB] FLAME SPREAD INDEX. A comparative measure, expressed as a dimensionless number, derived from visual measurements of the spread of flame versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and floor values are reported, the ceiling value is the *flame spread index*.

[RB] SMOKE-DEVELOPED INDEX. A comparative measure, expressed as a dimensionless number, derived from measurements of smoke obscuration versus time for a material tested in accordance with ASTM E84 or UL 723. Where ceiling and total smoke values are reported, the ceiling value is the *smoke-developed index*.

Reason: While ASTM E84 and UL 723 contain the same requirements, there are a few minor differences in how data are captured and reported. This proposal will clarify how the test data from testing under either standard correlates to the FS and SD requirements in the code. It will also aid in code education efforts by improving the language.

Note that Proposal G7-24 was unanimously recommended for approval by the IBC-FS Committee; the Committee took no action in CAH #2. G7-24 made the same change for these definitions in the IBC, IFC, IMC, and the IWUIC.

XPSA recommends this proposal be approval as submitted for consistency across all relevant I-Codes.

The Committee reason statement for G7-24 is captured here:

*"**Committee Reason**: The committee stated that the reason for approval was that the proposal clarifies how the test data from testing under ASTM E84 and UL 723 standards correlates to the FS and SD requirements in the code. The committee agreed with the clarification added to the definitions regarding reporting of ASTM E84 and UL 723 values. The committee concluded that the code change proposal clarifies that the ceiling value is applicable to avoid confusion when ceiling and floor values are reported."*

The reason statement for G7-24 is included here:

1) The purpose of the test is to determine the comparative burning characteristics of the material under test by evaluating the spread of flame over its surface and the density of the smoke developed when exposed to a test fire. These measurements are made as the test flame advances along the ceiling of the sample.

However, materials that melt and drip to the floor of the test chamber and continue burning, often have a second measurement reported, based upon the flame spread advancements of material burning along the floor of the furnace. For materials exhibiting these behaviors, both ceiling and floor measurements are reported for the flame spread, while ceiling and total smoke measurements are reported for the smoke developed. The intent of the code requirement for these materials has been that when both the floor and ceiling measurements are reported, the ceiling measurement applies to the building code. This code change proposal clarifies that the ceiling measurement is applicable to avoid confusion when these two values are reported. UL 723 contains specific direction in Section 7 (Classification) and Section 9 (Reporting) for the determination and reporting of ceiling and floor flame spread and ceiling and total smoke developed.

2) The International Mechanical Code (IMC) definitions are revised to match the IBC, IRC, IFC and IWUIC for consistency. Reference to UL 723 is the smoke-developed index is also added for consistency.

3) There is one other flame spread and smoke-developed index test standard besides ASTM E84 and UL 723. It is the CAN/ULC S102.2 test standard used for loose fill insulation, where the product is mounted and tested on the floor of the tunnel apparatus. Therefore, this test standard is listed as an exception in IBC Section 720.4 and IRC R302.10.

The clarification to the definitions regarding reporting of ASTM E84 and UL 723 values will not impact the reporting of CAN/ULC S102.2, which is currently limited to one product with one floor measurement. While ASTM E84 and UL 723 contain the same requirements, there are a few minor differences in how data are captured and reported. This proposal will clarify how the test data from testing under either standard correlates to the FS and SD requirements in the code. It will also aid in code education efforts by improving the language.

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

Justification for no cost impact:

The definition change reflects current practice and adds no requirements.

RB27-25

RB28-25

IRC: SECTION 202 (New)

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

Add new definition as follows:

WALL, FOUNDATION. Vertical component of the building's foundation system, such as a restrained basement wall, stem wall, or retaining wall, that supports and transfers loads from the above-grade portion of the building to the footings below.

Reason: While foundation wall provisions have been in the IRC for some time, there has not been a definition. By adding this definition it provides clarity to users as to when they must follow both the requirements of R403 and R404 for both footings and foundation walls rather than simply complying with the footing provisions of IRC R403.

Section R404 “Foundation and Retaining Walls” provides numerous requirements for vertical elements of the foundation that are above-and-beyond those for footings listed in R403. R404 applies to full basement walls, partial height walls known as “stem walls”, and in some cases retaining walls that are not properly restrained at the top. These walls support vertical and lateral loads from the structure as well as lateral soil loads applied to the face of the walls.

By adding this definition, it clarifies when stem walls and basement foundation walls are required to meet the additional requirements noted in R404 to ensure that forces are properly transferred through these walls to the footings below. This becomes especially critical in higher Seismic Design Categories D0, D1, and D2 as seismic lateral earth pressure can also be applied to these walls.

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

Justification for no cost impact:

The change is proposed for clarification of existing provisions only.

RB28-25

RB29-25

IRC: SECTION 202 (New), SECTION R312 (New), R312.1 (New), R312.2 (New), R312.2.1 (New), R312.2.2 (New), R312.3 (New), R312.4 (New), R312.5 (New), R312.6 (New), R312.7 (New), R312.7.1 (New), R312.7.2 (New), UL Chapter 44 (New)

Proponents: Bob Torbin, Omega Flex, Inc., representing Self (bob.torbin@omegaflex.net)

2024 International Residential 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 fuel gas detection system or separate alarm only unit.

Add new text as follows:

SECTION R312
FUEL GAS DETECTORS AND ALARMS

R312.1 General. Fuel gas detectors and alarms shall comply with Section R312 and shall be listed in accordance with either UL 1484 or UL 2075.

> **Exception:** Detector and alarm listed and located in accordance with a performance-based design approved by the building code official and in accordance with the manufacturer's instructions.

R312.2 Where required. Where required by the local jurisdiction, fuel gas detectors and alarms shall be provided in accordance with Sections R312.2.1 and R312.2.2.

R312.2.1 New Construction. For newly constructed dwelling units, fuel gas detectors and alarms shall be provided where either of the following conditions exist:

1. The dwelling unit contains one or more fuel-fired appliances.
2. The dwelling unit has a basement where the fuel gas piping penetrates the foundation wall below ground.

R312.2.2 Existing dwellings. Where the existing dwelling unit meets either of the requirements of Section R312.2.1, fuel gas detectors and alarms shall be installed prior to the transfer of ownership.

R312.3 Location. Fuel gas detectors and alarms shall be located in accordance with the manufacturer's installation instructions and the following:

1. At least one detector and alarm shall be located on the same floor as any permanently installed fuel gas-burning appliance in accordance with the following:
    1.1. In a horizontal flow path between 3 feet (915 mm) and 10 feet (3050 mm) from a permanently installed fuel gas cooking appliance.
    1.2. In a horizontal flow path within 10 feet (3050 mm) from other permanently installed fuel gas-burning appliances or a group of permanently installed fuel gas-burning appliances.
    1.3. Within an area of 600 square feet (56 square meters) of contiguous floor space and not more than 30 feet (9145 mm) from any permanently installed fuel gas-burning appliances or a group of permanently installed fuel gas-burning appliances.
2. One detector and alarm shall be installed in the basement or other subgrade room of dwelling units supplied with fuel gas where the point of entry of the service is below grade.
3. One detector and alarm shall be installed in an attached garage where the fuel gas point of delivery or a fuel gas burning appliance is installed.
4. For dwelling units with bedrooms on a different floor than the fuel gas burning appliances, at least one alarm shall be located outside of each separate sleeping area in the immediate vicinity of the bedrooms.

R312.4 Placement. Detectors and alarms shall be placed and permanently mounted in accordance with the manufacturer's installation instructions and the following:

1. For natural gas, the detector and alarm shall be placed on the ceiling or on the wall with the top of the detector within 12 inches (305 mm) of the ceiling.
2. For LP-gas, the entire detector-alarm unit shall be placed on the wall within 18 inches (457 mm) of the floor.
3. Detectors and alarms shall not be installed in locations directly in the airstream of supply and return registers.
4. For natural gas, detectors shall not be placed directly above doorway openings or in areas of obstructed air flow.

R312.5 Combination units. Combination fuel gas and carbon monoxide detectors and alarms shall be placed in accordance with the fuel gas being sampled.

R312.6 Interconnectivity. In new construction where more than one fuel gas detector and alarm are required, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the dwelling unit. Physical interconnection of fuel gas detectors and alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

R312.7 Power source. Fuel gas detectors and alarms shall receive their power in accordance with Sections R312.7.1 and R312.7.2.

R312.7.1 Primary power. Primary power shall be received from the dwelling unit wiring where such wiring is served from a commercial source. The wiring shall be permanent and without a disconnecting switch other than required for overcurrent protection.

R312.7.2 Alternative power. Fuel gas detectors and alarms shall be permitted to be battery operated whenever the following occurs:

1. Where primary power is interrupted.
2. Where installed in dwelling units without commercial power.
3. When fuel gas detectors and alarms are installed in an existing dwelling unit.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

UL 1484-2022	Standard for Residential Gas Detectors
UL 2075-2024	Gas and Vapor Detectors and Sensors

Reason: The lifesaving value of smoke and carbon monoxide detection devices is well documented and required by the IRC for many years. The National Transportation Safety Board, through its investigations of a multitude of natural gas incidents involving fatalities, recommends that fuel gas detectors/alarms also be included within the IRC. The inclusion of fuel gas detection to this code will improve the safe distribution and use of fuel gas when piping systems and appliances malfunction, or when actions by the homeowner or their contractors accidentally create a release of a fuel gas, or when the homeowner does not detect an odor of a fuel gas inside the house.

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, and NTSB Report NTSB/PAR-21-01 Atmos Energy Corporation Natural Gas-Fueled Explosion Dallas, Texas, non-mandatory requirements for fuel-gas detectors/alarms are proposed for inclusion within a new section R3XX of the IRC. Further justification for this type of detector and alarm is supported by the 2018 NFPA Report, Natural Gas and Propane Fires, Explosions and Leaks Estimates and Incidents by Marty Ahrens and Ben Evarts. Although the general technical specifications in the proposal are based on the forthcoming 2026 edition of NFPA 715 Standard, Installation for Fuel Gas Detection and Warning Equipment, the specific requirements that are proposed are not beholden to this document. The 2026 edition of NFPA 715 has been modified to include additional options regarding placement and location criteria that is based on new research studies on an analysis of the gas dispersion.

In the U.S., local fire departments respond to an average of 340 natural gas or LP-gas leaks per day with no ignition (2018 NFPA Report). 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 detector and alarm would provide advanced warning to home occupants of potential imminent danger and would almost certainly reduce the number of annual deaths associated with fuel gas use.

This Proposal seeks to protect occupants in dwelling units from explosions and fires caused by natural gas or liquefied petroleum gas (LP-Gas) leaks. The proposal is needed based on fire statistics from the 2024 NFPA Report, Structure Fires Involving Flammable Gases by Tucker McGree,

- During the years of 2010–2022, there was an estimated annual average of 11,537 reported home fires were a result of a flammable gas.
- These fires caused an estimated 191 civilian deaths, 747 civilian injuries, and $402 million in property damage each year. An estimated 10,774 fires occurred in homes and 5,166 occurred in non-home structures each year
- All the reported flammable gases, the largest percentage of fires began with the ignition of natural gas, followed by LP-Gas. The incidents where LP-Gas was the first material to ignite had more civilian deaths and injuries associated with them.

Bibliography: NTSB Report NTSB/PAR-19/01 PB2019-100722 Building Explosion and Fire Silver Spring, Maryland

NTSB Report NTSB/PAR-21-01 Atmos Energy Corporation Natural Gas-Fueled Explosion Dallas, Texas

NFPA Report, Natural Gas and Propane Fires, Explosions and Leaks Estimates and Incidents – 2018 by Marty Ahrens and Ben Evarts.

NFPA Report, Structure Fires Involving Flammable Gases – 2024 by Tucker McGree

NFPA 715-2026 Standard for the Installation of Fuel Gas Detection and Warning Equipment

Cost Impact: Increase

Estimated Immediate Cost Impact:

The estimated installation cost per fuel gas detector should be approximately equal to the installation cost of similar smoke and carbon monoxide detection systems in terms of the cost of the individual detector/alarm unit, the cost of installing permanent electrical wiring, or the cost of a battery-only type unit. The cost impact of each fuel gas detection/alarm system installed is estimated to be between $100 (battery operated) to $250/unit (based on manufacturer’s estimate for hard-wired units).

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposed amendment to the IRC does not mandate the installation of fuel gas detectors and alarms. The proposal allows the builder and/or the homeowner to install fuel gas detection systems that meet the needs of the affected residents, the fuel gas system configuration within the building, the manufacturer's installation instructions, and other local regulations. The number of fuel gas detectors can vary greatly depending on the general size/floor plan of the house, the location of the gas piping, and the type and number of gas appliance installed. The installation of fuel gas detection system is not intended to meet a one-size-fits-all approach. Therefore, the cost to install a fuel gas detection system can vary greatly.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.

UL 1484-2022 Standard for Residential Gas Detectors

UL 2075-2024 Gas and Vapor Detectors and Sensors

RB29-25

RB30-25

IRC: SECTION 202, SECTION R325.2

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Delete without substitution:

~~**[RB] GLAZING AREA.** The interior surface area of all glazed fenestration, including the area of sash, curbing or other framing elements, that enclose *conditioned space*. Includes the area of glazed fenestration assemblies in walls bounding conditioned *basements*.~~

Revise as follows:

[RB] SUNROOM. A one-story structure attached to a *dwelling* with an aggregate area of glazing ~~a *glazing area*~~ in excess of 40 percent of the *gross area* of the structure's exterior walls and roof. For the definition applicable in Chapter 11, see Section N1101.6.

SECTION R325
LIGHT, VENTILATION AND HEATING

R325.2 Bathrooms. Bathrooms, water closet compartments and other similar rooms shall be provided with an aggregate area of glazing ~~*glazing area*~~ in windows of not less than 3 square feet (0.3 m^2), one-half of which shall be openable.

> **Exception:** The glazed areas shall not be required where artificial light and a *local exhaust* system are provided. The minimum *local exhaust* rates shall be determined in accordance with Section M1505. Exhaust air from the space shall be exhausted directly to the outdoors.

Reason: The term "glazing area" and its definition are no longer useful in the IRC. The definition refers to ALL the glazing in the entire building, but only conditioned space, and is a relic from the pre 2006 chapter 11 energy code where a maximum of 15% glazing was permitted. The energy code no longer makes reference to the entire glazed area of a building in this manner. This phrase "glazing area" is provided in italics in the section for bathroom ventilation, but would not apply in the manner the term is defined. The glazing of a bathroom is only in relation to the single bathroom and not the entire building. Here is some added history regarding this subject.

1) The 1998 International One and Two-Family Dwelling Code published by ICC (in the early days) does NOT include a definition for this term and it does NOT include a chapter on energy. However, the 1995 Model Energy Code (MEC) does define this term and use it. In the 2000 IRC, chapter 11 for energy (based on the MEC) this term is used and the definition is included. In the 2006 energy code, this term was no longer used, but the definition remained.

2) In the 2003 IRC a definition for "sunroom addition" was added that made reference to a percentage of glazing. This defined term "glazing area" was used. However, much like with bathrooms, this is not the application of the term for sunrooms. Sunroom glazing area is only in relation to the sunroom and not the entire building. Further to the point, the definition for "glazing area" is in reference to "conditioned space". In the 2015 IRC clear guidance for different types of sunrooms was included in Section 301 for wind design. Here it is made clear that sunrooms may be conditioned spaces or unconditioned spaces.

3) Since the creation of the 2024 IRC, chapter 11 for energy has been moved to an entirely separate and different code development process including it's own definitions found in Chapter 11. If the term and definition for "glazing area" needs to be retained for energy code purposes (See Table N1105.4.2(1)) then the term needs to be defined as necessary in the IECC and Chapter 11 of the IRC, but not in Chapter 2 of 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:

This proposal is intended to remove relic terms no longer useful in the IRC and thus has no cost impact on construction.

RB31-25

IRC: SECTION 202

Proponents: Jennifer Goupil, American Society of Civil Engineers and Structural Engineering Institute, representing American Society of Civil Engineers (jgoupil@asce.org)

2024 International Residential Code

Revise as follows:

[RB] GUARD. A ~~building~~ component or ~~a system of building~~ assembly of components located at or near the open sides of an elevated walking ~~surfaces~~ surface that minimizes the possibility of a fall from the elevated walking surface to the ~~lower level~~ floor or grade below.

Reason: This proposal is a coordination proposal to bring the 2027 IRC up to date with the provisions of the 2022 edition of ASCE/SEI 7 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE/SEI 7-22). Additionally, this proposal coordinates the 2027 IRC with the 2027 IBC, IPMC, and IFC due to action taken in Group A on G9-24. The revised text shown in this proposal matches the text resulting from the outcome of Group A Committee Action Hearings #1 and #2.

The changes do the following: The word "building" is struck in two places as it is unnecessary and does not appear in the ASCE 7 definition. The definition is clear without it. Additionally, the use of the word “building” could cause confusion as the scope of the IRC includes buildings and their accessory structures per Section 101.2, but the word “structures” does not appear alongside the word “building”.

The word "system" is changed to "assembly" to match the ASCE 7 definition. The words in this usage are interchangeable. However, in ASCE 7 the defined term is Guard System, and as such the ASCE 7 definition uses “assembly” to avoid using “system” in both the defined term and in the definition. It is generally considered not good practice to repeat words being defined in the definition itself.

The addition of the word "elevated" matches ASCE 7 text and is consistent with the first part of the definition, referring to the walking surfaces as the elevated surface.

Changing "to a lower level" to "to the floor or grade below" is consist with Group A action. This was done to make the definition consistent with the existing code language describing when the elevation difference is great enough to require a Guard, contained in IBC Section 1015.2 and IRC Section 321.1.1.

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

Justification for no cost impact:

Improving coordination of a definition between I-Codes and with ASCE 7 is not expected to affect the cost of construction.

RB31-25

RB32-25

IRC: SECTION 202 (New), R318.7.5.3, R318.7.6

Proponents: David Cooper, Stair Manufacturing and Design Consultants, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2024 International Residential Code

[RB] STAIRWAY. One or more *flights* of *stairs*, either interior or exterior, with the necessary landings and connecting platforms to form a continuous and uninterrupted passage from one level to another.
[RB] MEZZANINE. An intermediate level or levels between the floor and ceiling of any *story*.
[RB] FLIGHT. A continuous run of rectangular treads or *winders* or combination thereof from one landing to another.

Add new definition as follows:

LANDING. The portion of a walking surface required for direct access to or from an adjacent door, stair, flight of stairs, ramp run, or elevator.

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.7.5.3 Nosings. Treads~~,~~ and landings~~ and floors~~ of *stairways* shall have a radius of curvature at the *nosing* not greater than $^{9}/_{16}$ inch (14 mm) or a bevel not greater than $^{1}/_{2}$ inch (12.7 mm). A *nosing* projection not less than $^{3}/_{4}$ inch (19 mm) and not more than $1^{1}/_{4}$ inches (32 mm) shall be provided on *stairways*. The greatest *nosing* projection shall not exceed the smallest *nosing* projection by more than $^{3}/_{8}$ inch (9.5 mm) within a flight of stairs and the landing~~s~~ at the top of the flight.

Exceptions:

1. A *nosing* projection is not required where the tread depth is not less than 11 inches (279 mm).
2. Where *risers* are open, the maximum *nosing* projection shall be permitted to exceed $1^{1}/_{4}$ inches (32 mm).

R318.7.5.4 Exterior plastic composite stair treads. *Plastic composite* exterior stair treads shall comply with the provisions of this section and Section R507.2.2.

R318.7.6 ~~Landings for stairways~~Stairway landings. There shall be a ~~floor or~~ landing at the top and bottom of each *flight* of stairs. The width perpendicular to the direction of travel shall be not less than the width of the *flight* served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be not less than that of a quarter circle with a radius equal to the required landing width. Where the *stairway* has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

Exceptions:

1. The top landing of an interior *stairway*, including those in an enclosed garage, shall be permitted to be on the other side of a door located at the top of the *stairway* , provided that the door does not swing over the stairs.
2. At an enclosed garage, the top landing at the *stair* shall be permitted to be not more than $7^{3}/_{4}$ inches (197 mm) below the top of the threshold.
3. At exterior doors, a top landing is not required for an exterior stairway of not more than two risers, provided that the door does not swing over the *stairway*.

4. Exterior *stairways* to grade with three or fewer *risers* serving a deck, porch or patio shall have a bottom landing width of not less than 36 inches (914 mm), provided that the stairway is not the required access to grade serving the required egress door.

Reason: What is the difference between a landing and a floor? There is clearly a difference that is not understood. An entire floor is not a landing, but the code uses the term “floor-or-landing” as if they are the same. The confused use of the terms interchangeably is due to the lack of a definition for either floor or landing. Landings as are flights are the components of a stairway as defined in the code and include here for your ready reference.

A landing is but a portion of a floor. The attribute of size is not addressed in dictionaries and this alone is justification for a unique definition in the code. A landing may not be a floor at all if it is not at a floor level but only located between flights.

If it is a deck or patio connected to the structure, is it a floor or landing? Clearly only enough area is needed to safely access or depart from the flight of stairs. The code, however, provides an option for a floor of indefinite size though only a landing is needed. An entire floor is not necessary to enter or exit a stairway. If a floor is provided instead of a landing, is it limited to the size of a landing or what portion of the floor is the landing? The code should not support such circular rhetoric..

How big is a floor or should I ask is there a need to describe the limits of a floor's size? If you could define "floor", it would likely not be in terms of its size? A landing is much different. The code specifies landing sizes throughout the code, albeit, sometimes indirectly but this alone makes a landing uniquely different from a floor.

The limit of a landing’s size is what defines where the stairway ends and where a floor begins. This is important because it prescribes the specific area where stairway requirements are applicable such as width, depth, and headroom of landings are uniquely regulated in R318.7 Stairways. The suggested definition clearly identifies the unique quality of landing size as "The portion of a walking surface required..." and quantifies the landing as the amount of space needed to perform the functions of a landing, e.g., change in direction, change in stride, rest, or simply provide the area required to enter or exit a doorway, stair, ramp or elevator.In addition to the definition, we have included comprehensive changes to other requirements with instances of confusing reference to the terms floor or landing. Each has been corrected by deleting floor where "floor or landing" has been used and any related contextual changes necessary. Each of these necessary changes to the code are very clear examples of how the suggested definition for landing can simplify code language and provide for consistent interpretation.

In an effort to correlate with the IBC and the A117.1 standard the proposed definition has been submitted and approved in the proceedings of the A117.1 committee for inclusion in the final ballot of the ICC A117.1 Standard expected in 2025. The text is the same except that "door" is deleted as landings at doors are not mentioned in A117.1. The definition was also approved by the MOE Committee in Group A CAH2.

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

Justification for no cost impact:

This is a new definition and editorial changed needed to correlate with other ICC defined terminology. The changes have no material affect upon the cost of construction.

RB32-25

RB33-25

IRC: SECTION 202

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Residential Code

Revise as follows:

[RB] MANUFACTURER'S INSTALLATION INSTRUCTIONS. Published ~~Printed~~ instructions for ~~included with~~ equipment as part of the conditions of their *listing* and *labeling*.

Reason: Manufacturer's installation instructions are increasingly made available in media other than printed versions. This proposal removes the requirement that instructions be "printed" from the definition. Doing so will permit alternative methods for providing instructions, including digital formats that support better sustainability. The proposed change is important in light of events such as the COVID-19 pandemic, which brought attention to the need to deliver information using alternative methods.

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

Justification for no cost impact:

Although near-term changes are not anticipated if this proposal is accepted, increasing available options for delivering installation instructions is expected to lead to either no change or a reduction in cost of construction through improved efficiencies.

RB33-25

RB34-25

IRC: SECTION 202, SECTION 202 (New)

Proponents: Kota Wharton, representing City of Grove City (kwharton@grovecityohio.gov)

2024 International Residential Code

Delete without substitution:

~~**[RB] MULTIPLE-STATION SMOKE ALARM.** Two or more single-station alarm devices that are capable of interconnection such that actuation of one causes all integral or separate audible alarms to operate.~~
~~**[RB] SINGLE-STATION SMOKE ALARM.** An assembly incorporating the detector, control equipment and alarm sounding device in one unit that is operated from a power supply either in the unit or obtained at the point of installation.~~

Add new definition as follows:

<u>**SMOKE ALARM.** An assembly incorporating the detector, control equipment and alarm sounding device in one unit that is operated from a power supply either in the unit or obtained at the point of installation.</u>

Reason: The IRC does not utilize either definition, single-station smoke alarm or multi-station smoke alarm. This code change reduces the definition of "single-station smoke alarm" to "smoke alarm" to make the code clearer of what is being referred to. Where interconnection is required, the existing definition of single-station smoke alarm is not restrictive.

This is the current text for smoke alarms for reference.

SECTIONR310
SMOKE ALARMS

R310.1 General. Smoke alarms shall comply with NFPA 72, Section R310 and the manufacturer’s installation instructions.

R310.1.1 Listings. Smoke alarms shall be *listed* and *labeled* in accordance with UL 217. Combination smoke and *carbon monoxide alarms* shall be *listed* and *labeled* in accordance with UL 217 and UL 2034.

R310.1.2 Installation. Smoke alarms and combination smoke and *carbon monoxide alarms* shall be installed in accordance with their listing and the manufacturer’s instructions.

R310.2 Where required. Smoke alarms shall be provided in accordance with this section.

R310.2.1 New construction. Smoke alarms shall be provided in *dwelling units*.

R310.2.2 Alterations, repairs and additions. Where *alterations*, *repairs* or *additions* requiring a *permit* occur, the individual *dwelling unit* shall be equipped with smoke alarms located as required for new *dwellings*.

Exceptions:

1. Work involving the exterior surfaces of *dwellings*, such as the replacement of roofing or siding, the addition or replacement of windows or doors, or the addition of a porch or deck.
2. Installation, *alteration* or repairs of plumbing or *mechanical systems*.

R310.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.

3. On each additional *story* of the *dwelling unit,* including *basements* and *habitable attics* and not including *crawl spaces* and uninhabitable *attics*. In *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.
4. Not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by this section.
5. In the hallway and in the room open to the hallway in *dwelling units* where the *ceiling height* of a room open to a hallway serving bedrooms exceeds that of the hallway by 24 inches (610 mm) or more.
6. Within the room to which a *sleeping loft* is open, in the immediate vicinity of the *sleeping loft*.

R310.3.1 Installation near cooking appliances. Smoke alarms shall be installed not less than 10 feet (3048 mm) horizontally from a permanently installed cooking appliance.

Exception: Smoke alarms shall be permitted to be installed not less than 6 feet (1829 mm) horizontally from a permanently installed cooking appliance where necessary to comply with Section R310.3.

R310.4 Interconnection. Where more than one smoke alarm is required to be installed within an individual *dwelling unit* in accordance with Section R310.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual *dwelling 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.

R310.5 Combination alarms. Combination smoke and *carbon monoxide alarms* shall be permitted to be used in lieu of smoke alarms.

R310.6 Power source. Smoke alarms shall receive their primary power from the *building* wiring where such wiring is served from a commercial source and, where primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Exceptions:

1. Smoke alarms shall be permitted to be battery operated where installed in *buildings* without commercial power.
2. Smoke alarms installed in accordance with Section R310.2.2 shall be permitted to be battery powered.

R310.7 Fire alarm systems. Fire alarm systems shall be permitted to be used in lieu of smoke alarms and shall comply with Sections R310.7.1 through R310.7.4.

R310.7.1 General. Fire alarm systems shall comply with the provisions of this code and the household fire warning equipment provisions of NFPA 72. Smoke detectors shall be *listed* in accordance with UL 268.

R310.7.2 Location. Smoke detectors shall be installed in the locations specified in Section R310.3.

R310.7.3 Permanent fixture. Where a household fire alarm system is installed, it shall become a permanent fixture of the occupancy, owned by the homeowner.

R310.7.4 Combination detectors. Combination smoke and *carbon monoxide detectors* shall be permitted to be installed in fire alarm systems in lieu of smoke detectors, provided that they are *listed* in accordance with UL 268 and UL 2075.

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

Justification for no cost impact:

This code change clarifies the definition of smoke alarms in the IRC without a technical change.

RB34-25

RB35-25

IRC: SECTION 202 (New), SECTION 317 (New), 317.1 (New), 317.2 (New), R318.1, R321.1.1

Proponents: Steve Thomas, Shums Coda Associates, representing Colorado Chapter Code Development Committee (sthomas@coloradocode.net)

2024 International Residential Code

Add new definition as follows:

OCCUPIABLE ROOFS. An exterior space on a roof that is designed for human occupancy, other than maintenance or *repair*.

Add new text as follows:

SECTION R317
OCCUPIABLE ROOFS

R317.1 Occupiable Roofs. Occupiable roofs shall comply with this section. The occupiable roof shall not be included in the number of stories as regulated in Section R101.2.

R317.2 Enclosures . Elements or *structures* enclosing the occupiable roof areas shall not extend more than 48 inches (1220 mm) above the surface of the occupiable roof.

Exceptions:

1. Stair and mechanical enclosures not exceeding 50 square feet (4.65 m^2) in roof area.
2. Elements or structures enclosing occupiable roof areas located on the same level as a story.

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.1 Means of egress. *Dwelling units* shall be provided with a means of egress in accordance with this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the *dwelling unit, including occupiable roofs,* to the required egress door without requiring travel through a garage. The required egress door shall open directly into a *public way* or to a *yard* or *court* that opens to a *public way*.

SECTION R321
GUARDS AND WINDOW FALL PROTECTION

R321.1.1 Where required. *Guards* shall be provided for those portions of open-sided walking surfaces, including floors, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or *grade* below at any point within 36 inches (914 mm) horizontally to the edge of the open side and at the perimeter of occupiable roofs. Insect screening shall not be considered as a *guard*.

Exception: Portions of an *occupiable roof* located less than 30 inches (762 mm) measured vertically to adjacent unoccupiable roof areas where *approved guards* are present at the perimeter of the roof.

Reason: The IRC is silent on how to apply the code to occupiable roofs. These occupiable spaces are becoming more popular and we need something in the code to address the issue. The proposed language is modeled after the IBC language regarding occupiable roofs. We believe that it is important to have some level of regulations when someone wants to use the roof for an occupiable space. This proposal will provide equivalent requirements to those included 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:

We believe that most building departments are already requiring occupiable roofs to comply with these proposed requirements. The intent is to provide clarifying language to give the code official language to use for things that are already being done.

RB35-25

RB36-25

IRC: SECTION 202 (New)

Proponents: Jeff Bowlsby, representing Se;lf

2024 International Residential Code

Add new definition as follows:

<u>**OTHERWISE SPECIFIED.** Where stated without context, this term shall mean either of the following: 1. As alternatively specified within this subject code, referenced code or referenced standard. 2. As alternatively specified in mandatory language by the *registered design professional* where an alternative material, design, method of construction and equipment in accordance with Section R104.2.2 is *approved*.</u>

Reason: This proposed code change includes a new definition for this currently undefined term “otherwise specified” where required context is not stated, to specify the required context in mandatory language, eliminating the terms’s vagueness and ambiguity, and to support uniform code interpretation, application, compliance, and enforcement. This proposed code change resolves these conflicts and conundrums.

Where used in the primary code documents (e.g. the IRC, referenced codes and referenced standards):

1. Use of this undefined term “otherwise specified” without required context does not establish minimum code requirements as set forth in IRC **R101.3 Purpose**.

2. No context is given for the undefined term “otherwise specified”. This undefined term is sometimes used without required context to provide mandatory language, therefore the term does not comply with IRC **R201.4 Terms not defined** and yet is codified. This undefined term is vague and ambiguous, and creates significant difficulties for code interpretation, application, compliance, and enforcement.

Example: 2021 IBC “1408.9 Surface-burning characteristics. Unless otherwise specified, HPL shall have a flame spread index of 75 or less and a smoke-developed index of 450 or less when tested in the minimum and maximum thicknesses intended for use in accordance with ASTM E84 or UL 723.” A literal reading of this code section can cause a misinterpretation of this undefined term “otherwise specified” in that an implied ‘specifier’ entity has an implied, unrestricted authority and discretion to “otherwise specify” alternative specifications such as an HPL with a greater flame spread index and smoke-developed index than the limits specified in 1408.9 allow. Surely this is not the intent of the code.

3. Items “otherwise specified” may imply that a ‘specifier’ entity has unrestricted authority and discretion to create alternative specifications which may vary from the minimum requirements of the code because there is no stated condition of approval where this term is used.

Example: ASTM F1667“10.1.4Mechanically deposited zinc coatings applied to fasteners after forming shall have a thickness in accordance with Specification B695, Class 40, unless otherwise specified.” No condition of approval for this alternative specification is stated such as the review and approval requirements for alternatives in IRC **R104.2.2 Alternative materials, design and methods of construction and equipment**. Surely this is not the intent of this reference standard.

4. This undefined term “otherwise specified” provides no helpful references to establish context

For undefined terms, the 2021 IBC Commentarydirects the code user to rely on a dictionary definition, referenced standards and the vague term ‘published textbooks’ to establish the context for defining this term. This undefined term “otherwise specified” is vague and ambiguous, and no definition or context establishing minimum codified requirements for this term can be gleaned from any of these documents.

5. This undefined term “otherwise specified” does not satisfy the requirement of mandatory language for use of defined terms in ICC CP#28-05 Code Development for referenced standards. As applies to referenced standards, ICC CP#28-05 4.6.2.1 requires that “A standard or portions of a standard intended to be enforced shall be written in mandatory language,” and 4.6.2.3 requires that “All terms shall be defined when they deviate from an ordinarily accepted meaning or a dictionary definition.” Where this undefined term “otherwise specified” is used in referenced standards without additional required context written in mandatory language, its use conflicts with and does not satisfy either of these CP#28-05 requirements.

6. The term “specified” implies a ‘specifier,’ whose characteristics are undefined.

No qualifications or restrictions are stated or implied preventing any entity from functioning as a ‘specifier.’ The ‘specifier’ entity implied in this undefined term “otherwise specified” is without context for the specifier’s qualifications or relationship to the permitted work. Therefore, the vague and ambiguous term ‘specifier’ can be (mis)interpreted and (mis)applied in the literal sense by code users to grant an unrestricted authority and discretion to any entity the code user determines to be a ‘specifier’ to ‘specify otherwise.’ A ‘specifier’ may be a licensed or unlicensed designer preparing construction documents, a contractor in a bid qualification, a manufacturer within their product data, a product or material supplier using their purchase order, a property developer or a homeowner, or any other entity. A ‘specifier’ entity may vary with the situation and may include legally or technically unqualified persons or the possibility that some of these ‘specifiers’ may have limited roles on the project.

The ordinarily accepted meaning of ‘specifier’ as used in the broader context of primary code documents is the registered design professional as defined in IRC Section R202. However, this undefined term “otherwise specified” does not limit the ‘otherwise specifying’ of an alternative to the registered design professional even though that professional is professionally responsible for the permitted work.

7. The ubiquitous practice of omitting drawings or specifications from work requiring compliance with the requirements for permit approval, conflicts with the essential purpose and requirements of the primary code documents ‘to establish minimum requirements’ and is not compliant with IRC R101.3. Items requiring review and compliance and intentionally or unintentionally NOT depicted on drawings and specifications submitted for permit approval are oftentimes as important as the items depicted. Because this undefined term “otherwise specified” without additional context implies a ‘specifier’ has the unrestricted authority and discretion to ‘specify otherwise,’ the term can be interpreted in the opposite sense - to ‘intentionally or unintentionally NOT specify something because it is not wanted’ by the ‘specifier,’ even where code compliance may require it. Compliance with codified requirements in primary code documents may simply be intentionally or unintentionally omitted from drawings or specifications submitted for permit approval such as when they are aesthetically objectionable or to reduce construction costs.Some code users will (incorrectly) interpret the intentional or unintentional omissions from the ‘approved for permit’ documents as approved omissions. Silence on whether code compliance and building official review and approval of the item ‘otherwise specified’ is or is not required creates conflicts during construction.

8. Where this undefined term “otherwise specified” is used, these combined factors cause misinterpretation and misapplication of the primary code documents and are a significant obstruction to effective code interpretation, application, compliance, and enforcement.

9. This undefined term “otherwise specified” has surreptitious functional similarities to the IRC R104.2.2 process, but the results of ‘otherwise specified’ are not approved unless the requirements of IRC R104.2.2 are satisfied.

10. This undefined term “otherwise specified” does not specifically mandate that ‘specifying otherwise’ shall comply with the full list of requirements of the IRC R104.2.2 process. Consider that the (mis)interpretation and (mis)application of this term may be a potential and intentional attempt at an unconditional, defacto approach to circumvent the IRC R104.2.2 process simply by “otherwise specifying” an alternative to minimum requirements of the primary code documents which is never presented to the building official for review or approval or for the testing and approval requirementsand authorityof the building official.

11. This undefined term “otherwise specified” does not establish the minimum requirements for WHERE the item ‘otherwise specified’ (alternative) shall be specified. Where the undefined term “otherwise specified” is used in a code or referenced standard, is the item specified within the same code or referenced standard or somewhere else? If the term means an Alternative is specified within an approved code or referenced standard then the context is established. However, this undefined term does not explicitly require in mandatory language: “unless otherwise specified <u>within this code or referenced standard</u>”.

12. This undefined term “otherwise specified” indicates no requirement to identify items “otherwise specified” or Alternatives on construction documents.

13. This undefined term “otherwise specified” in its current form where used without context in the code, referenced codes, or referenced standards, is illegal and void and a partial invalidity as specified in IRC **R102.5 Partial invalidity**, but does not make void or illegal any of the other parts or provisions.

14. More broadly, this undefined term “otherwise specified” is used not only within the IRC, but also within the referenced codes and referenced standards. The number and various types of codified referenced documents using the term is significant enough that coordinating changes to each of the codified referenced documents by proponents will take many years if not decades to correct, justifying this proposed code change for a single new definition in the IRC as the most appropriate and expedient solution, for uniformity of interpretation, application, compliance, and enforcement of the primary code documents.

15. Going forward, the term “otherwise specified” without an ordinarily accepted meaning for context should not be allowed in code

development of the primary code documents. CP#28-05 should also be considered for specific revision to not allow this term in referenced standards for the same reason.

A few examples:

Building Codes

- **2024 IBC @1406.9 Surface-burning characteristics.** Unless otherwise specified, MCM shall have a *flame spread index* of 75 or less and a *smoke-developed index* of 450 or less when tested in the maximum thickness intended for use in accordance with ASTM E84 or UL 723.

- **2024 IBC @1408.9 Surface-burning characteristics.** Unless otherwise specified, HPL shall have a *flame spread index* of 75 or less and a *smoke-developed index* of 450 or less when tested in the minimum and maximum thicknesses intended for use in accordance with ASTM E84 or UL 723.

- **2024 IBC @1607.4 Concentrated live loads.** Floors, roofs and other similar surfaces shall be designed to support the uniformly distributed *live loads* prescribed in Section 1607.3 or the concentrated *live loads*, given in Table 1607.1, whichever produces the greater *load effects*. Unless otherwise specified, the indicated concentration shall be assumed to be uniformly distributed over an area of 21/2 feet by 21/2 feet (762 mm by 762 mm) and shall be located so as to produce the maximum *load effects* in the structural members.

Referenced Codes

- **2024 IPC @ 301.2 Overlap.** Unless otherwise specified, clear floor spaces, clearances at fixtures, maneuvering clearances at doors, and turning spaces shall be permitted to overlap

- **2024 IPC @ 304.4 Door swing.** Unless otherwise specified, doors shall be permitted to swing into turning spaces.

- **2024 IPC @ 305.4 Knee and toe clearance.** Unless otherwise specified, clear floor space shall be permitted to include knee and toe clearance complying with Section 306.

- **2024 IPC @ 305.5 Position.** Unless otherwise specified, clear floor spaces shall be positioned for either forward or parallel approach to an element.

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Referenced Standards (Excepos from current edition of referenced standards listed in IRC Chapter 44)

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- **ASTM A36@ 5.1 Standard Specification for Carbon Structural Steel** Unless otherwise specified, plates used as bearing plates for bridges shall be subjected to mechanical tests and shall conform to the tensile requirements of Section 8.

- **ASTM B88 @ 1.2 Standard Specification for Seamless Copper Water Tube** The tube shall be produced from the following coppers, and the manufacturer has the option to supply any one of them, unless otherwise specified.

- **ASTM C844 @3.2.4 Standard Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster** *framing member, n*—that portion of the framing, furring, blocking, and so forth, to which the gypsum base is attached. Unless otherwise specified, the surface to which abutting edges or ends are attached shall be not less than 11⁄2 in. (38 mm) wide for wood members, not less than 11⁄4 in. (32 mm) wide for steel members, and not less than 6 in. (152 mm) wide for gypsum studs. For internal corners or angles, the bearing surface shall be not less than 3⁄4 in. (19 mm).

- **ASTM C844 @ 14.4 Standard Specification for Application of Gypsum Base to Receive Gypsum Veneer Plaster** "…Partitions shall be secured at the floor and ceiling in accordance with the gypsum base manufacturer's details or as otherwise required."

- **ASTM C926 @ 6.1 Standard Specification for Application of Portland Cement-Based Plaster** Metallic lath and lath fasteners used to receive plaster shall be installed in conformance with Specification C1063, except as otherwise specified.

- **ASTM C1063 @ 7.3.1.3Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster** Lath shall be installed with the long dimension at right angles to the framing members, unless otherwise specified.

- **ASTM C1280 @ 7.1Standard Specification for Application of Exterior Gypsum Panel Products for Use as Sheathing** Framing members shall be installed so that the surface will be in an even plane, unless otherwise specified, after the gypsum panel products have been applied.

- **ASTM F1667 @ 10.1.2.1Standard Specification for Driven Fasteners: Nails, Spikes, and Staples** Hot-dip galvanized steel wire for the manufacture of fasteners shall have a coating weight in accordance with Specification A641/A641M, Supplementary Requirements, Class 3S, when a heavier coating for exterior use and/or use in treated wood is specified. The minimum zinc coating shall be in accordance with Supplementary Requirements, Class 1, unless otherwise specified.

- **ASTM F1667 @ 10.1.3Standard Specification for Driven Fasteners: Nails, Spikes, and Staples** Electrogalvanized steel fasteners cut and formed from electrogalvanized steel wire or electrogalvanized after forming shall have a regular coating (no minimum weight of coating specified) in accordance with Specification A641/A641M, 9.2, unless otherwise specified.

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

Justification for no cost impact:

New defined term will assist in code interpretation, application, compliance and enforcement

RB36-25

RB37-25

IRC: SECTION 202 (New), R304.1.2, R304.2, R304.2.1, R305.1, R305.1.1, R305.1.2, R305.4, R406.3.2, SECTION R504, R504.1, R504.2, R504.2.2, R504.3, R507.9.1.1, R703.7.2

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

Add new definition as follows:

PRESERVATIVE-TREATED WOOD. Wood products that, when impregnated with chemicals by a pressure process or other means during manufacture, exhibit reduced susceptibility to damage by fungi, insects or marine borers.

Delete without substitution:

~~**[RB] TERMITE-RESISTANT MATERIAL.** Pressure-preservative-treated wood in accordance with the AWPA standards in Section R304.1, naturally durable termite-resistant wood, steel, concrete, masonry or other *approved* material.~~

SECTION R304 PROTECTION OF WOOD AND WOOD-BASED PRODUCTS AGAINST DECAY

Revise as follows:

R304.1.2 Ground contact. All wood in contact with the ground, embedded in concrete in direct contact with the ground or embedded in concrete exposed to the weather that supports permanent structures intended for human occupancy shall be *approved* ~~pressure-~~ preservative-treated wood suitable for ground contact use, except that untreated wood used entirely below groundwater level or continuously submerged in fresh water shall not be required to be ~~pressure-~~preservative treated wood.

R304.2 Quality mark. Lumber and plywood required to be ~~pressure-~~preservative treated wood in accordance with Section R304.1 shall bear the quality *mark* of an *approved* inspection agency that maintains continuing supervision, testing and inspection over the quality of the product and that has been *approved* by an accreditation body that complies with the requirements of the American Lumber Standard Committee treated wood program.

R304.2.1 Required information. The required quality *mark* on each piece of ~~pressure-~~preservative-treated wood that is lumber or plywood shall contain the following information:

1. Identification of the treating plant.
2. Type of preservative.
3. The minimum preservative retention.
4. End use for which the product was treated.
5. Standard to which the product was treated.
6. Identity of the *approved* inspection agency.
7. The designation “Dry,” if applicable.

Exception: Quality *mark*s on lumber less than 1 inch (25 mm) nominal thickness, or lumber less than nominal 1 inch by 5 inches (25 mm by 127 mm) or 2 inches by 4 inches (51 mm by 102 mm) or lumber 36 inches (914 mm) or less in length shall be applied by stamping the faces of exterior pieces or by end labeling not less than 25 percent of the pieces of a bundled unit.

SECTION R305
PROTECTION AGAINST SUBTERRANEAN TERMITES

R305.1 Subterranean termite control methods. In areas subject to damage from termites as indicated by Table R301.2, protection shall be by one, or a combination, of the following methods:

1. Chemical termiticide treatment in accordance with Section R305.2.
2. Termite-baiting system installed and maintained in accordance with the *label*.
3. ~~Pressure-preservative treated~~ Preservative-treated wood in accordance with the provisions of Section R304.1.
4. Naturally durable termite-resistant wood.
5. Physical barriers in accordance with Section R305.3 and used in locations as specified in Section R304.1.
6. Cold-formed steel framing in accordance with Sections R505.2.1 and R603.2.1.

R305.1.1 Quality mark. Lumber and plywood required to be ~~pressure-~~preservative treated wood in accordance with Section R305.1 shall bear the quality *mark* of an *approved* inspection agency that maintains continuing supervision, testing and inspection over the quality of the product and that has been *approved* by an accreditation body that complies with the requirements of the American Lumber Standard Committee treated wood program.

R305.1.2 Field treatment. Field-cut ends, notches and drilled holes of ~~pressure-~~preservative-treated wood shall be retreated in the field in accordance with AWPA M4.

R305.4 Foam plastic protection. In areas where the probability of termite infestation is “very heavy” as indicated in Figure R305.4, extruded and expanded polystyrene, polyisocyanurate and other foam plastics shall not be installed on the exterior face or under interior or exterior foundation walls or slab foundations located below *grade*. The clearance between foam plastics installed above *grade* and exposed earth shall be not less than 6 inches (152 mm).

Exceptions:

1. *Buildings* where the structural members of walls, floors, ceilings and roofs are entirely of *noncombustible materials* or ~~pressure-~~preservative-treated wood.
2. Where in addition to the requirements of Section R305.1, an *approved* method of protecting the foam plastic and structure from subterranean termite damage is used.
3. On the interior side of basement *walls.*

SECTION R406
FOUNDATION WATERPROOFING AND DAMPPROOFING

R406.3.2 Below-grade moisture barrier. A 6-mil-thick (0.15 mm) polyethylene film shall be applied over the below-*grade* portion of exterior foundation walls prior to backfilling. Joints in the polyethylene film shall be lapped 6 inches (152 mm) and sealed with adhesive. The top edge of the polyethylene film shall be bonded to the sheathing to form a seal. Film areas at *grade* level shall be protected from mechanical damage and exposure by a ~~pressure-~~preservative treated wood strip of lumber or plywood ~~strip~~ attached to the wall several inches above finished *grade* level and extending approximately 9 inches (229 mm) below *grade*. The joint between the strip and the wall shall be caulked full length prior to fastening the strip to the wall. Where *approved*, other coverings appropriate to the architectural treatment shall be permitted to be used. The polyethylene film shall extend down to the bottom of the wood footing plate but shall not overlap or extend into the gravel or crushed stone footing.

SECTION R504
~~PRESSURE~~ PRESERVATIVE-TREATED WOOD FLOORS (ON GROUND)

R504.1 General. ~~Pressure preservative-treated~~ Preservative-treated wood *basement* floors and floors on ground shall be designed to withstand axial forces and bending moments resulting from lateral soil pressures at the base of the exterior walls and floor live and *dead loads*. Floor framing shall be designed to meet joist deflection requirements in accordance with Section R301.

R504.2 Site preparation. The area within the foundation walls shall have all vegetation, topsoil and foreign material removed, and any fill material that is added shall be free of vegetation and foreign material. The fill shall be compacted to ensure uniform support of the ~~pressure~~ preservative-treated wood floor sleepers.

R504.2.2 Moisture barrier. Polyethylene sheeting of minimum 6-mil (0.15 mm) thickness shall be placed over the granular base. Joints shall be lapped 6 inches (152 mm) and left unsealed. The polyethylene membrane shall be placed over the ~~pressure~~ preservative-treated wood sleepers and shall not extend beneath the footing plates of the exterior walls.

R504.3 Materials. Framing materials, including sleepers, joists, blocking and plywood subflooring, shall be ~~pressure~~ preservative treated wood and dried after treatment in accordance with AWPA U1 (Commodity Specification A, Special Requirement 4.2), and shall bear the *label* of an accredited agency.

SECTION R507
EXTERIOR DECKS

R507.9.1.1 Ledger details. Deck ledgers shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, Southern Pine No. 2 grade or better ~~pressure~~ preservative-treated wood ~~Southern pine~~, incised Hem-Fir ~~pressure~~ preservative-treated wood ~~hem-fir~~, or decay-resistant, *naturally durable wood*. Deck ledgers shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

SECTION R703
EXTERIOR WALL COVERING

R703.7.2 Plaster. Plastering with *cement plaster* shall be in accordance with ASTM C926. Cement materials shall be in accordance with one of the following:

1. Masonry cement conforming to ASTM C91, Type M, S or N.
2. Portland cement conforming to ASTM C150, Type I, II or III.
3. Blended hydraulic cement conforming to ASTM C595, Type IP, IS (< 70), IL, or IT (S < 70).
4. Hydraulic cement conforming to ASTM C1157, Type GU, HE, MS, HS or MH.
5. Plastic (stucco) cement conforming to ASTM C1328.

Plaster shall be not less than three coats where applied over metal lath or wire lath and shall be not less than two coats where applied over masonry, concrete, ~~pressure~~ preservative-treated wood or decay-resistant wood as specified in Section R304.1 or gypsum backing. If the plaster surface is completely covered by veneer or other facing material or is completely concealed, plaster application need be only two coats, provided the total thickness is as set forth in Table R702.1(1).

On wood-frame construction with an on-grade floor slab system, exterior plaster shall be applied to cover, but not extend below, lath, paper and screed.

The proportion of aggregate to cementitious materials shall be as set forth in Table R702.1(3).

Reason: This proposal adds the definition for "Preservative-Treated Wood" from the IBC which addresses treatments introduced to wood products through a pressure process or other means during manufacture. The AWPA U1 standard, as referenced by the IRC, includes both pressure, and non-pressure, preservative treatments for protection against damage from decay and insects. By adding the IBC definition, it appropriately includes all preservative treatment options addressed in AWPA U1. The newly defined term has been consistently applied throughout the code to clarify requirements.

Additionally, the definition for "Termite-Resistant Material" has been deleted as that term is not used anywhere in the code.

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

Justification for no cost impact:

There are no technical changes proposed by this code change. A definition has only been added to clarify the existing provisions.

RB37-25

RB38-25

IRC: SECTION 202 (New), R306.3.2, R324.3.1, R324.4.5, SECTION R328, R328.1, SECTION M2006, M2006.1, M2006.3

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org); Andrew Bevis, Chair, representing Plumbing, Mechanical and Fuel Gas Code Action Committee (pmgcac@iccsafe.org)

2024 International Residential Code

Add new definition as follows:

SWIMMING POOL. Any structure or product intended for swimming, bathing or wading; designed and manufactured to be connected to a circulation system; installed aboveground, inground, onground, or partially aboveground; and not intended to be drained and filled with each.
SPA. A structure or product intended for the immersion of persons in temperature-controlled water for the purpose of relaxing, exercise, therapy or treatment; designed and manufactured to be connected to a circulation system; and not intended to be drained and filled with each use.

SECTION R306
FLOOD-RESISTANT CONSTRUCTION

Revise as follows:

R306.3.2 Elevation requirements.

1. *Buildings* and structures erected within coastal high-hazard areas and Coastal A Zones, shall be elevated so that the bottom of the lowest horizontal structural members supporting the lowest floor, with the exception of piling, pile caps, columns, grade beams and bracing, is elevated to or above the base flood elevation plus 1 foot (305 mm) or the design flood elevation, whichever is higher. Where stem wall foundations are permitted in Coastal A Zones in accordance with Section R306.3.3, the bottom of the lowest horizontal structural member supporting the lowest floor is the top of the foundation wall, or top of the portion of the foundation wall, supporting the slab.
2. *Basement* floors that are below *grade*on all sides are prohibited.
3. Attached garages used only for parking, building access or storage, and carports shall comply with Item 1 or shall be at or above *grade* on not less than one side and, if enclosed with walls, such walls shall comply with Item 7.
4. Detached *accessory structures* and detached garages shall comply with either of the following:
    - 4.1. The bottom of the lowest horizontal structural member supporting the floors shall be elevated to or above the elevation required in Item 1.
    - 4.2. Floors below the elevations required in Item 1 must be:
        - 4.2.1. Used only for parking or storage.
        - 4.2.2. One *story* and not larger than 100 square feet (9.29 m^2).
        - 4.2.3. Anchored to resist flotation, collapse or lateral movement resulting from design flood loads.
        - 4.2.4. Constructed of flood damage-resistant materials that comply with Section R306.1.8.
        - 4.2.5. Equipped with mechanical, plumbing and electrical systems, if applicable, that comply with Section R306.1.6.
5. The use of fill for structural support is prohibited.
6. Minor grading, and the placement of minor quantities of fill, shall be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, swimming pool decks, patios and walkways.

7. Walls and partitions enclosing areas below the elevation required in this section shall meet the requirements of Sections R306.3.5 and R306.3.6.

SECTION R324 GLAZING

R324.3.1 Impact test. Where required by other sections of the code, glazing shall be tested in accordance with CPSC 16 CFR 1201. Glazing shall comply with the test criteria for Category II unless otherwise indicated in Table R324.3.1(1).

Exception: Glazing not in doors or enclosures for ~~hot tubs, whirlpools~~ spas, saunas, steam rooms, bathtubs and showers shall be permitted to be tested in accordance with ANSI Z97.1. Glazing shall comply with the test criteria for Class A unless otherwise indicated in Table R324.3.1(2).

R324.4.5 Glazing and wet surfaces. Glazing in walls, enclosures or fences containing or adjacent to ~~hot tubs,~~ spas, ~~whirlpools,~~ saunas, steam rooms, bathtubs, showers and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface shall be considered to be a *hazardous location*. This shall apply to single glazing and each pane in multiple glazing.

Exception: Glazing that is more than 60 inches (1524 mm), measured horizontally, from the water's edge of a bathtub, ~~hot tub, spa, whirlpool~~ or swimming pool or from the edge of a shower, sauna or steam room.

SECTION R328 SWIMMING POOLS~~,~~ AND SPAS ~~AND HOT TUBS~~

R328.1 General. The design and construction of swimming pools and spas shall comply with the *International Swimming Pool and Spa Code* .

SECTION M2006 SWIMMING POOL HEATERS

M2006.1 General. Swimming pool ~~Pool~~ and spa heaters shall be installed in accordance with the manufacturer's installation instructions. Oil-fired swimming pool heaters shall be *listed* and *labeled* in accordance with UL 726. Electric swimming pool and spa heaters shall be listed and *labeled* in accordance with UL 1261. Swimming pool ~~Pool~~ and spa *heat pump* water heaters shall be *listed* and *labeled* in accordance with UL 1995 or UL/CSA/ANCE 60335-2-40.

Exception: Portable ~~residential~~ spas ~~and portable residential exercise spas~~ shall be *listed* and *labeled* in accordance with UL 1563 or CSA C22.2 No. 218.1.

M2006.2 Clearances. The clearances shall not interfere with *combustion air*, draft hood or flue terminal relief, or accessibility for servicing.

M2006.3 Bypass valves. Where an integral bypass system is not provided as a part of the swimming pool heater, a bypass line and valve shall be installed between the inlet and outlet piping for use in adjusting the flow of water through the heater.

Reason: The term 'swimming pool' and 'spa' are currently used in R105.2, N1103.11, M1602.2, M2301.1, M2301.2.5, P2911.2.
The intent of this proposal is to coordinate terminology for swimming pools and spas with ISPSC. Wading pools have 18" of water per ISPSC and hot tub and cold baths are a type of spa.

'Swimming pools' is currently defined in the IBC and IPC only.
'Spa' is defined in ISPSC.
'Hot tub' is not defined.
'Pools (swimming) hot tubs and spas' are defined in IZC.
'public swimming pool' is defined in IPC and ISPSC.
'residential swimming pool' is defined in ISPSC.

Generic definitions for Swimming Pool and Spa based on ISPSC scope and current definitions.
This proposal is submitted by the ICC Building Code Action Committee (BCAC) and ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC)
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and 2024 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.
PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and 2-24 PMGCAC has held several virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

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

Justification for no cost impact:

This is using a defintion consistently. This will not change construction requirements.

Staff Analysis: IRC Section G2241 is copied from the Fuel Gas Code. See G29-25.

RB38-25

RB39-25

IRC: SECTION 202

Proponents: Jeffrey Shapiro, International Code Consultants, representing National Fire Sprinkler Association (jeff.shapiro@intlcodeconsultants.com)

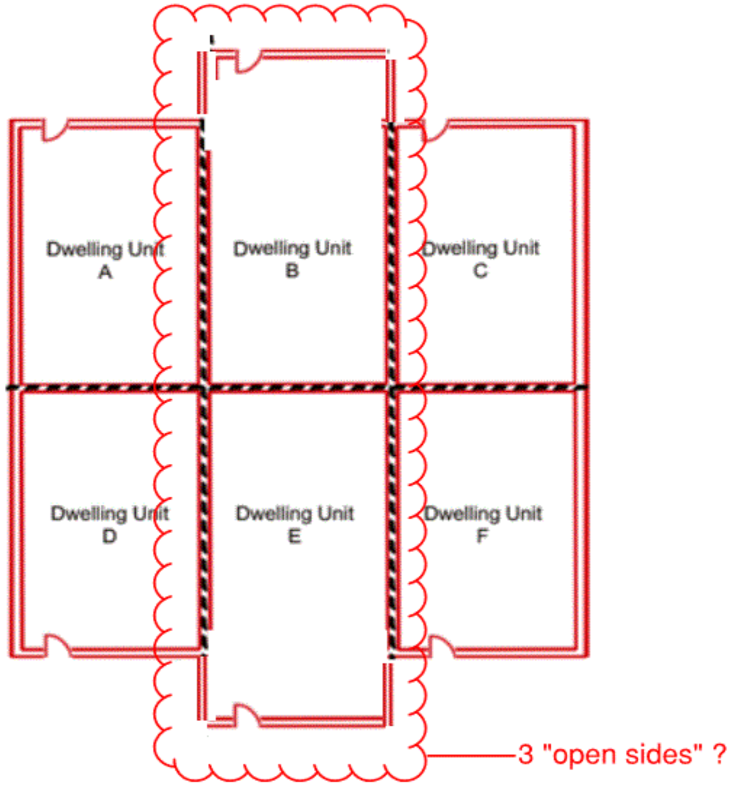
2024 International Residential Code

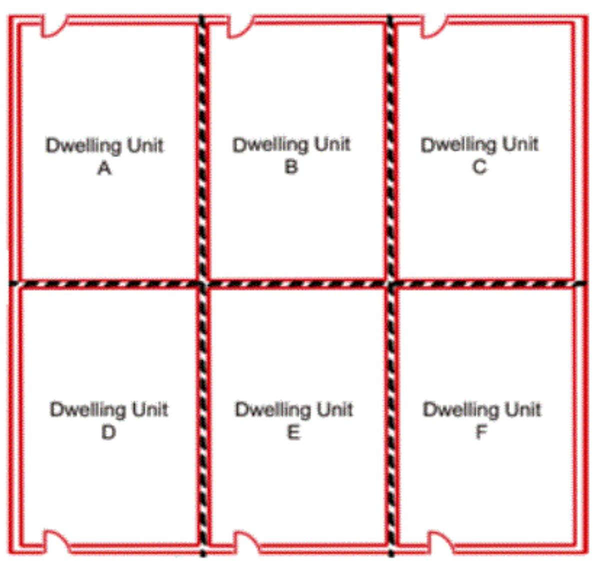
Revise as follows:

[RB] TOWNHOUSE UNIT. A single-family *dwelling unit* in a *townhouse* that extends from foundation to roof and that has a *yard* or *public way* on not less than two sides <u>or on not less than one side where an automatic sprinkler system in accordance with Section P2904 is provided throughout the *townhouse*.</u>

Reason: For the past few code cycles, we have had a lot of discussion regarding what constitutes an "open side." Creative architects can easily manipulate layouts to take advantage of the fact that there is no definition or guidance on what is or isn't an open side with respect to the minimum wall length or percentage of open perimeter that must be provided. In previous code hearings, we discussed how an open side might be as little as a 3-foot wide pathway to a rear exit door. Looking at the attached figure, simply by moving the exterior wall out a bit on the center units, do you go from one side open to three. Some would argue "no" but there's nothing in the code to definitively back that opinion or interpretation.

From the perspective of what does the open side buy with respect to safety if the building is sprinklered and otherwise satisfies the requirements for means of escape and exit openings using only one open side, the answer is not much in my opinion. The back sides of townhouse lots are often difficult, if not impossible, to ladder with ground ladders given fences, plants/trees, and poor access from the street side. Given the relatively little value of requiring the second open side, no guidance on what constitutes "open," and the possible value to townhouse developers to have this design option as a sprinkler incentive in jurisdictions where sprinklers might not otherwise be required because of local amendments, the approach recommended herein puts an end to a lot of misery in applying the code and provides an acceptable level of safety.





Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Depending on the design, a few windows or doors might be eliminated, but this would be entirely optional. Nevertheless, the option being added certainly will be cost neutral or better.

Estimated Immediate Cost Impact Justification (methodology and variables):

You cannot assign a dollar value to an option that may or may not be used in design. Mostly, this provides a design advantage, as opposed to a cost savings.

RB39-25

RB40-25

IRC: SECTION 202 (New), TABLE R301.2, R301.2.5 (New), R301.2.5.1 (New), ICC Chapter 44 (New),

Proponents: Milad Shabanian, representing Insurance Institute for Business & Home Safety (mshabanian@ibhs.org); Shamim Rashid-Sumar, representing National Ready Mixed Concrete Association (ssumar@nrmca.org); Christopher Brunette, representing Colorado Division of Fire Prevention & Control (chris.brunette@state.co.us)

2024 International Residential Code

Add new definition as follows:

<u>**WILDFIRE HAZARD AREAS (WHA).**</u> <u>A geographic area designated by the local jurisdiction with fire hazard severity of medium, high, or extreme factors of wildfire exposure.</u>

SECTION R301
DESIGN CRITERIA

Add new text as follows:

<u>**R301.2.5**</u> <u>**Wildfire-resistant construction.**</u> <u>The construction, alteration, inspection, maintenance and repair of buildings and structures located within wildfire hazard areas shall be in accordance with ICC 605 and this code.</u>

<u>**R301.2.5.1**</u> <u>**Wildfire hazard areas.**</u> <u>The authority having jurisdiction shall designate *wildfire hazard areas* in accordance with the *International Wildland-Urban Interface Code*.</u>

Add new standard(s) as follows:

ICC

International Code Council, Inc.
200 Massachusetts Avenue, NW, Suite 250
Washington, DC 20001

<u>605-2025</u> <u>Standard for Residential Construction in Regions with Wildfire Hazard</u>

Revise as follows:

TABLE R301.2 CLIMATIC AND GEOGRAPHIC DESIGN CRITERIA

GROUND SNOW LOAD[o]	WIND DESIGN				SEISMIC DESIGN CATEGORY[f]	SUBJECT TO DAMAGE FROM			ICE BARRIER UNDERLAYMENT REQUIRED[h]	FLOOD HAZARDS[g]	AIR FREEZING INDEX[i]	MEAN ANNUAL TEMP[j]	<u>WILDFIRE HAZARD AREAS[p]</u>
	Speed[d] (mph)	Topographic effects[k]	Special wind region[l]	Windborne debris zone[m]		Weathering[a]	Frost line depth[b]	Termite[c]					
—	—	—	—	—	—	—	—	---	—	—	—	—	---
MANUAL J DESIGN CRITERIA[n]													
Elevation			Altitude correction factor[e]	Coincident wet bulb	Indoor winter design relative humidity	Indoor winter design dry-bulb temperature			Outdoor winter design dry-bulb temperature			Heating temperature difference	
—			—	—	—	—			—			—	
Latitude			Daily range	Summer design gains	Indoor summer design relative humidity	Indoor summer design dry-bulb temperature			Outdoor summer design dry-bulb temperature			Cooling temperature difference	
—			—	—	—	—			—			—	

For SI: 1 pound per square foot = 0.0479 kPa, 1 mile per hour = 0.447 m/s.

a. Where weathering requires a higher strength concrete or grade of masonry than necessary to satisfy the structural requirements of this code, the frost line depth strength required for weathering shall govern. The weathering column shall be filled in with the weathering index, “negligible,” “moderate” or “severe” for concrete as determined from Figure R301.2(1). The grade of masonry units shall be determined from ASTM C34, ASTM C55, ASTM C62, ASTM C73, ASTM C90, ASTM C129, ASTM C145, ASTM C216 or ASTM C652.

b. Where the frost line depth requires deeper footings than indicated in Figure R403.1(1), the frost line depth strength required for weathering shall govern. The jurisdiction shall fill in the frost line depth column with the minimum depth of footing below finish grade.

c. The jurisdiction shall fill in this part of the table to indicate the need for protection depending on whether there has been a history of local subterranean termite damage.

d. The jurisdiction shall fill in this part of the table with the wind speed from the ultimate design wind speeds map [Figure R301.2(2)]. Wind exposure category shall be determined on a site-specific basis in accordance with Section R301.2.1.4.

e. The jurisdiction shall fill in this section of the table to establish the design criteria using Table 10A from ACCA Manual J or established criteria determined by the jurisdiction.

f. The jurisdiction shall fill in this part of the table with the seismic design category determined from Section R301.2.2.1.

g. The jurisdiction shall fill in this part of the table with: the date of the jurisdiction's entry into the National Flood Insurance Program (date of adoption of the first code or ordinance for management of flood hazard areas); and the title and date of the currently effective Flood Insurance Study or other flood hazard study and maps adopted by the authority having jurisdiction, as amended.

h. In accordance with Sections R905.1.2, R905.4.3.1, R905.5.3.1, R905.6.3.1, R905.7.3.1 and R905.8.3.1, where there has been a history of local damage from the effects of ice damming, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall fill in this part of the table with "NO."

i. The jurisdiction shall fill in this part of the table with the 100-year return period air freezing index (BF-days) from Figure R403.3(2) or from the 100-year (99 percent) value on the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)."

j. The jurisdiction shall fill in this part of the table with the mean annual temperature from the National Climatic Data Center data table "Air Freezing Index-USA Method (Base 32°F)."

k. In accordance with Section R301.2.1.5, where there is local historical data documenting structural damage to buildings due to topographic wind speed-up effects, the jurisdiction shall fill in this part of the table with "YES." Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

l. In accordance with Figure R301.2(2), where there is local historical data documenting unusual wind conditions, the jurisdiction shall fill in this part of the table with "YES" and identify any specific requirements. Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

m. In accordance with Section R301.2.1.2 the jurisdiction shall indicate the wind-borne debris wind zone(s). Otherwise, the jurisdiction shall indicate "NO" in this part of the table.

n. The jurisdiction shall fill in these sections of the table to establish the design criteria using Table 1a or 1b from ACCA Manual J or established criteria determined by the jurisdiction.

o. The jurisdiction shall fill in this section of the allowable stress design table using the Ground Snow Loads in Figure R301.2(3).

<u>p. In accordance with Sections R301.2.5 and R301.2.5.1, the jurisdiction shall indicate the widlfire hazard area(s). Otherwise, the jurisdiction shall fill in this part of the table with "NO."</u>

Reason: Wildfires present an increasingly significant risk to residential construction, yet the current version of the International Residential Code (IRC) does not adequately address this peril. The absence of specific guidance within the IRC for mitigating wildfire hazards creates a critical gap in the code. As wildfire exposure intensifies, particularly in regions identified as Wildland-Urban Interface (WUI) areas, the vulnerability of residential homes to wildfire events underscores the need for actionable standards.

Existing Gap in the IRC

The IRC serves as a comprehensive resource for the construction of one- and two-family dwellings and townhouses. However, it does not include specific provisions for wildfire resilience, such as construction techniques, material requirements, or design practices to reduce the risk of wildfire ignition. Without explicit references or requirements addressing wildfire hazards, homeowners and builders in wildfire-prone regions must rely on inconsistent local regulations or supplementary codes, such as the International Wildland-Urban Interface Code (IWUIC). This gap leaves a significant portion of residential construction exposed to preventable risks.

Increased Wildfire Exposure for Residential Buildings

The frequency, intensity, and geographic reach of wildfires are on the rise due to climate change, increased development in WUI areas, and other factors. According to recent data:

- Wildfire seasons are lasting longer, with more acres burned annually.
- Residential developments in WUI regions have expanded, placing more homes directly in harm's way.
- Wildfire-related losses have escalated, with billions of dollars in damages annually and devastating impacts on communities.

This heightened exposure demands proactive measures to improve the resilience of residential buildings against wildfire hazards. Incorporating wildfire-specific standards into the IRC is a crucial step toward addressing this growing threat.

Importance of ICC 605: Standard for Residential Construction in Regions with Wildfire Hazard

The new **ICC 605 Standard for Residential Construction in Regions with Wildfire Hazard**, developed by the International Standards for Mitigating Hazards in Residential and Related Construction (IS-MHRRC), provides comprehensive guidance for enhancing wildfire resilience. This standard offers:

- Prescriptive and performance-based design requirements to reduce ignition risks.
- Material specifications for fire-resistant construction components.
- Construction practices to limit ember penetration and radiant heat exposure.
- Practical strategies for reducing wildfire vulnerability while maintaining cost-effective solutions for builders and homeowners.

By referencing ICC 605 in the IRC, this proposal will:

1. Provide a clear and uniform approach to wildfire mitigation for residential construction.
2. Empower jurisdictions to adopt and enforce consistent wildfire-resilient practices.
3. Enhance the safety and durability of homes in wildfire-prone areas, thereby reducing losses and improving community resilience.

Conclusion

Adding ICC 605 as a referenced standard in the IRC is a necessary and timely update to address the growing threat of wildfires. It fills a critical gap in the code, aligns with modern building science, and supports the broader goal of safeguarding residential structures against all hazards. This proposal ensures that the IRC remains relevant and effective in protecting lives, property, and communities from the devastating impacts of wildfires.

For additional information on the standard, go to the ICC 605 webpage at IS-MHRRC - ICC.

Bibliography:

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0

Adopting ICC 605 for residential construction in wildfire-prone areas will result in an increase in initial construction costs [1-4]. The magnitude of this increase is directly influenced by the extent of defensible space provided and the severity of the wildfire hazard in the area.

1. **Minimum Cost Increase (Extended Defensible Space)**

    When the defensible space is extended to **1.5 times the required minimum**, the increase in construction costs is minimal. This scenario primarily addresses risks associated with **ember exposure** by creating a buffer zone that reduces the likelihood of ignition from windborne embers.

2. **Moderate Cost Increase (Required Defensible Space)**

If the defensible space provided is **equal to the required minimum**, construction costs increase moderately. The additional cost is intended to mitigate risks from **both ember exposure and radiant heat**. With reduced clearance, more robust construction materials and design features are required to protect the structure from these hazards.

3. **Maximum Cost Increase (Less than Required Defensible Space)**

   In situations where defensible space is **less than the required minimum**, the increase in construction costs is highest. This is due to the need for enhanced fire-resistant materials and building practices to protect against **ember exposure, radiant heat, and direct flame contact.**

Estimated Immediate Cost Impact Justification (methodology and variables):

Reference:

[1] Headwaters economics, 2024, Retrofitting a Home for Wildfire Resistance, Costs and Considerations. https://headwaterseconomics.org/wp-content/uploads/2024/06/Wildfire_Retrofit_Report_R5.pdf

[2] Headwaters economics and Insurance institute for business & home safety, 2022, Construction Costs for a Wildfire-Resistant Home, California Edition. https://headwaterseconomics.org/wp-content/uploads/2022_HE_IBHS_WildfireConstruction.pdf

[3] Home innovation research labs, 2020, Cost Impact of Building a House in Compliance with IWUIC. https://www.nahb.org/-/media/NAHB/advocacy/docs/top-priorities/codes/code-adoption/cost-impact-building-house-in-compliance-with-iwuic.pdf?rev=ea1604e447b84da1b41432bb5d291d6a&hash=83D447A8997466E64DF34D8280BC7CD2.

4] Headwaters economics and Insurance institute for business & home safety, 2018, Building a Wildfire-Resistant Home: Codes and Costs. https://headwaterseconomics.org/wp-content/uploads/building-costs-codes-report.pdf

Estimated Life Cycle Cost Impact:

Despite the initial increase in construction costs, the overall **lifecycle cost** of structures built to ICC 605 standards is expected to be **lower**. This reduction results from the binary nature of fire damage—structures either survive with minimal loss or are destroyed entirely. By significantly improving the likelihood of survival during a wildfire incident, the enhanced construction requirements reduce potential repair and replacement costs over the building's lifespan. Furthermore, these measures can lead to indirect cost savings through reduced insurance premiums and minimized community recovery expenditures following a wildfire event.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
ICC 605-2025 Standard for Residential Construction in Regions with Wildfire Hazard

RB40-25

RB41-25

IRC: R301.1, R401.1, R501.1, R601.1, R701.1, R801.1, R901.1, R1001.1

Proponents: Steven Orlowski, Sundowne Building Code Consultants, LLC, representing Self (sorlowski@sbcc.codes); Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

CHAPTER 3
BUILDING PLANNING

SECTION R301
DESIGN CRITERIA

Add new text as follows:

R301.1 Scope. Design criteria of buildings, structures and parts thereof shall comply with this chapter.

Revise as follows:

~~**R301.1**~~ **R301.2 Application.** *Buildings* and structures, and parts thereof, shall be constructed to safely support all loads, including *dead loads*, *live loads*, roof loads, flood loads, snow loads, wind loads and seismic loads as prescribed by this code. The construction of *buildings* and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets the requirements for the transfer of loads from their point of origin through the load-resisting elements to the foundation. *Buildings* and structures constructed as prescribed by this code are deemed to comply with the requirements of this section.

CHAPTER 4
FOUNDATIONS

SECTION R401
GENERAL

Add new text as follows:

R401.1 Scope. Design and construction of the foundation and foundation spaces for buildings shall comply with this chapter.

Revise as follows:

~~**R401.1**~~ **R401.2 Application.** The provisions of this chapter shall control the design and construction of the foundation and foundation spaces for *buildings*. In addition to the provisions of this chapter, the design and construction of foundations in flood hazard areas as established by Table R301.2 shall meet the provisions of Section R306. Wood foundations shall be designed and installed in accordance with AWC PWF.

Exception: The provisions of this chapter shall be permitted to be used for wood foundations only in the following situations:

1. In *buildings* that have not more than two floors and a roof.
2. Where interior *basement* and foundation walls are constructed at intervals not exceeding 50 feet (15 240 mm).

Wood foundations in *Seismic Design Category* D_0, D_1 or D_2 shall be designed in accordance with accepted engineering practice.

CHAPTER 5
FLOORS

SECTION R501
GENERAL

R501.1 ~~Application~~Scope. ~~The provisions of this chapter shall control the design and construction of the floors~~Floorsfor *buildings*, including the floors of *attic* spaces used to house mechanical or plumbing fixtures and *equipment*shall comply with this chapter.

CHAPTER 6
WALL CONSTRUCTION

SECTION R601
GENERAL

R601.1 ~~Application~~Scope. ~~The provisions of this chapter shall control the design~~Design and construction of walls and partitions for *buildings*shall comply with this chapter.

CHAPTER 7
WALL COVERING

SECTION R701
GENERAL

R701.1 ~~Application~~Scope. ~~The provisions of this chapter shall control the design~~Design and construction of the interior and *exterior wall covering* for *buildings* shall comply with this chapter.

CHAPTER 8
ROOF-CEILING CONSTRUCTION

SECTION R801
GENERAL

R801.1 ~~Application~~Scope. ~~The provisions of this chapter shall control the design~~Design and construction of the roof-ceiling system for *buildings* shall comply with this code.

CHAPTER 9
ROOF ASSEMBLIES

SECTION R901
GENERAL

R901.1 Scope. ~~The provisions of this chapter shall govern the design~~Design, materials, and construction ~~and quality~~ of *roof assemblies* shall comply with this chapter.

CHAPTER 10
CHIMNEYS AND FIREPLACES

SECTION R1001
MASONRY FIREPLACES

R1001.1 ~~General~~Scope. Design, construction and installation of chimneys, fireplaces and masonry heaters shall comply with this chapter. Masonry fireplaces shall be constructed in accordance with this section and the applicable provisions of Chapters 3 and 4.

Reason: Currently, there is inconsistency among all the I-Codes in how the scoping sections are written at the beginning of each chapter. The Code Correlation Committee requested a task group be formed to review the scoping section in all the I-Codes and determine if there would be a way to harmonize both the language and style across the model codes. The Scoping Task Group was formed and consisted of several members from the various Code Action Committees and interested parties (some with no client interest). The task group reviewed each chapter of the I-codes and after careful consideration, developed a format that could be incorporated and repeated for all the I-Codes.

As you will see in the proposed changes above, most of the chapters began with a style and format that was already consistent and was only slightly changed to give the scoping a more authoritative infliction. Where the chapter contained no scoping provisions, the task group added scoping language based on the content of the chapter. Where the existing scoping sections provided a laundry list of what is contained in the chapter, these list were reformatted into a list form to make it easier for users to see what information was contained.

The Scoping Task group proposes that the recommended changes will improve the code by:
1. Create consistency in language used in the scope for all the I-Codes.
2. Creates a scoping section for chapters that did not have one before to clarify what is covered by the chapter.
3. Clarify the items covered and not covered in the chapter, using consistent format to send the user to different chapter(s) or code(s).
4. Remove redundant administrative language from existing scoping sections.
5. Where there were extensive number of items outlined in the scoping section, the items are now broken out into a list format to make it easier for the reader to indicate what is contained in the chapter.

To the best of the task groups knowledge the proposed changes are editorial in nature and no requirements not already addressed in the existing scoping or in the chapter being referenced were added. As these proposed changes are editorial, there is no cost impact on the cost of construction.

This proposal is submitted with the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and 2024 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

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

Justification for no cost impact:

As stated in our reason statement, these proposed code changes are editorial, there is no cost impact on the cost of construction.

RB41-25

RB42-25

IRC: SECTION R301, R301.1 (New), R301.1.1 (New), R301.1, ICC Chapter 44 (New), APPENDIX BB, SECTION BB101, BB101.1

Proponents: Brad Wiseman, Garmin USA, representing Tiny Home Industry Association; Zachariah Giffin, Operation Tiny Home, representing consumers (zackgiffin@gmail.com); Amelia Dicks, representing Wind River Built (amelia@windriverbuilt.com); Nick Mosley, representing California Tiny House, Inc.

2024 International Residential Code

SECTION R301
DESIGN CRITERIA

Add new text as follows:

R301.1 Scope. Design criteria of buildings, structures and parts thereof shall comply with this chapter.

R301.1.1 Small residential units. A dwelling unit that is1,200 square feet (111.5 m^2) or less constructed as a permanent residential structure, shall be constructed in accordance with ICC/THIA 1215 or this code, as applicable.

~~**R301.1**~~ **R301.2 Application.** *Buildings* and structures, and parts thereof, shall be constructed to safely support all loads, including *dead loads*, *live loads*, roof loads, flood loads, snow loads, wind loads and seismic loads as prescribed by this code. The construction of *buildings* and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets the requirements for the transfer of loads from their point of origin through the load-resisting elements to the foundation. *Buildings* and structures constructed as prescribed by this code are deemed to comply with the requirements of this section.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
200 Massachusetts Avenue, NW, Suite 250
Washington, DC 20001

1215-202x	ICC/THIA Design, Construction and Regulation of Tiny Houses for Permanent Occupancy

APPENDIX BB
TINY HOUSES

SECTION BB101
GENERAL

Revise as follows:

BB101.1 Scope. This appendix shall be applicable to *tiny houses* used as single *dwelling units*. *Tiny houses* shall comply with this code except as otherwise stated in this appendix.

Exception: A permanent residential structure constructed in accordance with ICC/THIA 1215.

Reason: The proposed change seeks to include minimum requirements to safeguard public health, safety, general welfare and to address societal and industry challenges for the inspection and regulatory compliance of small residential units, a new defined term that seeks to address structures less than 1,200 square feet that may serve as both primary and accessory residential dwelling space. This change will also serve to improve uniformity in the inspection and regulatory compliance of small residential units.

The proposed change is necessary to update the IRC to explicitly include provisions related to common design elements, construction practices and regulatory compliance requirements commonly associated with small residential units, thereby improving the uniformity and consistency of those design elements, construction practices and regulatory compliance requirements.

The proposed change will also serve to ensure that the provisions of the IRC are properly harmonized with the provisions of the ICC/THIA 1215 standard.

Finally, the proposed change will improve building officials' ability to develop and adopt regulations and practices that allow small residential units as a permissible form of residential building for permanent occupancy.

For additional information, see the ICC webpage for this standard for ICC/THIA 1215.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0.00

Estimated Immediate Cost Impact Justification (methodology and variables):

The ICC/THIA 1215 standard simply provides better focus on small residential units and the specific needs of this type of construction, so this change will not affect the cost of construction. Instead it provides a better regulatory tool which will facilitate the construction of small residential units.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
ICC 1215-202x ICC/THIA Design, Construction and Regulation of Tiny Houses for Permanent Occupancy

RB42-25

RB43-25

IRC: R301.2.1, TABLE R301.2.1(2), TABLE R301.2.1(3) (New)

Proponents: Dave Monsour, THOMAS ASSOCIATES, INC. (DASMA), representing DASMA (Door & Access Systems Manufacturers Assoc.) (dmonsour@thomasamc.com)

2024 International Residential Code

SECTION R301
DESIGN CRITERIA

Revise as follows:

R301.2.1 Wind design criteria. *Buildings* and portions thereof shall be constructed in accordance with the wind provisions of this code using the ultimate design wind speed in Table R301.2 as determined from Figure R301.2(2). The structural provisions of this code for wind loads are not permitted where wind design is required as specified in Section R301.2.1.1. Where different construction methods and structural materials are used for various portions of a *building*, the applicable requirements of this section for each portion shall apply. Where not otherwise specified, the wind loads listed in Table R301.2.1(1) adjusted for height and exposure using Table R301.2.1(2) shall be used to determine design load performance requirements for wall coverings, curtain walls, *roof coverings*, exterior windows, *skylights*, ~~garage doors~~ and exterior doors other than garage doors. Where loads for garage doors are not otherwise specified, the loads listed in Table R301.2.1(3) adjusted for height and exposure using Table R301.2.1(2) shall be used to determine design load performance requirements. The resulting positive and negative design wind pressures shall not be less than 10 psf.

TABLE R301.2.1(2) HEIGHT AND EXPOSURE ADJUSTMENT COEFFICIENTS ~~FOR Table R301.2.1(1)~~

MEAN ROOF HEIGHT	EXPOSURE		
	B	C	D
15	0.82	1.21	1.47
20	0.89	1.29	1.55
25	0.94	1.35	1.61
30	1.00	1.40	1.66
35	1.05	1.45	1.70
40	1.06	1.49	1.74
45	1.10	1.53	1.78
50	1.13	1.56	1.81
55	1.16	1.59	1.84
60	1.19	1.62	1.87

Add new text as follows:

TABLE R301.2.1(3) GARAGE DOOR WIND LOADS FOR A BUILDING WITH A MEAN ROOF HEIGHT OF 30 FEET LOCATED IN EXPOSURE B (ASD) (psf)[a,b,c]

DOOR SIZE		ULTIMATE DESIGN WIND SPEED, V*ult* (mph)																									
		90		95		100		105		110		115		120		130		140		150		160		170		180	
WIDTH (ft)	HEIGHT (ft)	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**	**Pos**	**Neg**
8	**7**	7.8	-8.8	8.6	-9.8	9.6	-10.9	10.6	-12.0	11.6	-13.2	12.7	-14.4	13.8	-15.7	16.2	-18.4	18.8	-21.3	21.5	-24.5	24.5	-27.8	27.7	-31.4	31.0	-35.2
9	**7**	7.7	-8.7	8.6	-9.7	9.5	-10.7	10.5	-11.8	11.5	-13.0	12.6	-14.2	13.7	-15.5	16.0	-18.1	18.6	-21.0	21.4	-24.1	24.3	-27.5	27.4	-31.0	30.8	-34.8
16	**7**	7.4	-8.2	8.2	-9.1	9.1	-10.1	10.0	-11.2	11.0	-12.3	12.0	-13.4	13.1	-14.6	15.4	-17.1	17.8	-19.9	20.5	-22.8	23.3	-25.9	26.3	-29.3	29.5	-32.8
18	**7**	7.3	-8.1	8.1	-9.1	9.0	-10.0	9.9	-11.1	10.9	-12.1	11.9	-13.3	13.0	-14.4	15.2	-16.9	17.7	-19.7	20.3	-22.6	23.1	-25.7	26.0	-29.0	29.2	-32.5
20	**7**	7.2	-8.0	8.1	-9.0	8.9	-9.9	9.9	-11.0	10.8	-12.0	11.8	-13.1	12.9	-14.3	15.1	-16.8	17.5	-19.5	20.1	-22.4	22.9	-25.4	25.8	-28.7	28.9	-32.2

For SI: 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s, 1 pound per square foot = .0479 kPa

a. Interpolation shall be permitted for door widths or ultimate design wind speeds between those given above. For door heights over 7 feet, the values in this table shall be used. For door heights less than 7 feet and for doors less than 56 square feet in area, pressures shall be determined in accordance with Table R301.2.1(1).

b. Positive and negative values signify, respectively, pressures acting toward and away from the exterior surface of the door.

c. Negative pressures assume the door overlaps the building's end zone by 2 feet. For overlaps less than 2 feet, the values in this table shall be used. For overlaps exceeding 2 feet, pressures shall be determined in accordance with Table R301.2.1(1).

Reason: Garage doors are critical in maintaining building structural integrity during windstorms. If the garage door gives way, internal pressure can build up on the roof, leading to building collapse. This phenomenon has been demonstrated in many field and laboratory studies over the years by NIST, IBHS, FEMA, and others. Yet these same organizations, as well as DASMA, report a general lack of wind-rated doors being specified and enforced in many regions throughout the country. This proposal requests a new table for garage door design wind pressures. The table highlights and simplifies existing design wind pressure requirements for garage doors, and does not create any new requirements. We believe this new table will foster greater compliance with existing provisions of the code. A version of this table has been used for many years in Florida (Florida Building Code, Building and the Florida Building Code, Residential), and is included in the 2020 edition of ICC 600 Standard for Residential Construction in High-Wind Regions.

As an example of the complexity of the existing approach, Table R301.2.1(1) divides wall component and cladding pressures into two groups: Zone 4 and Zone 5 (wall end zone). Residential garage doors typically overlap the end zone. Accepted methods for resolving the overlap involve calculations not referenced in the code, which defeats the purpose of Table R301.2.1(1) in providing an easy reference for pre-calculated design wind pressures.

This proposal entails a change to the title of Table R301.2.1(2), since that table will no longer be used only for Table R301.2.1(1).

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

Justification for no cost impact:

This proposal is a clarification. The added table simplifies the process of determining design wind pressures for garage doors according to existing IRC requirements.

RB43-25

RB44-25

IRC: R301.2.1.1

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

2024 International Residential Code

SECTION R301
DESIGN CRITERIA

Revise as follows:

R301.2.1.1 Wind ~~limitations and wind~~ design required. ~~The wind provisions of this code shall not apply to the design of buildings where wind design is required in accordance with Figure R301.2.1.1, or where the ultimate design wind speed, V_{ult}, in Figure R301.2(2) equals or exceeds 140 miles per hour (225 kph) in a special wind region.~~

~~**Exceptions:**~~

1. ~~For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R608.~~
2. ~~For *structural insulated panels*, the wind provisions of this code shall apply in accordance with the limitations of Section R610.~~
3. ~~For cold-formed steel *light-frame construction*, the wind provisions of this code shall apply in accordance with the limitations of Sections R505, R603 and R804.~~

In regions where wind design is required in accordance with Figure R301.2.1.1 or where the ultimate design wind speed, V_{ult}, in Figure R301.2(2) equals or exceeds 140 miles per hour (225 kph) in a special wind region, the design of <u>structural components and cladding elements of</u> *buildings* for wind loads shall be in accordance with one or more of the following methods:

1. AWC *Wod Frame Construction Manual* (WFCM).
2. ICC *Standard for Residential Construction in High-Wind Regions* (ICC 600).
3. ASCE *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* (ASCE 7).
4. AISI *Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-Family Dwellings* (AISI S230).
5. *International Building Code*.
6. <u>For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Section R608.2.</u>
7. <u>For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R610.2.</u>
8. <u>For cold-formed steel light-frame construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R505.1.1, R603.1.1 and R804.1.1.</u>
9. <u>For exterior wall coverings, soffits, roof coverings and fenestrations, the wind provisions of this code shall apply in accordance with the limitations of Sections R609, R703, R704, and R905.</u>

The elements of design not addressed by the methods in Items 1 through <u>9</u> ~~5~~ shall be in accordance with the provisions of this code.

Where ASCE 7 or the International Building Code is used for the design of the building, the wind speed map and exposure category requirements as specified in ASCE 7 and the International Building Code shall be used.

Reason: This proposal is intended to clarify the wind limitations in the IRC. Currently, the IRC contains an assortment of requirements for wind loads scattered throughout the code. While Section R301.2.1.1 intends to limit the applicability of the IRC to areas where wind design is not required in accordance with Figure R301.2.1.1, it's not very clear what exactly applies in the IRC in regions where wind design is required. Current Section R301.2.1.1 states that the "wind provisions" of this code do not apply where wind design is required but is not clear anywhere in the code as to what the wind provisions in this code do apply to. The use of the phrase "wind provisions of this code" is very confusing. Clearly the prescriptive fastening schedule in Table R602.3(1) should not apply where wind design is required. However, it's not very clear that this table is actually part of the "wind provisions in this code." This proposal makes it clear that the prescriptive provisions in Chapters 4 through 9 do not apply where wind design is required except as identified in the proposed new exceptions. Provisions in the IRC that do apply in wind design required regions have been consolidated into the Exceptions to Section R301.2.1.1. New language clarifies that it is the "structural and cladding design of buildings for wind loads" that is limited in IRC. Therefore, Section R405 (foundation drainage), Section R406 (dampproofing and waterproofing provisions), Section R702 (interior coverings), Section R806 (roof ventilation), Section R807 (attic access) and others would apply as specified in the code.

Additionally, this proposal reorders the language so that the code tells the user directly what is required to be used when located in a wind design required region (WFCM, ICC 600, ASCE 7, AISI S230, and/or IBC). This improves the flow of the code text and is similar to the approach used in the 2000, 2003, 2006 and 2009 IRC.

A new exception is proposed to be added that clarifies that the seismic requirements in the code, including the scope as specified in Section R301.2.2, apply regardless.

New exceptions are also proposed to be added for roof coverings, wall coverings, and fenestrations which have specific wind limitations and/or specific wind design requirements in the IRC. New clarifying language was added to Chapter 9 of the 2024 IRC that provides specific wind requirements and wind limitations in the code for roof coverings. This proposal aligns with the clarifying language in Chapter 9 of the 2024 IRC.

Similar proposals have been submitted previous cycles, that, with a few modifications, had broad support. However, a couple of points could not be agreed upon prior to the item being brought to the floor. This proposal is not intended to change any technical requirements in the IRC related to wind design. It is simply intended to simply clarify the wind limitations 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:

This proposal simply clarifies the limitations of the wind provisions in the IRC to the design of structural and cladding elements.

RB44-25

RB45-25

IRC: R301.2.1.6 (New), Figure R301.2.1.6 (New), TABLE R301.2.1.6 (New)

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, representing Self (jcrandell@aresconsulting.biz); Art DeGaetano, representing Northeast Regional Climate Center, Cornell University (atd2@cornell.edu)

2024 International Residential Code

SECTION R301
DESIGN CRITERIA

Add new text as follows:

R301.2.1.6 Wind-driven rain. Minimum design wind pressures used to evaluate the wind-driven rain resistance of building assemblies and components shall be permitted to be determined in accordance with Figure R301.2.1.6 and Table R301.2.1.6.

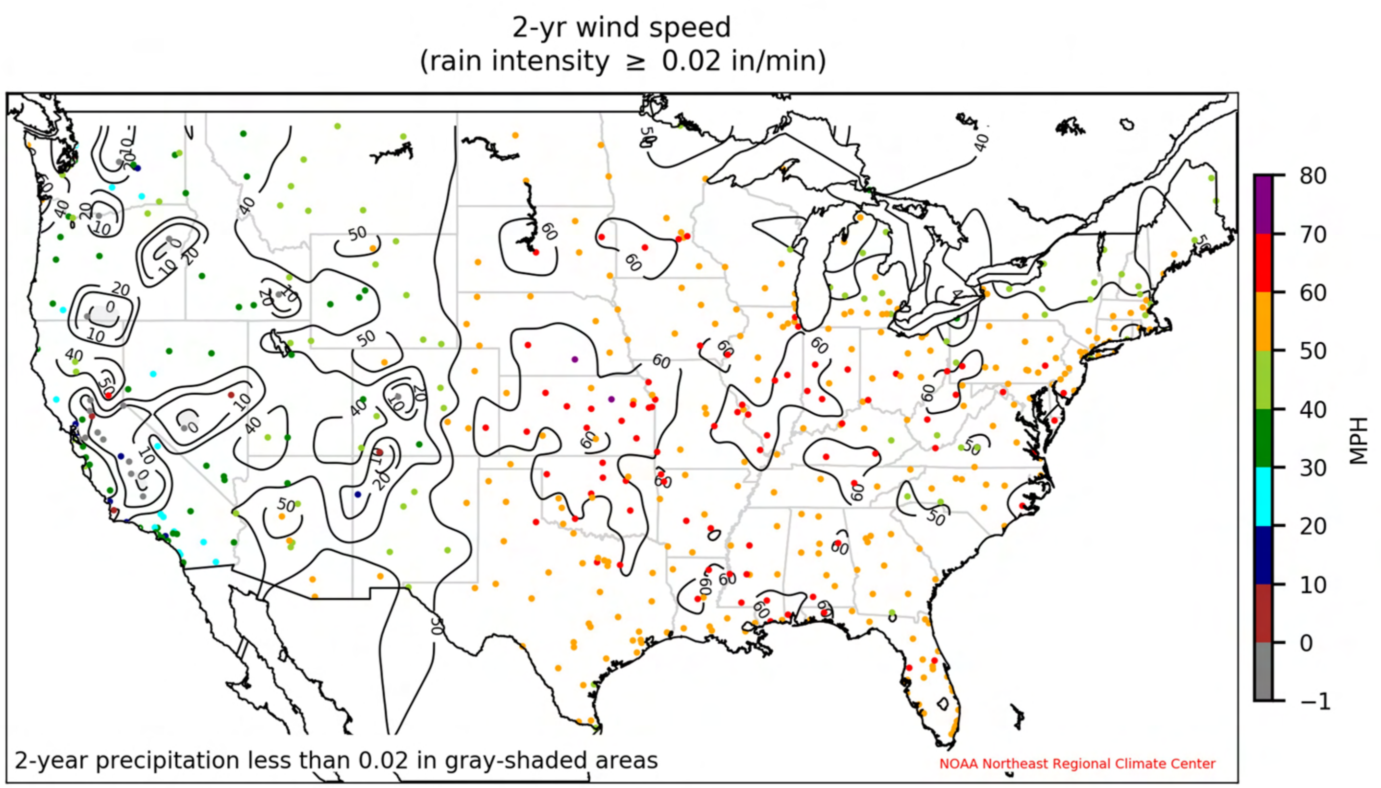


Figure R301.2.1.6 Wind-driven rain wind speed (mph, 3 sec gust)
[For SI: 1 mph = 0.447 m/s]

TABLE R301.2.1.6 MINIMUM WIND-DRIVEN RAIN DESIGN PRESSURE (PSF)[a,b]

Wind Exposure	Mean Roof Height (ft)	Wind-driven Rain Wind Speed (mph, 3 sec gust) from Figure R301.2.1.6					
		≤ 30	40	50	60	70	80

	15	2.86	2.86	2.86	3.21	4.37	5.71
	20	2.86	2.86	2.86	3.50	4.76	6.21
	25	2.86	2.86	2.86	3.72	5.06	6.61
B	30	2.86	2.86	2.86	3.95	5.37	7.02
	40	2.86	2.86	2.98	4.28	5.83	7.62
	50	2.86	2.86	3.17	4.57	6.22	8.12
	60	2.86	2.86	3.33	4.79	6.52	8.52
	15	2.86	2.86	4.01	5.77	7.85	10.3
	20	2.86	2.86	4.24	6.11	8.31	10.9
	25	2.86	2.86	4.43	6.38	8.68	11.3
C	30	2.86	2.96	4.62	6.65	9.05	11.8
	40	2.86	3.14	4.90	7.06	9.61	12.6
	50	2.86	3.29	5.14	7.40	10.1	13.2
	60	2.86	3.41	5.33	7.67	10.4	13.6
	15	2.86	3.35	5.23	7.53	10.3	13.4
	20	2.86	3.51	5.48	7.90	10.8	14.0
	25	2.86	3.64	5.69	8.19	11.2	14.6
D	30	2.86	3.77	5.89	8.48	11.6	15.0
	40	2.86	3.96	6.20	8.92	12.1	15.0
	50	2.86	4.13	6.45	9.29	12.6	15.0
	60	2.86	4.26	6.65	9.58	13.0	15.0

For SI: 1 psf = 47.9 Pa; 1 mph = 0.447 m/s; 1 ft = 0.305 m

a. Wind-driven rain wind speed is to be obtained from Figure R301.2.1.6 which provides 3-second gust wind speeds at standard conditions of wind exposure C (open, flat terrain) at a height of 33 ft (10m) above ground.

b. The tabulated pressures are positive components and cladding pressures calculated in accordance with ASCE 7 for a windward wall for the indicated exposure condition and building mean roof height. Wind directionality is not used to reduce the wind-driven rain pressure. The wind speed obtained from Figure R301.2.1.6 used for this pressure calculation is adjusted from a 3-sec gust basis to a 1-min average wind speed using the following wind speed averaging time conversion factors: 0.72 (Exposure B), 0.79 (Exposure C), and 0.82 (Exposure D). Wind-driven rain pressures for different exposure and mean roof height conditions shall be permitted to be calculated in a consistent manner in accordance with ASCE 7 and Figure R301.2.1.6. The calculated pressure shall not be less than 2.86 psf and need not exceed 15.0 psf.

Reason: The code lacks a risk-consistent basis for addressing wind-driven rain and resistance to water intrusion. This proposal provides a wind-driven rain hazard map (i.e., annual extreme 3-sec gust wind speeds coincidental with a minimum rainfall rate threshold) to properly characterize the hazard as it varies across wind-driven rain climatology of the U.S. Coordinating proposals have been submitted for the IBC and IRC.

First, the proposal “permits” and does not mandate use of these wind-driven rain wind speeds and associated minimum design pressures for evaluation water penetration resistance. This approach is necessary because various other code referenced product standards will need time to consider and re-align with this new hazard-based approach to wind-driven rain resistance. The proposed map and table requirements are somewhat more conservative than, but generally consistent with, current industry minimum and maximum pressure values used in practice. But now the selection of a design pressure for specification of water penetration resistance is properly related to variation in actual hazard across the US (and variation in fundamental wind load parameters such as exposure and building height).

The two key components of this proposal are further explained as follows:

Figure 1609.8 / **R301.2.1.6** - The wind-driven rain wind speed map is based on the JAMC article referenced in the Bibliography as a joint effort of the University of Florida and Cornell University's Northeast Climate Data Center with support from other interested parties, including the Insurance Institute for Business and Home Safety (IBHS). Additional work to extend the research to develop a US map was funded by NOAA at Cornell University. The climatology of wind-driven rain is developed from recently available 1-min weather observations from National Weather Service Automated Surface Observing Systems (ASOS). One-minute data better represent the joint occurrence of the extremes that define wind-driven rain occurrence than hourly data, which previously was the shortest available temporal resolution. After adjusting the winds speeds to standardize for exposure and anemometer type, the wind data corresponding to specific rainfall thresholds were fit to a statistical distribution to obtain estimates of the recurrence of wind speeds associated with different rainfall intensities. The values serve as the basis for a wind-driven rain climatology for the United States that is analogous to climatologies that exist and inform building codes in Europe and Canada. The wind-driven rain map represents a 3-sec gust wind speed (miles per hour) for a 2-yr mean recurrence interval with a threshold coincidental rainfall rate of 0.02 in/min (0.5 mm/min). For additional information, refer to the JAMC article referenced in Bibliography.

Table 1609.8 / **R301.2.1.6** - The main purpose of the mapped wind-driven rain hazard is to provide a wind-driven rain wind speed from which an appropriate, risk-consistent pressure differential can be determined as a means to specify or evaluate water-resistance of wall assemblies and exterior wall covering assemblies or components. The pressure differential may be determined in two ways. One way is to use pre-calculated values as shown in the table. The other way is to calculate the pressure using the ASCE 7 provisions for wind loads, but substituting the appropriate wind-driven rain wind speed from Figure 1609.8 / R301.2.1.6 for the basic wind speed used for structural design purposes in ASCE 7.

The latter method was how the table values were generated (as detailed for transparency and repeatability in the table footnotes). An example of calculating the wind-driven rain wind pressure using Figure 1609.8 / R301.2.1.6 and the wind load provisions of ASCE 7 is as follows:

Wind-driven rain wind speed: 60 mph, 3sec gust (Figure 1609.8 / R301.2.1.6)

Wind Exposure: B (suburban/wooded)

Building Height: 30 feet

Wall Pressure coefficients – GCp = 1.0 (positive); GCpi = -0.18 (negative internal pressure)

Kz = 0.7 (exposure B, 30' height)

Kd = 1.0 (directionality not considered)

Kzt = 1.0 (no topographic wind speed up effects considered)

Ke = 1.0 (no elevation effects considered w/r to lower density of air at higher elevations)

V1-min/V3-sec conversion factor: 0.72

$p = [0.00256\ Kz\ Kzt\ Kd\ Ke\ (0.72 \times V)^2] \times [GCp - GCpi]$

$= 0.00256(0.7)(1.0)(1.0)(1.0)(0.72 \times 60)^2 \times [1.0 + 0.18]$

= (3.34 psf) x [1.18] = **3.95 psf**

The range of calculated pressures are shown in the following supplemental table without inclusion of the minimum and maximum pressure values consistent with the extremes of current practice (and available products such as fenestration or water-resistive barrier systems and flashing methods). This table is provided for transparency and informational purposes.

Pressures (psf) for Water Resistance Evaluation (based on conversion to 1-min average wind speed)											
Wind Exposure	Mean Roof Height (ft)	WDR Wind Speed (MPH - 3 sec gust)									
		10	20	30	40	50	60	70	80	90	100
B	15	0.09	0.36	0.80	1.43	2.23	3.21	4.37	5.71	7.23	8.93
	20	0.10	0.39	0.87	1.55	2.43	3.50	4.76	6.21	7.86	9.71
	25	0.10	0.41	0.93	1.65	2.58	3.72	5.06	6.61	8.37	10.34
	30	0.11	0.44	0.99	1.75	2.74	3.95	5.37	7.02	8.88	10.96
	40	0.12	0.48	1.07	1.90	2.98	4.28	5.83	7.62	9.64	11.90
	50	0.13	0.51	1.14	2.03	3.17	4.57	6.22	8.12	10.27	12.68
	60	0.13	0.53	1.20	2.13	3.33	4.79	6.52	8.52	10.78	13.31
C	15	0.16	0.64	1.44	2.56	4.01	5.77	7.85	10.26	12.98	16.02
	20	0.17	0.68	1.53	2.71	4.24	6.11	8.31	10.86	13.74	16.97
	25	0.18	0.71	1.59	2.84	4.43	6.38	8.68	11.34	14.35	17.72
	30	0.18	0.74	1.66	2.96	4.62	6.65	9.05	11.82	14.97	18.48
	40	0.20	0.78	1.76	3.14	4.90	7.06	9.61	12.55	15.88	19.61
	50	0.21	0.82	1.85	3.29	5.14	7.40	10.07	13.15	16.65	20.55
	60	0.21	0.85	1.92	3.41	5.33	7.67	10.44	13.63	17.26	21.30
D	15	0.21	0.84	1.88	3.35	5.23	7.53	10.25	13.39	16.95	20.92
	20	0.22	0.88	1.97	3.51	5.48	7.90	10.75	14.04	17.77	21.94
	25	0.23	0.91	2.05	3.64	5.69	8.19	11.15	14.56	18.43	22.75
	30	0.24	0.94	2.12	3.77	5.89	8.48	11.55	15.08	19.09	23.56
	40	0.25	0.99	2.23	3.96	6.20	8.92	12.14	15.86	20.07	24.78
	50	0.26	1.03	2.32	4.13	6.45	9.29	12.64	16.51	20.89	25.80
	60	0.27	1.06	2.39	4.26	6.65	9.58	13.04	17.03	21.55	26.61

Second, it is important to note that the failure mode that this proposal addresses is the initiation of a leak (onset of water intrusion) at the most extreme (worst) 1-minute of coincidental wind and rain that would typically occur in a given year on average. Therefore, it provides protection for routine and lesser extreme events that have equal or lower wind-driven rain wind speed (even if the rainfall rate is substantially greater than the threshold used to develop the map). Events that exceed the wind-driven rain wind speed tend to have lower coincidental rainfall rates as based on the natural tendency or shape of the hazard curves in the climatological data (see JAMC article referenced in Bibliography).

Finally, as shown in the tabulated pressure values in the proposal, the lower limit of 2.86 psf (137 Pa) for test pressure is used to correspond with the minimum test pressure used in recognized standards addressing wind-driven rain resistance (e.g., ASTM E331) despite the table above showing that lower pressure could be justified in regions of low wind-driven rain hazard. The upper limit of 15.0 psf (718 Pa) also is based on current accepted practice for worst-case wind-driven rain climate conditions in the U.S. and ensures the availability of solutions (it also ensures equivalency with current accepted practices for regions or conditions considered to have high wind-driven rain hazard). This range of WDR pressures also is consistent with that used in Canada. These limits ensure that this new approach is "calibrated" to accepted practice and that solutions are available while also better aligning solutions with actual variation in U.S. wind-driven rain hazard. Even so, the 15 psfcap will provide substantial protection against significant water intrusion and contents damage in greater wind-driven rain hazard conditions or events (higher wind speed at greater return periods) up to the point where structural failures begin to occur and the general integrity of the building envelope is compromised. Such extreme structural safety-level events are beyond the scope of a serviceability concern underlying the current and proposed approach to water resistance. Regardless, the proposed approach deals with the matter of wind-driven rainwater resistance in a much more risk-consistent fashion based on the variation in hazard across the U.S. (wind-driven rain wind speed) and for different building conditions (e.g., wind exposure and building height).

Bibliography: Belcher, B.N., DeGaetano, A.T., Masters, F.J., Crandell, J., and Morrison, M.J. (2023). Development of an Extreme Wind-Driven Rain Climatology for the Southeastern United States Using 1-Min Rainfall and Peak Wind Speed Data. Journal of Applied Meteorology and Climatology, American Meteorological Society, DOI: https://doi.org/10.1175/JAMC-D-22-0156.1

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 - While the cost impact indicates "increased cost" (there was no suitable default answer in cdpACCESS), the proposal does not mandate any new requirements. It provides a new means or option to evaluate building wall assemblies and components for water resistance using an improved methodology based on actual wind-driven rain hazard. If voluntarily used, it could result in an increase or decrease cost for material or assembly qualification purposes relative to existing practices. But, the increase or decrease in cost to the end user may be very small. This proposal also does not require any existing materials or methods recognized in the code to alter current requirements, methods, or standards. So, it should be considered cost neutral.

Estimated Immediate Cost Impact Justification (methodology and variables):

$0 - see cost impact statement above.

RB45-25

RB46-25

IRC: R301.2.2.1.1

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com)

2024 International Residential Code

SECTION R301 DESIGN CRITERIA

Revise as follows:

R301.2.2.1.1 Alternate determination of seismic design category. The seismic design category and short-period design spectral response accelerations, S_{DS} , for a site shall be allowed to be determined in accordance with Section 1613 of the *International Building Code*. The value of S_{DS} determined in accordance with the *International Building Code* is permitted to be used to set the seismic design category in accordance with Table R301.2.2.1.1, and to interpolate between values in Tables R602.10.3(3)~~ and R603.9.2(1)~~ and other seismic design requirements of this code.

Reason: During the course of writing other code change proposals it was identified that the reference to Table R603.9.2(1) appears to be in error. This table does not include any information relative to Seismic Design Categories, so interpolating based on S_{DS} is not possible. Research into past code editions found that this reference appears to have been in error over a number of code cycles and it has not yet been determined what table it originally referenced. As a result the pointer is being 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:

This proposal is deleting an erroneous reference and will have no cost impact.

RB46-25

RB47-25

IRC: R301.2.2.1.1

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

SECTION R301 DESIGN CRITERIA

Revise as follows:

R301.2.2.1.1 Alternate determination of ~~seismic design category~~ Seismic Design Category. ~~The seismic design category and short-period design spectral response accelerations, S_{DS}, for a site shall be allowed to be determined in accordance with Section 1613 of the *International Building Code*.~~As an alternate to determination of the *Seismic Design Category* in accordance with Section R301.2.2.1, the *Seismic Design Category* shall be determined in accordance with all of the following:

1. The short-period spectral response acceleration, S_{DS}, shall be determined in accordance with Section 1613 of the *International Building Code.*
2. Using this S_{DS} value, the *Seismic Design Category* shall be determined in accordance with Table R301.2.2.1.1.

~~The value of and~~ Where S_{DS} is determined in accordance with the *International Building Code* it is permitted to use S_{DS} ~~be used to set the seismic design category in accordance with Table R301.2.2.1.1, and~~to interpolate between values in Tables R602.10.3(3) and R603.9.2(1) and other seismic design requirements of this code.

Reason: This proposal clarifies use of an alternate method to determine the Seismic Design Category (SDC). It clarifies that SDS determined per the IBC is used to assign the SDC in accordance with IRC Table R301.2.2.1.1. Further, it removes any suggestion that an IBC SDC is permitted to be used for IRC design. The importance of this clarification is heightened because the IBC has adopted IBC-SDC Maps.

When using the IRC, Seismic Design Categories (SDCs) are commonly determined using the IRC-SDC maps in Figures R301.2.2.1(1) to (7). An alternative method is provided in Section R301.2.2.1.1, allowing the user to first determine SDS in accordance with the IBC, and then to assign the SDC in accordance with IRC Table R301.2.2.1.1, based on the determined SDS. There are two potential benefits to using this alternative approach. First, where the designer has geotechnical information that specifies the site class (found in ASCE 7 as referenced in IBC), the designer can determine SDS based on this more specific site class information, and this could result in the assignment of a lower SDC. Second, whether or not the designer has site class information, the value of SDS determined per the IBC can be used to interpolate IRC design requirements such as assignment of wall bracing length. This second item retains 2024 IRC language and is not the intended subject of this code change proposal.

Note that when the designer is directed to use IBC provisions to determine SDS, the IBC in turn specifies use of ASCE 7. Note also that the pointer to Section R603.9.2(1) appears to be in error; this sentence is being addressed in a separate code change proposal.

The editorial revisions in this code change proposal make clear that the IRC user can use the IBC to determine SDS, but cannot use the IBC to determine SDC. This is because the SDC maps adopted by the IRC and IBC are different and not interchangeable, as seen in Figures 1 and 2. Although IBC SDC maps should provide conservative information for differentiating SDC C from SDC D, they do not adequately separate SDC D into D0, D1 and D2. Most importantly the IBC maps do not adequately assign the designation of SDC E that is intended for use of the IRC. The IRC mapping assumes short period structures and assigns SDC based on SDS, and this is directly incorporated into the pre-engineered prescriptive seismic designs. IBC mapping triggers SDC E based on S1. While there has always been some difference between the extent of SDC E in the IRC and IBC maps, it appears to have become even more dramatic under 2024 Edition maps, as seen below.

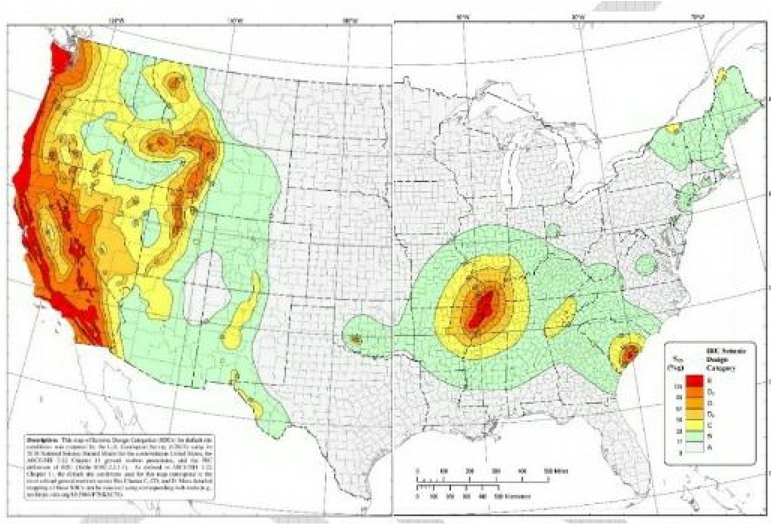


Figure 1. 2024 IRC Seismic Design Categories for the conterminous United States.

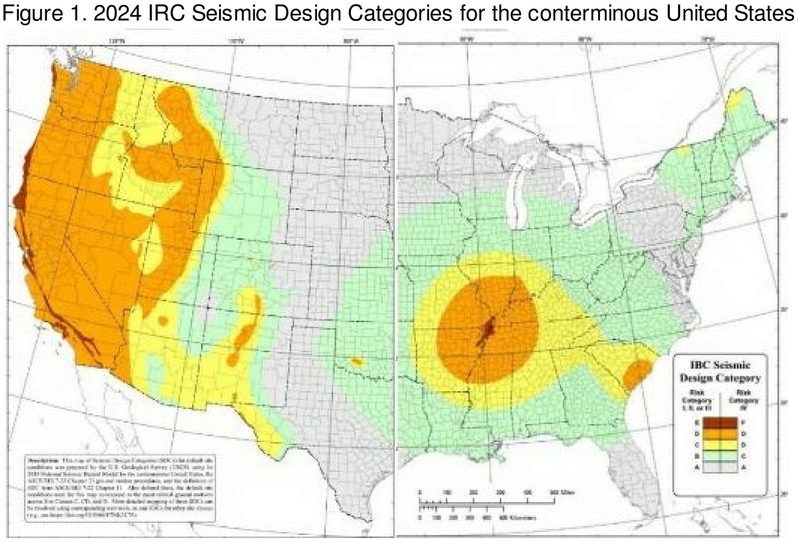


Figure 2. 2024 IBC Seismic Design Categories for the conterminous United States.

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

Justification for no cost impact:

This code change proposal will not increase or decrease the cost of construction because the proposal is only intended to clarify the current code requirements for seismic design.

RB47-25

RB48-25

IRC: R301.2.2.4

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

SECTION R301
DESIGN CRITERIA

Revise as follows:

R301.2.2.4 Masonry construction. Masonry construction in *Seismic Design Categories* D_0<u>,</u> ~~and~~ D_1 , <u>and D_2</u> <u>and in *townhouses* in *Seismic Design Category* C</u> shall comply with the requirements of Section <u>R606.12</u> ~~R606.12.1. Masonry construction in *Seismic Design Category* D_2 shall comply with the requirements of Section R606.12.4.~~

Reason: Section R301.2.2.4 is intended as a pointer to seismic design provisions for masonry construction. This is an editorial clarification and simplification with a single pointer to Section R606.12.

The current pointers reference subsections R606.12.1 and R606.12.4. This creates two ambiguities:

A potential misinterpretation could infer that the remaining subsections of Section R606.12 may not be applicable.

Users that go directly to R606.12.4 must also intentionally seek out R606.12.1 to understand the full scope of the seismic requirements.

By revising Section R301.2.2.4 to provide a single pointer to Section R606.12, both of these concerns are addressed.

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

Justification for no cost impact:

This proposal does not increase or decrease the cost of construction because it only clarifies current code provisions seismic categories in masonry construction.

RB48-25

RB49-25

IRC: R301.2.2.10

Proponents: Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com); Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com)

2024 International Residential Code

SECTION R301 DESIGN CRITERIA

Revise as follows:

R301.2.2.10 Seismic restraint of appliances and equipment. In *Seismic Design Categories* D_0, D_1 and D_2 and in *townhouses* in *Seismic Design Category* C, appliances and equipment that are designed to be fixed in position shall be supported and braced or anchored to the structure in accordance with the component manufacturer's recommendations or per Section R301.2.2.10.1.

Exceptions: Other than water heaters, seismic ~~Seismic~~ support, bracing and anchorage are not required for the following:

1. Suspended mechanical ducts, electrical conduit, automatic sprinkler systems and plumbing systems where the operating weight of the system weighs 5 pounds/ft (2.3 kg/ft) or less.
2. Where the appliance or equipment is bearing on an elevated floor or roof and the housing height is not greater than 1.5 times the width of the housing base in either direction.
3. Where the installed weight of a suspended appliance or equipment is 20 pounds (9.1 kg) ~~50 pounds (22.7 kg)~~ or less.
4. Where the installed weight is 400 pounds (181.4 kg) or less and the center ~~bottom~~ of the appliance or equipment is 4 feet (1219 mm) or less above the adjacent floor level.

Reason: This proposal is intended to resolve discrepancies between IRC and ASCE 7 provisions regarding non-structural component seismic bracing.

Section R301.2.2.10 was added during the 2024 cycle to provide clear consistent prescriptive provisions on seismic bracing requirements for residential appliances and equipment. The criteria required to qualify for the exceptions were intended to align with comparable criteria in ASCE 7 Chapter 13 for non-structural components. However, slight discrepancies remained between the exception criteria in the IRC and ASCE 7. This proposal correlates the R301.2.2.10 exception criteria with ASCE 7-22 Table 13.1-1.

Following is ASCE 7-22 Table 13.1-1 for reference. The boxed bullet items in the image below identify the specific criteria used as the basis for this proposal.

Table 13.1-1. Nonstructural Components Exempt from the Requirements of This Chapter.

Seismic Design Category (SDC)	Nonstructural Components Exempt from the Requirements of this Chapter
All Categories	• Furniture (except storage cabinets, as noted in Table 13.5-1) • Temporary components that remain in place for 180 days or less • Mobile units and equipment including components that are moved from one point in the structure to another during ordinary use
A	• All components
B	• Architectural Components, other than parapets, provided that the component Importance Factor, I_p, is equal to 1.0 • Mechanical and Electrical Components
C	• Mechanical and Electrical Components, provided that either ○ The component Importance Factor, I_p, is equal to 1.0 and the component is positively attached to the structure; or ○ The component weighs 20 lb (89 N) or less
D, E, F	• Mechanical and electrical components positively attached to the structure, provided that ○ For discrete mechanical and electrical components, the component weighs 400 lb (1,779 N) or less, the center of mass is located 4 ft (1.22 m) or less above the adjacent floor level, flexible connections are provided between the component and associated ductwork, piping, and conduit, and the component Importance Factor, I_p, is equal to 1.0; or ○ For discrete mechanical and electrical components, the component weighs 20 lb (89 N) or less; or ○ For distribution systems, the component Importance Factor, I_p, is equal to 1.0 and the operating weight of the system is 5 lb/ft (73 N/m) or less. • Distribution systems included in the exceptions for conduit, cable tray, and raceways in Section 13.6.5, duct systems in 13.6.6, and piping and tubing systems in 13.6.7.3. Where in-line components, such as valves, in-line suspended pumps, and mixing boxes require independent support, they shall be addressed as discrete components and shall be braced considering the tributary contribution of the attached distribution system.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost increase should be minimal and will be limited to heavier suspended systems.

- $36-$42 => 25-feet of 20-gage coil strapping
- $6 - $10 => 175-feet of 20-gage galvanized steel wire
- $21-$35 => 10-foot long 14-gage channel strut

Estimated Immediate Cost Impact Justification (methodology and variables):

Construction materials necessary for small system anchorage and bracing are readily available at local hardware stores. A range of common materials (coil strapping, wire bracing, or rigid struts) can be used to achieve the required bracing and stability.

RB49-25

RB50-25

IRC: R301.2.2.11 (New), ICC Chapter 44 (New)

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

SECTION R301 DESIGN CRITERIA

Add new text as follows:

R301.2.2.11 Seismic alterations. Structural alterations in all *Seismic Design Categories* that are intended exclusively to improve seismic resistance and are not required by other provisions of this code shall be in accordance with applicable provisions *of the International Existing Building Code*, with ICC 1300, or with other approved methods.

Add new standard(s) as follows:

ICC

International Code Council, Inc.
200 Massachusetts Avenue, NW, Suite 250
Washington, DC 20001

ICC 1300-2024 Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings.

Reason: This proposal adds to IRC Section R301.2.2 “Seismic provisions" a new Section R301.2.2.11 addressing voluntary seismic alterations. The intent is to provide technical resources for voluntary seismic retrofit, to encourage technically appropriate and cost-effective retrofit measures. The first method listed identifies applicable provisions of the IEBC. These include both the engineered voluntary retrofit provisions of IEBC Section 503.13 and the prescriptive retrofit provisions of IEBC Appendix Chapter A3. The second method listed is new standard ICC 1300-2024, *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings*, which is also added to Chapter 44. The third method listed allows the building official to approve methods deemed to be appropriate. These might include locally developed retrofit plan sets, commonly used in western states.

ICC 1300 is a new retrofit standard that allows one- and two-family dwelling units and townhouses to be assessed and retrofit to provide a higher level of seismic resistance. Damage assessments from earthquakes and application of modern seismic design standards and modeling techniques have shown crawl space homes, homes with living areas over garages, hillside homes, and brick masonry chimneys to be vulnerable to significant earthquake damage. ICC’s Residential Seismic Assessment and Retrofit Standard Consensus Committee (IS-RSARC) has developed ICC 1300, based on prestandard FEMA P-1100 prepared by the Applied Technology Council for FEMA. The best available seismic numerical modeling tools and engineering practices were used to identify targeted prescriptive and engineered retrofit measures to best achieve performance objectives. For further information on this standard see the IS-RSARC web page.

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

Justification for no cost impact:

This proposal provides a new voluntary compliance methodology that can be selected at the user’s option.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
ICC 1300-2024 Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings.

RB50-25

RB51-25

IRC: R301.2.4, R306.1, R306.2, R306.3, R306.4 (New), R306.4.1 (New), R306.4.2 (New), BO102.7, BO103.1(New), BO104.6 (New), BO105.5 (New), BO106.4 (New), BO107.2 (New), BO108, BO108.1, TABLE BO108.1

Proponents: Rebecca Quinn, RCQuinn Consulting, representing Association of State Floodplain Managers (rebecca@rcquinnconsulting.com); Chad Berginnis, representing Association of State Floodplain Managers (cberginnis@floods.org)

2024 International Residential Code

SECTION R301 DESIGN CRITERIA

Revise as follows:

R301.2.4 Floodplain construction. *Buildings* and structures located ~~constructed~~ in whole or in part in flood hazard areas as established in Table R301.2 shall be constructed in accordance with the flood-resistant construction provisions of code.~~, and *substantial improvement* and *repair* of *substantial damage* of *buildings* and structures located in whole or in part in flood hazard areas, shall be designed and constructed in accordance with Section R306. *Buildings* and structures that are located in more than one flood hazard area, including A Zones, Coastal A Zones and V Zones, shall comply with the provisions associated with the most restrictive flood hazard area. *Buildings* and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.~~

R301.2.4.1 Alternative provisions. As an alternative to the requirements in Section R306, ASCE 24 is permitted subject to the limitations of this code and the limitations therein.

SECTION R306 FLOOD-RESISTANT CONSTRUCTION

Delete and substitute as follows:

~~**R306.1 General.** *Buildings* and structures constructed in whole or in part in flood hazard areas established in Table R301.2, and *substantial improvement* and *repair* of *substantial damage* of *buildings* and structures located in whole or in part in flood hazard areas, shall be designed and constructed in accordance with the provisions contained in this section. *Buildings* and structures that are located in more than one flood hazard area, including A Zones, Coastal A Zones and V Zones, shall comply with the provisions associated with the most restrictive flood hazard area. *Buildings* and structures located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.~~

R306.1 General. Buildings located in whole or in part in flood hazard areas established by Table R301.2 shall comply with the following:

1. New construction shall be designed and constructed in accordance with Sections R306.1.1 through R306.1.10 and Section R306.2 or R306.3.
2. Buildings located in more than one flood hazard area shall comply with the provisions associated with the most restrictive flood hazard area.
3. Buildings located in whole or in part in identified floodways shall be designed and constructed in accordance with ASCE 24.
4. Substantial improvement and repair of substantial damage of existing buildings shall be designed and constructed in accordance with Sections R306.1.1 through R306.1.10 and Section R306.2 or R306.3.
5. Repair, alteration, additions and foundations of existing buildings shall comply with Section R306.4.

Revise as follows:

R306.2 Flood hazard areas including A Zones. Areas that have been determined to be prone to flooding and that are not subject to high-velocity wave action shall be designated as flood hazard areas. Flood hazard areas that have been delineated as subject to wave heights between $1^1/_2$ feet (457 mm) and 3 feet (914 mm) or otherwise designated by the *jurisdiction* shall be designated as Coastal A Zones and are subject to the requirements of Section R306.3. *Buildings* and structures ~~constructed~~ located in whole or in part in flood hazard areas shall be designed and constructed in accordance with Sections R306.2.1 through R306.2.5 ~~R306.2.4~~.

R306.3 Coastal high-hazard areas including V Zones and Coastal A Zones, where designated. Areas that have been determined to be subject to wave heights in excess of 3 feet (914 mm) or subject to high-velocity wave action or wave-induced erosion shall be designated as coastal high-hazard areas. Flood hazard areas that have been designated as subject to wave heights between $1^1/_2$ feet (457 mm) and 3 feet (914 mm) or otherwise designated by the *jurisdiction* shall be designated as Coastal A Zones. *Buildings* and structures located ~~constructed~~ in whole or in part in coastal high-hazard areas and Coastal A Zones, where designated, shall be designed and constructed in accordance with Sections R306.3.1 through R306.3.10.

Add new text as follows:

R306.4 Existing buildings and structures. In flood hazard areas, repairs, alterations, additions and foundations of existing buildings and structures shall comply with Section R306.4.1, R306.4.2 or R306.4.3.

R306.4.1 Repairs. As applicable to the flood hazard area, comply with the following:

1. Existing buildings and structures shall be brought into compliance with requirements of Section R306.1 and R306.2 or R306.3 for new construction when the buildings have sustained substantial damage or when repairs constitute substantial improvement.
2. Replacement of exterior equipment and exterior appliances damaged by flood shall meet the requirements of Section R306.1.6.

R306.4.2 Alterations. As applicable to the flood hazard area, the following shall comply with Section R306.1 and Section R306.2 or R306.3 for new construction:

1. Alterations that constitute substantial improvement of an existing building and all aspects of the existing building.
2. New foundations, foundations raised or extended upward, and replacement foundations.

R306.4.3 Additions and foundations. For existing buildings and structures located in flood hazard areas:

1. Additions, and additions combined with other proposed work, that constitute substantial improvement of the existing building shall comply with the requirements of Section 306 for new construction, and all aspects of the existing building shall be brought into compliance with the requirements of Section R306 for new construction.

2. Additions, and additions combined with other proposed work that do not constitute substantial improvement of the existing building are not required to comply with the requirements of Section R306 for new construction provided that both of the following apply:
   2.1. The addition shall not create or extend a nonconformity of the existing building with the requirements of Section R306.
   2.2. The lowest floor of the addition shall be at or above the lower of the lowest floor of the existing building or the lowest floor elevation required in Section R306.

3. For new foundations, foundations raised or extended upward, and replacement foundations, the foundations shall be in compliance with the requirements of Section R306 for new construction. Existing buildings with slab-on-ground foundations shall not be elevated on new, raised, extended, or replaced foundations unless the existing slabs are assessed in accordance with ACI 562 and, if required in accordance with the assessment, strengthened in accordance with ACI 562 and ACI 318 to meet the load requirements of Chapter 4.

APPENDIX BO
EXISTING BUILDINGS AND STRUCTURES

SECTION BO102
COMPLIANCE

Delete and substitute as follows:

~~**BO102.7 Flood hazard areas.** Work performed in existing buildings located in a flood hazard area as established by Table R301.2 shall be subject to the provisions of Section R104.3.1.~~

BO102.7 Flood hazard areas. Work on existing buildings located in flood hazard areas shall comply with the flood hazard area provisions of Section R306 and this appendix, as applicable. The building official shall determine if the work proposed for existing buildings in flood hazard areas constitutes substantial improvement or repair of substantial damage.

SECTION BO103
DEFINITIONS

Add new definition as follows:

FLOOD HAZARD AREA. The greater of the following two areas

1. The area within a floodplain subject to a 1-percent or greater chance of flooding in any given year.
2. The area designated as a flood hazard area on a community’s flood hazard map, or otherwise legally designated.

SECTION BO104
REPAIRS

Add new text as follows:

BO104.1.1 Flood hazard areas. Repairs to existing buildings located in *flood hazard areas* shall comply with Section R306.4 and this appendix.

SECTION BO105
ALTERATIONS

BO105.1.1 Flood hazard areas. Alterations to existing buildings located in *flood hazard areas* shall comply with Section R306.4 and this appendix.

SECTION BO106
ADDITION

BO106.1.1 Flood hazard areas. Additions and foundations for existing buildings located in flood hazard areas shall comply with Section R306.4 and this appendix.

SECTION BO107
RELOCATED BUILDINGS

BO107.2 Flood hazard areas. When relocated within, or moved into, *flood hazard areas*, the foundations of residential buildings shall comply with the flood-resistant construction requirements of Section R306 for new construction.

BO108
HISTORIC BUILDINGS

BO108.1 Flood hazard areas. In *flood hazard areas*, where the work proposed constitutes *substantial improvement* or repair of *substantial damage*, the existing building shall be brought into compliance with the flood-resistant construction requirements of Section R306 for new construction.

Exception: If a historic building will continue to be a historic building after the proposed work is completed, then the proposed work is not considered *substantial improvement* or repair of *substantial damage*. For the purposes of this exception, a historic building is any of the following:

1. Listed or preliminarily determined to be eligible for listing in the National Register of Historic Places.
2. Determined by the Secretary of the US Department of Interior as contributing to the historical significance of a registered historic district or a district preliminarily determined to qualify as an historic district.
3. Designated as historic under a state or local historic preservation program that is approved by the Department of Interior.

Revise as follows:

SECTION ~~BO108~~ BO109
REFERENCED STANDARDS

~~BO108.1~~ BO109.1 General. See Table ~~BO108.1~~ BO109.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title and the section or sections of this appendix that reference the standard.

TABLE ~~BO108.1~~ BO109.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTION HEREIN REFERENCED
ACI 562-21	Assessment, Repair, and Rehabilitation of Existing Concrete Structures—Code Requirements	BO106.4
IEBC—24	*International Existing Building Code®*	BO102.8
IFC—24	*International Fire Code®*	BO107.1
IPMC—24	*International Property Maintenance Code®*	BO107.1

Reason: Communities that participate in the NFIP have always had to determine whether work on existing dwellings in floodplains constitutes substantial improvement and whether damage to existing dwellings in floodplains constitutes substantial damage. Sec. R306 already specifies that “substantial improvement and repair of substantial damage” shall comply with the section. The definition of “substantial improvement” includes alterations, repairs, and additions. Sec. R104.3.1 requires the code official to make substantial improvement and substantial damage determinations.

The IEBC has explicit provisions for repair, alteration, and additions of existing buildings in flood hazard areas. This proposal clarifies the IRC in Sec. R306 and Appendix BO, largely based on the IEBC. The IEBC provides clarity for building officials and applicants as to what requirements apply to repairs, alterations, and additions to existing buildings.

R301.2.4: rather than maintain word-for-word duplication with Sec. R306.1, the proposal replaces that language with a sentence to phrase the general requirement to be more in line with similar provisions in R301.2.1 (for wind) and the topic sentence in R301.2.2 (seismic).

R306.1: proposal reformats the text as a list, with some clarifications, prompted by the addition of a pointer to new Section R306.4 for repairs, alterations, additions and foundation work.

New R306.4 for existing buildings.

- R306.4.1 for repairs. The proposed language is based on IEBC 401.3 (repairs that constitute substantial improvement) and IEBC 405.2.6 (have sustained substantial damage). The provision for replacement of exterior equipment damaged by flood is companion to a separate proposal for the IEBC.
- R306.4.2 for alterations. The proposed language is based on IEBC 503.2 prescriptive compliance for alterations (except not retaining the inverse statement for alterations that do NOT constitute substantial improvement).
- R306.3 for additions and foundations. The provisions for additions to dwellings and foundation work on buildings in flood hazard areas. The basis for the proposed added text is IEBC 502.2, prescriptive compliance for additions, with the addition of evaluation of slabs-on-ground when existing dwellings will be raised on foundations (same is proposed to be added to IEBC). Raised, extended, and new foundations are included with additions because the "addition" is defined as "An extension or increase in floor areas, number of stories, or height of a building or structure" (emphasis added). FEMA and others have reported on evidence of problems and failures of elevation projects when slabs are not evaluated
and strengthened before raising. A separate proposal adds the evaluation of slabs to the IEBC.

The proposal also amends IRC Appendix BO, Existing Buildings and Structure, to more fully incorporate flood requirements and better coordinate with the IRC.

- BO102.7: Describe the requirements, rather than refer only to R104.3.1.
- BO103, Definitions: Add the definition for "flood hazard area." A separate proposal would add the same to Sec. R202. If that proposal passes, this definition in Appendix BO is not needed.
- BO104.1.1: for clarity, refer to the proposed added Sec. 306 for repairs.
- BO105.1.1: for clarity, refer to the proposed added Sec. 306 for alterations.
- BO106.1.1: for clarity, refer to proposed added Sec. 306 for additions and foundations.
- BO107.2: add for relocated buildings, equivalent to IEBC 1402.6.
- BO108.1: add for historic buildings, equivalent to IEBC 1201.4. The I-Code definition for "historic building" allows designation under local law and local designation of historic districts. The NFIP does not recognize designation by local historic preservation programs unless the communities are designated by the US Department of Interior as Certified Local Governments. Certified local programs, like certified state programs, must abide by federal requirements when they designate historic buildings and historic districts. The exception means all historic structures in flood hazard areas must comply when work is substantial improvement or the structures incur substantial damage – except those that qualify under the NFIP definition. That preserves consistency with the NFIP 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 proposal provides more detail in the IRC on how to achieve compliance with existing requirements for substantial improvement and repair of substantial damage in flood hazard areas. Providing additional detail on meeting requirements already in the code will not impact the cost of construction.

Staff Analysis: The proposed referenced standard, ACI 562-21, Assessment, Repair, and Rehabilitation of Existing Concrete Structures —Code Requirements, is currently referenced in the IEBC.

RB51-25

RB52-25

IRC: TABLE R301.5

Proponents: Allen Burris, Clark County Nevada, representing Southern Nevada Chapter (allen.burris@clarkcountynv.gov); Jeffrey Grove, representing Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Residential Code

SECTION R301
DESIGN CRITERIA

Revise as follows:

TABLE R301.5 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS (in pounds per square foot)

USE	UNIFORM LOAD (psf)	CONCENTRATED LOAD (lb)
Uninhabitable attics without storage[b]	10	—
Uninhabitable attics with limited storage[b, g]	20	—
Habitable attics and attics served with fixed stairs	~~30~~40	—
Balconies (exterior) and decks[e]	40	—
Fire escapes	40	—
Guards	—	200[h, i]
Guard in-fill components[f]	—	50[h]
Handrail[d]	—	200[h]
Passenger vehicle garages	50	2,000[a]
Areas other than sleeping areas	40	—
Sleeping areas	~~30~~40	—
Stairs	40[c]	300[c]

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm^2, 1 pound = 4.45 N.

a. Elevated garage floors shall be capable of supporting the uniformly distributed live load or a 2,000-pound concentrated load applied on an area of 4$^1/_2$ inches by 4$^1/_2$ inches, whichever produces the greater stresses.

b. Uninhabitable attics without storage are those where the clear height between joists and rafters is not more than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

c. Individual stair treads shall be capable of supporting the uniformly distributed live load or a 300-pound concentrated load applied on an area of 2 inches by 2 inches, whichever produces the greater stresses.

d. A single concentrated load applied in any direction at any point along the top. For a guard not required to serve as a handrail, the load need not be applied to the top element of the guard in a direction parallel to such element.

e. See Section R507.1 for decks attached to exterior walls.

f. Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.

g. Uninhabitable attics with limited storage are those where the clear height between joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.

The live load need only be applied to those portions of the joists or truss bottom chords where all of the following conditions are met:

1. The attic area is accessed from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is not less than 30 inches.
2. The slopes of the joists or truss bottom chords are not greater than 2 units vertical in 12 units horizontal.
3. Required insulation depth is less than the joist or truss bottom chord member depth.

The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 pounds per square foot.

h. Glazing used in handrail assemblies and guards shall be designed with a load adjustment factor of 4. The load adjustment factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

i. Where the top of a guard system is not required to serve as a handrail, the single concentrated load shall be applied at any point along the top, in the vertical downward direction and in the horizontal direction away from the walking surface. Where the top of a guard is also serving as the handrail, a single concentrated load shall be applied in any direction at any point along the top. Concentrated loads shall not be applied concurrently.

Reason: In the post COVID environment, many people are working from home and setting up home offices or exercise equipment in their extra bedrooms. The homeowners are unaware there is a different strength in the floor system in the sleeping areas than in the rest of the house. When these rooms are designed with a lighter structural load with the assumption that these will be used for sleeping and bedroom furniture there is a risk that the change in use will overload the structure. While changing the load requirements will not cover all scenarios such as putting heavy safes on the second floor, it will allow the homeowner to use the house as the want without concern to which rooms or areas of the floor are weaker than others.

Cost Impact: The 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 could be a cost savings buy making joist sizes more consistent and getting reduced pricing based on quantity. There could also be a slight cost increase due to larger member sizes. The end result is a wash.

RB52-25

RB53-25

IRC: TABLE R301.5

Proponents: Thomas Zuzik Jr, Railingcodes.com, representing Feeney Inc. - Oakland, CA (https://feeneyinc.com) (coderep@railingcodes.com)

2024 International Residential Code

SECTION R301
DESIGN CRITERIA

Revise as follows:

TABLE R301.5 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS (in pounds per square foot)

USE	UNIFORM LOAD (psf)	CONCENTRATED LOAD (lb)
Uninhabitable attics without storage[b]	10	—
Uninhabitable attics with limited storage[b, g]	20	—
Habitable attics and attics served with fixed stairs	30	—
Balconies (exterior) and decks[e]	40	—
Fire escapes	40	—
Guards	—	200[h, i]
Guard in-fill components[f, i]	—	50[h], 12[i]
Handrail[d]	—	200[h]
Passenger vehicle garages	50	2,000[a]
Areas other than sleeping areas	40	—
Sleeping areas	30	—
Stairs	40[c]	300[c]

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 square inch = 645 mm^2, 1 pound = 4.45 N.

a. Elevated garage floors shall be capable of supporting the uniformly distributed live load or a 2,000-pound concentrated load applied on an area of 4$^1/_2$ inches by 4$^1/_2$ inches, whichever produces the greater stresses.

b. Uninhabitable attics without storage are those where the clear height between joists and rafters is not more than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

c. Individual stair treads shall be capable of supporting the uniformly distributed live load or a 300-pound concentrated load applied on an area of 2 inches by 2 inches, whichever produces the greater stresses.

d. A single concentrated load applied in any direction at any point along the top. For a guard not required to serve as a handrail, the load need not be applied to the top element of the guard in a direction parallel to such element.

e. See Section R507.1 for decks attached to exterior walls.

f. Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.

g. Uninhabitable attics with limited storage are those where the clear height between joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.

The live load need only be applied to those portions of the joists or truss bottom chords where all of the following conditions are met:

1. The attic area is accessed from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is not less than 30 inches.

2. The slopes of the joists or truss bottom chords are not greater than 2 units vertical in 12 units horizontal.

3. Required insulation depth is less than the joist or truss bottom chord member depth.

The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 pounds per square foot.

h. Glazing used in handrail assemblies and guards shall be designed with a load adjustment factor of 4. The load adjustment factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

i. Where the top of a guard system is not required to serve as a handrail, the single concentrated load shall be applied at any point along the top, in the vertical downward direction and in the horizontal direction away from the walking surface. Where the top of a guard is also serving as the handrail, a single concentrated load shall be applied in any direction at any point along the top. Concentrated loads shall not be applied concurrently.

j. Guard in-fill components, except the handrail, shall be designed to withstand a horizontally applied concentrated load of 12 pounds (.0534kN) from a sphere passing through the guard where openings greater than 1.25-inches (31.75 mm) exist in a guard's infill. The sphere shall have a diameter equal to the applicable infill opening limitation in Section R321.1.3.

Attached Files

- **ICC Test Rail Pic B.png**
  https://www.cdpaccess.com/proposal/12052/35618/files/download/9300/
- **ICC Test Rail Pic A.png**
  https://www.cdpaccess.com/proposal/12052/35618/files/download/9299/
- **ICC Test Rail Pic C.png**
  https://www.cdpaccess.com/proposal/12052/35618/files/download/9292/
- **ICC Test Rail Pic S.png**
  https://www.cdpaccess.com/proposal/12052/35618/files/download/9291/

Reason: For over 30-years building officials, engineers, designers, contractors, manufacturers and fabricators have been debating whether or not the sphere measurements delineated for guard opening limitations, currently in the 2024 IRC Section R321.1.3 and prior editions, is simply a opening size measurement or is it an opening size measurement combined with a measured force load, citing "openings that allow passage". With a lack of language delineating no force load be applied, then the opposite is to define a specific infill penetration spread load in the model codes to cover this conflict with inspectors who routinely use many different non-codified techniques to determine if a guard meets a requirement that is not in the ICC-IRC model code.
This proposal is based on testing research done by the proponent to correlate a pound-force load on a sphere in relation to ASTM E935-00 "Test Method D - Application of horizontal static load to determine resistance to cone penetration by infill area of picket and panel railing systems", first published by ASTM in the designation: E 935 - 91 "Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings[1]", and then include this corelated cone load to a sphere load as a specific design load for infill spread for the model 2027 IRC. For those of you who are not familiar with this "Test Method" it was developed by the same group who also developed the method for testing the 1sqft area load test, published in one form or another, and first published in the model IRC

since the 2001 supplement (Proposal RB14-01 added by this same proponent), to the current 2024 model IRC in table "R301.5 Guard in-fill component h".

The information for this reason statement in the monograph is limited to the very basic's. For those parties interested in more detailed information on this proposal beyond the summary, we are publishing on going information though out the 2025 group "B" process at (https://railingcodes.com/infill/) to provide more up to date information and details, as this proposal progresses through the 2027 code cycle process.

ESTABLISHED ASTM TESTING METHOD HISTORY

The initial publication of ASTM E935 in 1983 included 2 test methods, "Test Method A - Horizontal Static Load Application" and "Test Method B - Vertical Static Load Application". Two additional test methods were then added to E935 in the 1991 publication of ASTM E935-91, which also includes the title changes to Test Methods A and B. In the 1991 publication, Test Method A was renamed "Application of Horizontal Static Load to Top Rail" and Test Method B was renamed "Application of Vertical Static Load to Top Rail", and the first of the 2 new test methods added in 1991 was "Test Method C - Application of Horizontal Static Load to Infill Areas of Picket and Panel Railing Systems", and the second was “Test Method D – Application of Horizontal Static Load to Determine Resistance to Cone Penetration by Infill Area of Baluster and Panel Railing Systems.”, Test Method D was specifically developed to be able to test the spread between infill elements in guard systems. ASTM E935-91 cites ASTM E985 "Specifications for Permanent Metal Railing Systems and Rails for Buildings" for the specific loads to be used for each test method in E935.

ASTM E935-00 was Reapproved in 2006 and

- is the latest edition which included the test method for guard infill deflection as; “Test Method D – Application of Horizontal Static Load to Determine Resistance to Cone Penetration by Infill Area of Baluster and Panel Railing Systems”.
- E935-00 also cites, as did the 1991 test method, to use
  - E985-00 for the load that will be applied for Test Method D, and
  - in section 7.1.8 "The minimum horizontal test load to be applied by a penetration cone to the infill area of a baluster or panel railing system (see Test Method D of Test Methods E935) shall be 220 N (50 lbf)."

Specifics of importance in ASTM E935-00, in Test Method D

- Test Method D specifies when testing to use a cone that is 1.25% the size of the opening limitation.
  - This translates to using a 5-inch Cone for testing an opening limitation of 4-inches in guard infill.
- The test method specifies that the cone's point be truncated to 1-inch in diameter.
  - For this reason we have limited the load requirement in this proposal to openings that allow a sphere 1.25-inches in diameter to pass through.
  - Openings smaller than the 1.25-inch sphere are exempt from this requirement

The current edition of ASTM E935-21 does not include "Test Method D". E935 was re-written to be more inline with only the sections of the "code" which were being used and removed sections that were never adopted and published as E935-13. The revisions in E935-13 of the Test Method Document outlined the test methods in Section 10 Procedure. Though some may argue that a lack of adoption means that "Test Method D" is not valid, we believe and present the fact that 3 of the 4 test methods first developed over 40 and 30 years ago are still used and that it took 30 years to add the 4th test method to clarify minimum compliance for infill spreading when the building code industry see's the need for the code to clarify the detail.

Identifying openings in Guard Infill most vulnerable to Spreading through Penetration

To simplify this code submittal which will apply to guard infill, the proposal will be focusing on wire cables as they are the most vulnerable and scrutinized type of guard infill for opening spreading/deflection concerns. Furthermore, we are narrowing the monograph reason statement even further to focus on the most vulnerable common wire cable used in the built environment, imported 1/8-inch diameter 1x19 type 316 stainless steel, arguably the most flexible type of infill commonly used in guard systems. Even though this proposal adds the requirement to all types of guard infill, and we are researching and testing different types of guard materials and construction, the ongoing results will be being published on the proponents website for public review. We stipulate for this proposal that the minimum required by code language should be based on the results of the most vulnerable and with wire cable guard infill being the most scrutinized by code officials and is likely the most affected by the addition of this proposed new model code requirement, we focused on finding this infill types pass/fail point for Test Method D of ASTM E935-00.

SAFE INFILL – SAFE CABLE DESIGN LOADS

The tensioning, stiffness and resistance that the guard infill preforms to is directly related to the material, and with wire cable this is directly related to safe cable design loads. Per industry manufacture Loos & Co. Inc., 1/8-inch diameter, 1x19 type 316 stainless steel imported wire cable, lists the minimum break point at 1,780lbf on their website. The cable's minimum break point is applied to the industry-based safety factors for designated Safe Workload and the Maximum Cable Pretension load for Cable Rail Installations. This results in a safe workload limit of 356lbf, based on 20% of the cable's minimum break load and a Maximum Cable Pretension limit of 445lbf which is 25% of the cable's minimum break load.

TRANSLATING THE ASTM E935-00 Test Method D PENETRATION CONE TEST METHOD TO SPHERE CODE

The proponent of this proposal erected a guard section 28 feet long, with cable infill and installed load cells to measure the lbf for each cable's tension that the cone and sphere were pulled between. The wire infill cables were tensioned uniformly until the infill met enough tension so the 50lbf on the cone's load cell sensor was met, (minus the drag load), without exceeding the cables work load maximum limit and pretension load. Once the guard's infill section met the Part D Test Method of E935-00, the proponent changed out the 5-inch cone designated in ASTM E935-00 with a 4-inch sphere. The 4-inch sphere was then pulled logging the tension through to failure while recording the results. Those results produced data which was then used to establish the proposed pound-force load to be applied to the sphere for the requirements listed in the code proposal.

There will be questions for how code officials might be able to verify that the infill will meet the designated new load. To start with, how are code officials inspecting the current loads for guards in IRC R301.5 table? There are more than a few ways this can be done, of which one is manufactures specifications for guard systems. As for guards with cable infill, some cable fitting manufactures already publish charts in their installation instructions for tensioning based on cable construction, size, length, clear span, and centerline vertical spacing. There are a few ways that verifying these parameters are met if the field with simple hand tools. However, this information is different based on more than a few parameters as our research through testing is showing.

The amount of work product, information and documentation for this proposal has been document for public viewing with information, pictures and videos of the results and testing done to correlate the proposed code change on the proponents website at https://railingcodes.com/infill/

Of Note the proponent will begin holding monthly or bi-monthly working sessions, though zoom in the middle of February 2025, to discuss the proposal and the on going research as this proposal progresses through the 2027 code cycle. Those interested in joining in the group meetings can fill out a form on the proponents website.

Bibliography: ASTM Editions:

- ASTM E935-83 Initial edition Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for buildings[1]A
- ASTM E935-91 Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for buildings[1]
- ASTM E935-00ε1 Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for buildings[1]
- ASTM E935-13 Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for buildings[1]
- ASTM E985-91 Standard Specification for Performance of Permanent Metal Railing Systems and Rails for Buildings[1]
- ASTM E985-00 Standard Specification for Performance of Permanent Metal Railing Systems and Rails for Buildings[1]

ICC Evaluation Service:

- ICC ES-AC273 Acceptance Criteria for Handrails and Guards.
  - Originally approved 2004.
  - Last Approved 2017
  - Editorially revised May 2021

ICC 2001 Supplement Monograph

- RB14-01 T.R301.4 (IBC 1607.7.1.2)

Websites:

- Loos & Co. Inc - Stainless Steel Strand, Bare 1x19, Import
  - https://loosco.com/product/cable/stainless-steel-strand-bare-1x19-import/
- Railingcodes.com - Proponent Research & Testing Information
  - https://railingcodes.com/infill/

- Feeney Inc. - Guard system for Testing Provided by
  - https://feeneyinc.com/product/metal/

Cost Impact: Increase

Estimated Immediate Cost Impact:

The estimated cost impact is between $0.00 & $320.00

Estimated Immediate Cost Impact Justification (methodology and variables):

The proponent of this proposal does not believe that there will be a cost increase, let alone any significant increase in cost because we believe that an estimated 98%, if not higher, of the guards being installed today are being built to comply and already meet or exceed the minimum requirements set forth in this code change proposal. However, per ICC requirements if we see any possible increase we need to provide justification of that cost increase in details.

So for those guards that possibly don't meet the minimums proposed, they can do so at minimum cost with minor changes to the design and installation of the guard system.

As stipulated in the proposal's main reason statement the most affected type of guard infill is, imported 1x19 1/8-inch diameter stainless steel cable, and the following examples are based on an installation of the cable infill guard system on an exterior deck 24 feet wide by 15 feet projection of 2 sides, and the other 24 foot side being a building.

The following summaries are supported by the breakdowns that follow after the 2 summary examples.

- WOOD POST GUARD INSTALLATION:
  - The 24ft guard section is divided by 4ft, this equals 6 sections, which then translates to 7 support posts.
    - Next if we divide the same 24ft section by 3ft we now have 8 sections, which translates to 9 support posts.
      - This is an additional 2 posts at an estimated $80.00 each
  - Then if we look at the 2 sides being 15ft and divide that by 4ft, this equals 4 sections, which translates to 5 support posts
    - Next is we divide the same 15ft section by 3ft we now have 5 sections, which translates to 6 support posts per side.
      - This is an additional 2 posts at an estimated $80.00 each
  - This example summary produces (4) posts at $80.00 each for a estimated total of $320.00

- WIDE SPAN POST GUARD INSTALLATION:
  - The 24ft section is divided by 5ft, this equals 5 sections, which then translates to 6 support posts.
    - Next we add a midspan vertical tension baluster into each of the 5 sections
      - This is an additional 5 balusters estimated at $47.49 each
      - This minuses 1 post at an estimated $80.00 each
  - Then if we look at the 2 sides being 15ft and divide that by 5ft, this equals 3 sections, which translates to 4 support posts
    - Next we add a midspan vertical tension baluster into each of the 3 sections on each side
      - This is an additional 6 balusters estimated at $47.49 each
      - This minuses 2 posts at an estimated $80.00 each
  - This example summary produces
    - (3) less posts at $80.00 each and equals a credit of $240.00
    - and adds (11) balusters at $47.49 each and equals a total of $522.39
      - This equals $522.39 - $240.00 for an additional estimated cost of $282.39
      - The $282.39 is less than the $320.00 estimated cost increase

Cost Reference Supporting Documentation:

- Wood post costs
  - Wood Post Added to Wood Deck Estimated Cost
    Wood post prices pulled from lowes.com at the time of code proposals submittal.
    - Severe Weather 4-in x 4-in x 6-ft 2 Southern yellow pine
      - Ground contact pressure treated lumber
      - Lowe's Item #312530 | Model #Y240406-GC $9.18 each
    - Simpson Strong-Tie 2-in x 4-in 14-gauge ZMAX Tension tie
      - Lowe's Item #2132165 | Model #DTT2Z $10.88 each
    - Deck Plus 1/2-in x 7-in Coated Coarse Thread Hex Bolt
      - Lowe's Item #756045 | Model #260735 $4.05 each x (2) = $8.10
    - Deck Plus 1/2-in Coated Standard Washer
      - Lowe's Item #756041 | Model #260724 $0.49 each x (4) = $1.96

Deck Plus 1/2-in x 13 Coated Steel Hex Nut

Lowe's Item #756033 | Model #260704 $4.05 each x (2) = $0.59

Per post estimated added cost:

Material Estimated at $31.30 plus local sales tax

$25.00 Installation Labor cost

Combined Estimate of $56.30 Each Post

Misc. Contingency labor/materials $23.70

Proposal Budget per post $80.00

- Option for keeping wide metal or wood post spans:
  - Adding Vertical Mid-Span Baluster based on Feeney Inc. Retail Pricing

Feeney 42-in-level baluster $40.00 each

Mounting Hardware estimated at $2.49 each

Labor cost added per baluster for installation $5.00

Estimated $47.49 added for each baluster.

Labor costs will vary depending on the area of the country the work is being done.

Estimated Life Cycle Cost Impact:

We estimate no increase in life cycle cost

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

Guards are a fixed building material that requires no change in the cost of the life cycle with this type of requirement.

RB53-25

RB54-25

IRC: TABLE R301.5

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R301
DESIGN CRITERIA

Revise as follows:

TABLE R301.5 MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS (in pounds per square foot)

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a. Elevated garage floors shall be capable of supporting the uniformly distributed live load or a 2,000-pound concentrated load applied on an area of $4^1/_2$ inches by $4^1/_2$ inches, whichever produces the greater stresses.

b. Uninhabitable attics without storage are those where the clear height between joists and rafters is not more than 42 inches, or where there are not two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses. This live load need not be assumed to act concurrently with any other live load requirements.

c. Individual stair treads shall be capable of supporting the uniformly distributed live load or a 300-pound concentrated load applied on an area of 2 inches by 2 inches, whichever produces the greater stresses.

d. A single concentrated load applied in any direction at any point along the top. For a guard not required to serve as a handrail, the load need not be applied to the top element of the guard in a direction parallel to such element.

e. See Section R507.1 for decks attached to exterior walls.

f. Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area not to exceed 12 inches by 12 inches, including openings and spaces between infill components ~~equal to 1 square foot.~~ This load need not be assumed to act concurrently with any other live load requirement.

g. Uninhabitable attics with limited storage are those where the clear height between joists and rafters is 42 inches or greater, or where there are two or more adjacent trusses with web configurations capable of accommodating an assumed rectangle 42 inches in height by 24 inches in width, or greater, within the plane of the trusses.

The live load need only be applied to those portions of the joists or truss bottom chords where all of the following conditions are met:

1. The attic area is accessed from an opening not less than 20 inches in width by 30 inches in length that is located where the clear height in the attic is not less than 30 inches.
2. The slopes of the joists or truss bottom chords are not greater than 2 units vertical in 12 units horizontal.
3. Required insulation depth is less than the joist or truss bottom chord member depth.

The remaining portions of the joists or truss bottom chords shall be designed for a uniformly distributed concurrent live load of not less than 10 pounds per square foot.

h. Glazing used in handrail assemblies and guards shall be designed with a load adjustment factor of 4. The load adjustment factor shall be applied to each of the concentrated loads applied to the top of the rail, and to the load on the in-fill components. These loads shall be determined independent of one another, and loads are assumed not to occur with any other live load.

i. Where the top of a guard system is not required to serve as a handrail, the single concentrated load shall be applied at any point along the top, in the vertical downward direction and in the horizontal direction away from the walking surface. Where the top of a guard is also serving as the handrail, a single concentrated load shall be applied in any direction at any point along the top. Concentrated loads shall not be applied concurrently.

Reason: Between the 2005 and 2010 edition of ASCE 7, loading for infill of guards changed from "one square foot" to "12 inches by 12 inches". This was a critical change to better describe the intent of the application of this load. Since the 2012 edition, the IBC has referenced ASCE 7 for guard infill design loads. The goal of this proposal is to align the IRC with the IBC and ASCE 7 for how infill loads are to be applied for evaluation.

This is important, because "one square foot" could be any shape. It would allow the load to be placed on a single baluster in the shape of 24 inches tall and 6 inches wide, and makes the IRC more restrictive in guard design than is permitted under the IBC . I do not believe that is the intent, as revealed in the ASCE 7.

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

Justification for no cost impact:

This change "could" lower the cost of construction if builders are currently required to make a single baluster strong enough to resist the entire load. This cost savings is not worth justifying. The motivation to this change is to make the words match the most likely application being interpreted.

RB54-25

RB55-25

IRC: TABLE R301.7, ASTM Chapter 44 (New)

Proponents: Quyen Thai, representing City of Tacoma (qthai@cityoftacoma.org)

2024 International Residential Code

SECTION R301
DESIGN CRITERIA

Revise as follows:

TABLE R301.7 ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS[b, c]

STRUCTURAL MEMBER	ALLOWABLE DEFLECTION
Rafters having slopes greater than 3:12 with finished ceiling not attached to rafters	*L*/180
Interior walls and partitions	*H*/180
Floors	*L*/360
Ceilings with brittle finishes (including plaster and stucco)	*L*/360
Ceilings with flexible finishes (including gypsum board)	*L*/240
All other structural members[f] ~~, excluding guards and handrails~~	*L*/240
Exterior walls—wind loads[a] with plaster or stucco finish	*H*/360
Exterior walls—wind loads[a] with other brittle finishes	*H*/240
Exterior walls—wind loads[a] with flexible finishes	*H*/120[d]
Lintels supporting masonry veneer walls[e]	*L*/600

Note: *L* = span length, *H* = span height.

a. For the purpose of the determining deflection limits herein, the wind load shall be permitted to be taken as 0.7 times the component and cladding (ASD) loads obtained from Table R301.2.1(1).

b. For cantilever members, *L* shall be taken as twice the length of the cantilever.

c. For aluminum structural members or panels used in roofs or walls of sunroom *additions* or patio covers, not supporting edge of glass or sandwich panels, the total load deflection shall not exceed *L*/60. For continuous aluminum structural members supporting edge of glass, the total load deflection shall not exceed *L*/175 for each glass lite or *L*/60 for the entire length of the member, whichever is more stringent. For sandwich panels used in roofs or walls of sunroom *additions* or patio covers, the total load deflection shall not exceed *L*/120.

d. Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of *H*/180.

e. Refer to Section R703.8.2. The *dead load* of supported materials shall be included when calculating the deflection of these members.

f. Guards, regardless of material, shall comply wiht the deflection criteria in ASTM E985.

Add new standard(s) as follows:

ASTM

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

E985-00e1	Standard Specification for Permanent Metal Railing Systems and Rails for Buildings

Reason: This proposal introduces a deflection limit for guards that is compatible with current testing standards.

In the proposal last cycle that eliminated the deflection requirement for guards and handrails (RB44-22), the proponent indicated that requiring a guard to meet the L/240 was not feasible, as many current guards would not meet that requirement. However, under the current, code, there is <u>no</u> limit. We believe that it is critical that guards be restrained from deflecting more than a certain expected limit.

ICC Acceptance Criteria AC 273 for wood and metal guards points to ASTM E935. ASTM E935 limits the deflection to the lesser of:

H/24 + L/96, or

H/12

Where:

H = guard height (inches)

L = tributary length of guard top rail (inches)

For a 3-foot high guard with posts at 4 feet on center, a post would be allowed to deflect 2 inches:

H/24 + L/96 = 36/24 + 48/96 = 2 inches

H/12 = 36/12 = 3 inches

If the L/240 limit were applied (noting that Footnote b says to use twice the length of the cantilever), the allowable deflection would be 36/240 = 0.15 inches.

In most cases, sizing the members to comply with the structural requirements (shear and bending moment) will govern, and deflection will not be an issue. However, even though 2 inches is still a relatively large deflection for such a short post, we believe that the ASTM standard will provide a reasonable limit.

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

Justification for no cost impact:

By nature, this is more or less editorial since the requirement was removed but expectations are still there to ensure guard rails are strong enough to withstand loads. Majority of existing guard rail systems should already meet/comply with this proposal and would not be impacted compared to if the prior versions of the deflection load was required at L/240, then majority of guard rails would need to be reevaluated and modified to strengthen the guards and would therefore be an increase in cost. But, since this code proposal is more in line with what is existing, there should be no increase nor decrease in cost.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
ASTM E985-00e1 Standard Specification for Permanent Metal Railing Systems and Rails for Buildings

RB55-25

RB56-25

IRC: R302.1, TABLE R302.1(1), TABLE R302.1(2)

Proponents: Bryant Arms, representing NYS DOS (bryant.arms@dos.ny.gov); Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Chad Sievers, NYS, representing NYS Dept of State (chad.sievers@dos.ny.gov); Stephen Van Hoose, representing NYS DOS (stephen.vanhoose@dos.ny.gov); Bryan Toepfer, representing NY DOS (bryan.toepfer@dos.ny.gov); Daniel Carroll, New York State Department of State, representing Division of Building Standards and Codes (daniel.carroll@dos.ny.gov); Gregory Benton, NYS, representing Department of State, Division of Building Standards and Codes (gregory.benton@dos.ny.gov); Christopher Jensen, representing NYS DOS - Division of Building Standards and Codes (christopher.jensen@dos.ny.gov)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.1 Exterior ~~walls~~ fire separation distance. Construction, projections, openings and penetrations of exterior walls~~of, *dwellings, townhouses*~~, *and* horizontal combustible assemblies ~~and accessory buildings~~ shall comply with Table R302.1(1) based on *fire separation distance*; or *dwellings* and *townhouses* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2) based on *fire separation distance.*

For the purposes of determining *fire separation distance*, *dwellings* and *townhouses* on the same *lot* shall be assumed to have an imaginary line between them. Where a new *dwelling* or *townhouse* is to be erected on the same lot as an existing *dwelling* or *townhouse*, the location of the assumed imaginary line with relation to the existing *dwelling* or *townhouse* shall be such that the existing *dwelling* or *townhouse* meets requirements of this section.

Where a *lot line* exists between adjacent *townhouse units*, *fire separation distance* of exterior walls shall be measured to the *lot line*. Where a lot line does not exist between adjacent *townhouse units*, an imaginary line shall be assumed between the adjacent *townhouse units* and *fire separation distance* of exterior walls shall be measured to the imaginary line. *Fire separation distance* and requirements of Section R302.1 shall not apply to walls separating *townhouse units* that are required by Section R302.2.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory* buildings located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
~~4~~. Detached garages accessory to a *dwelling unit* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

TABLE R302.1(1) EXTERIOR HORIZONTAL ASSEMBLIES AND WALLS

EXTERIOR ~~WALL~~ ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code with exposure from both sides	0 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Projections and horizontal assemblies	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[a, b]	≥ 2 feet to < 5 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
	Not allowed	NA	< 3 feet

EXTERIOR ~~WALL~~ ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Openings in walls	25% maximum of wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where vent openings that communicate with the attic are not installed in the overhang or gable wall.

TABLE R302.1(2) EXTERIOR HORIZONTAL ASSEMBLIES AND WALLS—DWELLINGS AND TOWNHOUSES WITH AN AUTOMATIC SPRINKLER SYSTEM

EXTERIOR ~~WALL~~ ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections and horizontal assemblies	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	NA	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. For residential subdivisions where all dwellings and townhouses are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistance rated and for fire-resistance-rated projections and horizontal assemblies shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

c. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where vent openings that communicate with the attic are not installed in the overhang or gable wall.

Reason: According to Exception #2 in Section R302.1 of the 2024 IRC, neither fire separation nor fire-resistance is required between accessory buildings or between them and their dwelling units. That section also allows combustible carports, decks, pavilions, gazebos, and other buildings that lack certain exterior walls to have no fire-resistance and zero fire separation distance to other structures on the same lot and to the lot's boundaries.

Consequently:

Regardless of their size, those accessory structures can be placed anywhere on the dwelling's lot without any of the fire separation considerations that are required for exterior walls. They can have zero-clearance to other buildings. They can even join fire-separated buildings without jeopardizing compliance to the IRC.

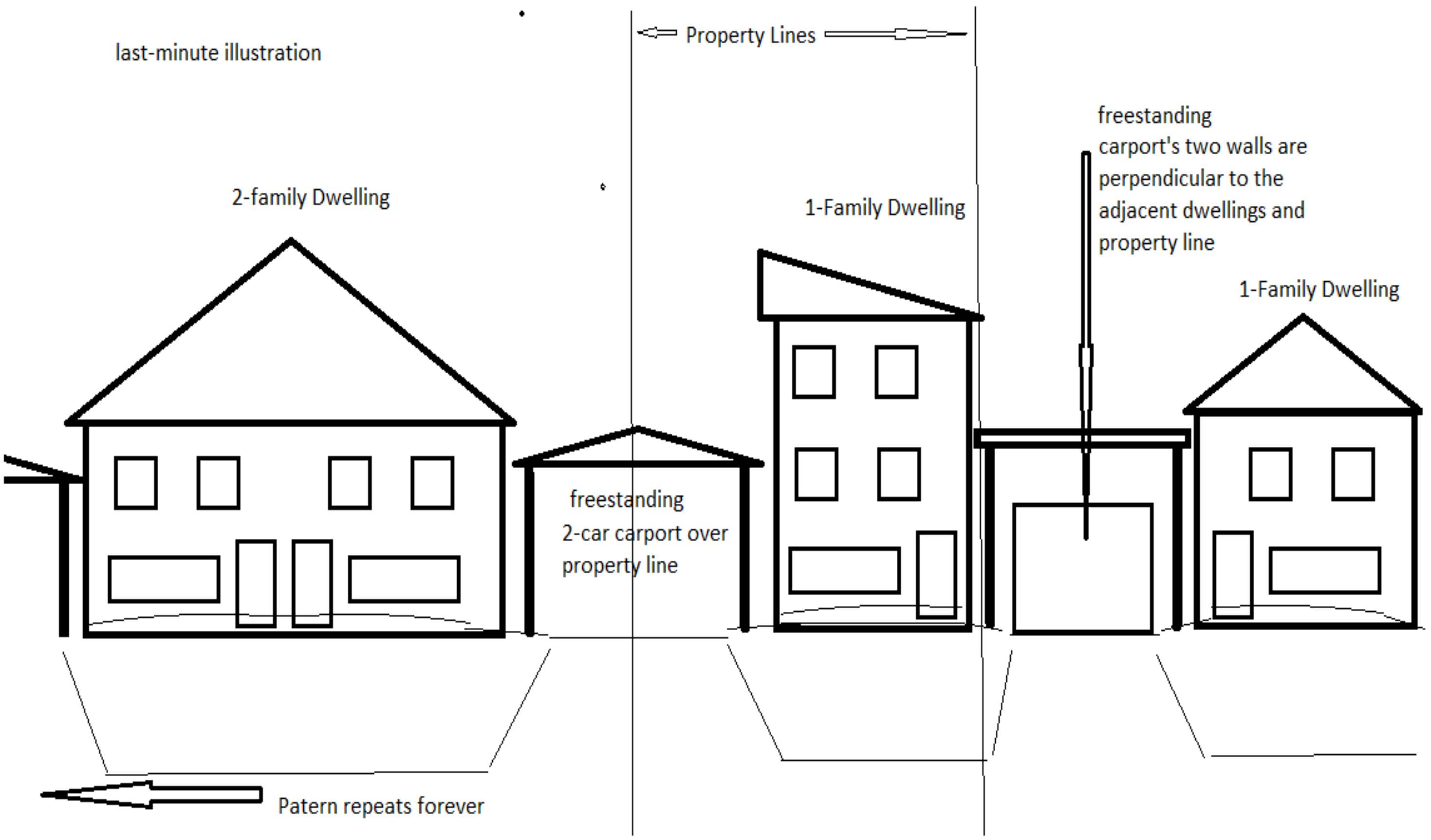
For example, a freestanding open combustible accessory structure, which is its own separate "building", can effectively connect a detached garage to a dwelling without causing the garage to lose its detached status. That's a consequence of no fire separation and no fire-resistance being required between accessory structures and between them and their dwellings. Note that the provisions in Sections R302.5, R302.6, and R311.2.1 of the 2024 IRC only apply to dwelling units and garages that are in the same "building".

Furthermore, carports can include up to two exterior walls according to Section R317.2 of the IRC. If those walls are perpendicular to the walls of adjacent buildings and the carports are freestanding, then Section R302.1 currently allows those carport walls to abut the adjacent buildings without any fire-resistance. Carports that are placed that way between two buildings can effectively become garages that doesn't lose their status as carports.

The hazard being presented is substantial. To understand why, consider a freestanding hallway. It can currently be placed between a detached garage and a dwelling without fire separation or any fire-resistance between it and either of them if its open on two ends and the walls on its other sides are perpendicular to the exterior walls of both the garage and the dwelling. That 'detached' hallway can direct a fire from the garage's door to the dwelling's door through its open ends. An open-ended attic over the freestanding hallway could do worse by providing a direct path for fire from the detached garage's ventilated attic to the dwelling's ventilated attic despite them technically being separate buildings.

That hazard is compounded by the number of buildings that can be joined together in this manner. The 2024 IRC allows accessory non-fire-resistant open structures to abut the walls of other buildings or even cross property lines without any fire separation or fire-resistance. They can do that even when they have exterior walls, although those walls must be perpendicular to the adjacent building or property line. Fire is able to burn its way unimpeded from accessory building to dwelling to accessory building to the next dwelling, and from property to property to include an unlimited number of dwellings that are daisy-chained together in this manner.

This proposal solves that problem by applying the fire separation that is being required for an exterior wall's projections to apply also to the ceilings, roofs, and decks of accessory structures. It prevents the lack the exterior walls that face adjacent structures or property lines from enabling a potentially substantial fire hazard. Basically, this proposal causes combustible horizontal assemblies such as carports, gazebos, pavilions, and decks to be equivalent to an exterior wall's projections for the purposes of determining fire separation distances around accessory structures.



Cost Impact: Increase

Estimated Immediate Cost Impact:

The proposed change requires horizontal assemblies, such as walls in partially enclosed carports, to have at most 1-hour fire resistance depending on separation distance. For light-frame wood construction, a 1-hour fire rating on the exterior side of the wall is often by installing a layer of fire-resistant gypsum paneling over combustible sheathing.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of 1-hour fire resistant gypsum paneling (5/8" Type X) is approximately \$0.35 to \$0.45 per square foot (1). The cost of ½" gypsum paneling is approximately \$0.30 to \$0.37" per square foot (2). Assuming a 1-car carport with a size of 20'x10'x8' (length x width x height), with two framed and sheathed walls, the materials cost increase for a 1-hour fire resistance rating on both walls would be determined as follows (using average costs):

Square footage of walls: 2x (20' x 8') = 320 sqft. (assuming long walls are the ones sheathed)

Cost increase for interior FRT drywall: (\$0.40 – \$0.34) x 320 sqft = \$19

Cost for exterior FRT drywall: \$0.40 x 320 sqft = \$144

Total materials cost: \$144 + \$48 = \$147

Assuming 50% additional cost for taping/sealant/etc, the new total materials cost is \$221.

Labor costs for installing drywall vary between \$1.30 to \$2.02 per square foot for typical installations but can be as high as \$3.90 to \$5.15

per square foot for complex jobs (such as fire rated assemblies) (3). For the same carport as above, the labor cost increase would be determined as follows (using average costs):

Cost increase for interior FRT drywall: ($4.53 - $1.66) x 320 sqft. = $918

Cost for exterior FRT drywall: $4.53 x 320 sqft. = $1,450

Total labor cost increase = $2,368

Total cost increase: $2,589Sources:

https://realestimateservice.com/blog/cost-of-fire-rated-wall/

https://drywallpriceguide.com/drywall-prices-by-type/

https://drywallpriceguide.com/drywall-installation-prices-and-costs/

RB56-25

RB57-25

IRC: R302.1

Proponents: Ali Fattah, City of San Diego Development Services Department, representing City of San Diego (afattah@sandiego.gov)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings, townhouses* and accessory buildings shall comply with Table R302.1(1) based on *fire separation distance*; or *dwellings* and *townhouses* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2) based on *fire separation distance* . The maximum area of unprotected and protected openings permitted in an exterior wall in any story of *dwellings, townhouses* and accessory buildings shall not exceed the percentages specified in Table R302.1(1) or Table R302.1(2) based on the fire separation distance of each individual story.

For the purposes of determining *fire separation distance*, *dwellings* and *townhouses* on the same *lot* shall be assumed to have an imaginary line between them. Where a new *dwelling* or *townhouse* is to be erected on the same lot as an existing *dwelling* or *townhouse*, the location of the assumed imaginary line with relation to the existing *dwelling* or *townhouse* shall be such that the existing *dwelling* or *townhouse* meets requirements of this section.

Where a *lot line* exists between adjacent *townhouse units*, *fire separation distance* of exterior walls shall be measured to the *lot line*. Where a lot line does not exist between adjacent *townhouse units*, an imaginary line shall be assumed between the adjacent *townhouse units* and *fire separation distance* of exterior walls shall be measured to the imaginary line. *Fire separation distance* and requirements of Section R302.1 shall not apply to walls separating *townhouse units* that are required by Section R302.2.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory* buildings located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling unit* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Attached Files

- **RB49-22 ext wall openigns.pdf**
  https://www.cdpaccess.com/proposal/11075/35262/files/download/8938/
- **FS17-14 FSD per story.pdf**
  https://www.cdpaccess.com/proposal/11075/35262/files/download/8937/

Reason: The proposed code change addresses a significant omission in the IRC in that where the area of exterior openings is restricted based on fire separation distance the IRC does not identify the method of measurement and as a consequence uniform and consistent code application is not possible since IRC users also enforce the IBC. The IRC does not define wall, and it is generally assumed to be defined based on origination and termination points from a foundation or floor up to the underside of a floor or roof above.

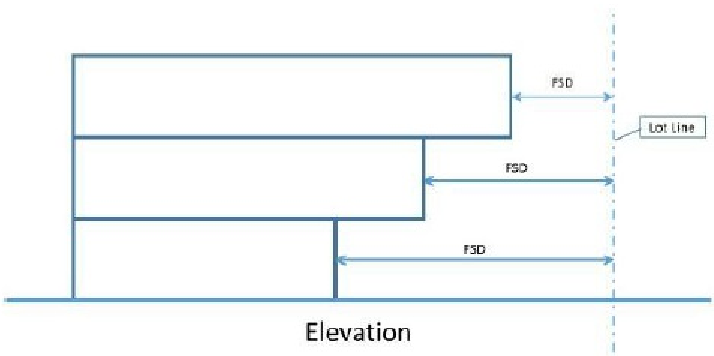
This code change proposes that the wall area used to determine exterior wall opening limitations due to fire separation distance FSD be based on the wall area per story. Presently code users either apply the area limitation based on the entire are of a 3-story wall or per story. Both code applications are accurate since the IRC is silent regarding the method of measurement. Additionally, the IRC penalizes buildings within its scope from enjoying the same benefits in the IBC the eliminate the haggle that the opening created when an upper floor is larger than the floor below needs to be evaluated based on its degree of openness.

While the IBC and IRC are separate codes, building standards in the IBC for Group U and R-3 have generally been harmonized with the IRC and vice versa.

- Fire separation distance requirements are the same
- Fire sprinkler requirements are the same
- The fire load assumed in an R-3 are assumed to be the same in a dwelling regulated by the IRC per NFPA 13-D.
- An R-3 under the IBC and a dwelling under the IRC are allowed to be of VB non-rated construction when 3 stories in height or less and there are no limitations on area.

The proposed code change extends the benefits granted in the IBC pursuant to the IRC based on the rationale in code change FS17-14, submitted by the Colorado Chapter of ICC, that was approved by the Fire Safety Committee where inverted wedding cake building configurations were recognized. This configuration

whereby upper stories can be larger than lower stories happen frequently on IRC projects and this code change allows an evaluation per story.



Furthermore, this code change seeks to improve the IRC to address an anomaly that would allow for an unsafe condition Without this code change the entire exterior wall surfaces for a three-story high exterior wall can be used to allow a very large first story exterior wall opening that will significantly expose an adjacent structure. Figures A and B in the attachment shows what is allowed in the IRC for a building with an FSD less than 5 feet.

Testimony by the City/County of Dever during the 2024 cycle stated that the IRC is different than the IBC since it limits building to a height of 3 stories. Fire behavior is not different for a structure regulated under the IBC or IRC where building size is not limited and building heights above 3 stories require additional protection in the IBC. In fact, buildings constructed under the IRC are the least protected from a fire safety point of view and fire separation rules limit fire spread to and from them.The National Institute for Standards and Technology complete actual scale fire testing to validate the appropriate fire separation distance between structures and demonstrated that when building is located closer than 10 ft from another with opposing openings that ignition of exterior wall finishes occurs and fire spreads from building to building. The testing showed the impacts of structure to structure and lower structure to a taller structure and summarized the testing. While the focus is WUI hazards the testing demonstrated fire transmission issues structure to structure.

Recent wildfire in southern California while wind driven and caused by ember attacks. also demonstrated how combustible unprotected that is not suppressed during a fire event gets involved and spreads fire to adjoining buildings. Gypsum wall board not installed for fire resistance fails and detaches from framing sooner than the hourly rating of the sheathing material which makes this building type vulnerable to fire spread. The opening percentage rules in both the IBC and IRC limit transmission of fire through radiation and transmission due to flame impingement and was validated in the NIST study that at 10 ft there is a dramatic reduction of hazard. It is therefore important to limit the size of exterior wall openings as intended by the code table in the IRC which does not envision a 10 ft by 10 ft exterior wall opening on the first story of a 3-story dwelling located at a FSD of 3 ft.   We request that the committee approve the code change as submitted.

Figure A

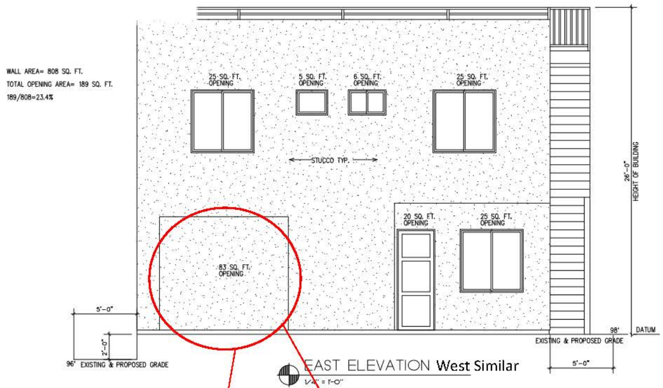
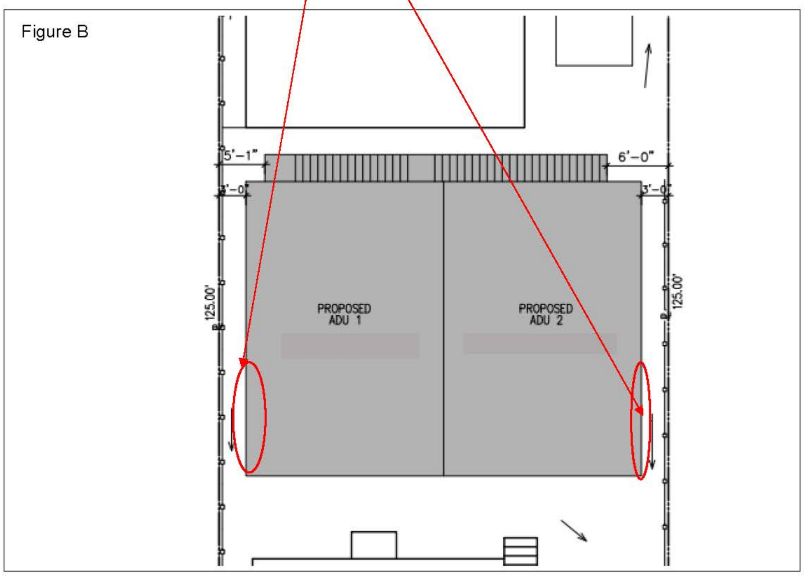


Figure B



2024 International Building Code

705.9.1 Allowable area of openings. The maximum area of unprotected and protected openings permitted in an *exterior wall* in any *story* of a *building* shall not exceed the percentages specified in Table 705.9 based on the *fire separation distance* of each individual *story*.

Exceptions:

1. In other than Group H occupancies, unlimited unprotected openings are permitted in the first *story above grade plane* where th one of the following:
   1.1. A street and has a *fire separation distance* of more than 15 feet (4572 mm).
   1.2. An unoccupied space. The unoccupied space shall be on the same *lot* or dedicated for public use, shall be not less than 3 mm) in width and shall have access from a street by a posted *fire lane* in accordance with the *International Fire Code* .
2. *Buildings* whose exterior bearing walls, exterior nonbearing walls and exterior *primary structural frame* are not required to be fi rated shall be permitted to have unlimited unprotected openings.

Bibliography: Structure Separation Experiments | NIST

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This code change may have the impact of limiting unusual design or construction however it will also permit buildings with larger stories located above smaller stories not to include exterior wall opening imitations beneath the larger story outer most edge.

Some code enforcers consider attached porches to be projections from exterior walls and some consider them the face of the attached accessory structure to be the wall face and considered the space between posts and beams to be exterior wall openings. An attempt to resolve the issue of windowless buildings and those without exterior walls failed during the development of the 2018 IBC and this issue is not a subject of the code change and therefore the cost impact is not being evaluated.

Estimated Immediate Cost Impact Justification (methodology and variables):

Estimated Immediate Cost Impact Justification (methodology and variables):

The requirement may require a change in layout but does not require additional construction materials. When measuring the area of exterior walls per story the code change can have the effect of reducing the number of windows per story.

Based on a valuation schedule developed on behalf of the City and County of San Francisco the cost of an exterior wall is approximately $30 to $40 per square ft and the cost of a window is $85 per square foot ft. So, while the cost of construction may be reduced as a result of the code change the reduction in the ability to include more exterior wall openings cannot be quantified.

RB57-25

RB58-25

IRC: R302.1

Proponents: Scot Harris, Preston Wood & Associates, LLC. Jack Preston Wood AIBD/NCBDC, representing self (scot@jackprestonwood.com)

2024 International Residential Code

SECTION R302 FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings, townhouses* and accessory buildings shall comply with Table R302.1(1) based on *fire separation distance* ; or *dwellings* and *townhouses* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2) based on *fire separation distance*.

For the purposes of determining *fire separation distance*, *dwellings* ~~and *townhouses*~~ on the same *lot* shall be assumed to have an imaginary line between them. Where a new *dwelling* ~~or *townhouse*~~ is to be erected on the same lot as an existing *dwelling* ~~or *townhouse*~~, the location of the assumed imaginary line with relation to the existing *dwelling* ~~or *townhouse*~~ shall be such that the existing *dwelling* ~~or *townhouse*~~ meets requirements of this section.

Where a *lot line* exists between adjacent *townhouse units*, *fire separation distance* of exterior walls shall be measured to the *lot line*. ~~Where a lot line does not exist between adjacent *townhouse units*, an imaginary line shall be assumed between the adjacent *townhouse units* and *fire separation distance* of exterior walls shall be measured to the imaginary line.~~ *Fire separation distance* and requirements of Section R302.1 shall not apply to walls separating *townhouse units* that are required by Section R302.2.

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory* buildings located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling unit* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Reason: The definition for “Townhouse” states in part three or more dwelling units.

The scope of the IRC code book allows 2 dwelling units *per lot*.

The scope of the IRC code book is for Building Classification R-3.

The IBC Building Classification (sections 310.3 and 310.4) makes no mention of the residential type “Townhouse”.

If there are townhouses, the townhouse must have metes and bounds for each townhouse dwelling unit to be able to reference the IRC.

“Where a lot line does not exist…” is out of scope to the IRC for townhouses and shall be removed or rephrased to reference the IBC for townhouses that are located on a single tract of land (building classification R-2).

Is there an exception? Is it possible to have 2 townhouse dwelling units on one tract of land as defined by metes and bounds and up to 2 townhouse dwelling units on the abutting tract of land where all dwellings are connected as one building?

If the scenario in the previous paragraph is allowed, then there will be a 1-hour separation between the “duplexes” and 2-hour separation along the lot line – where all dwellings are not equipped with a sprinkler system. This 4-dwelling unit building will be able to follow the IRC. Is this your intention? See Exhibit 1.

This is another reason to rename the title of this IRC code book to include the phrase “ON A SINGLE LOT” or “ON A SINGLE TRACT OF LAND”.

Confusion and misinterpretations will be eliminated.

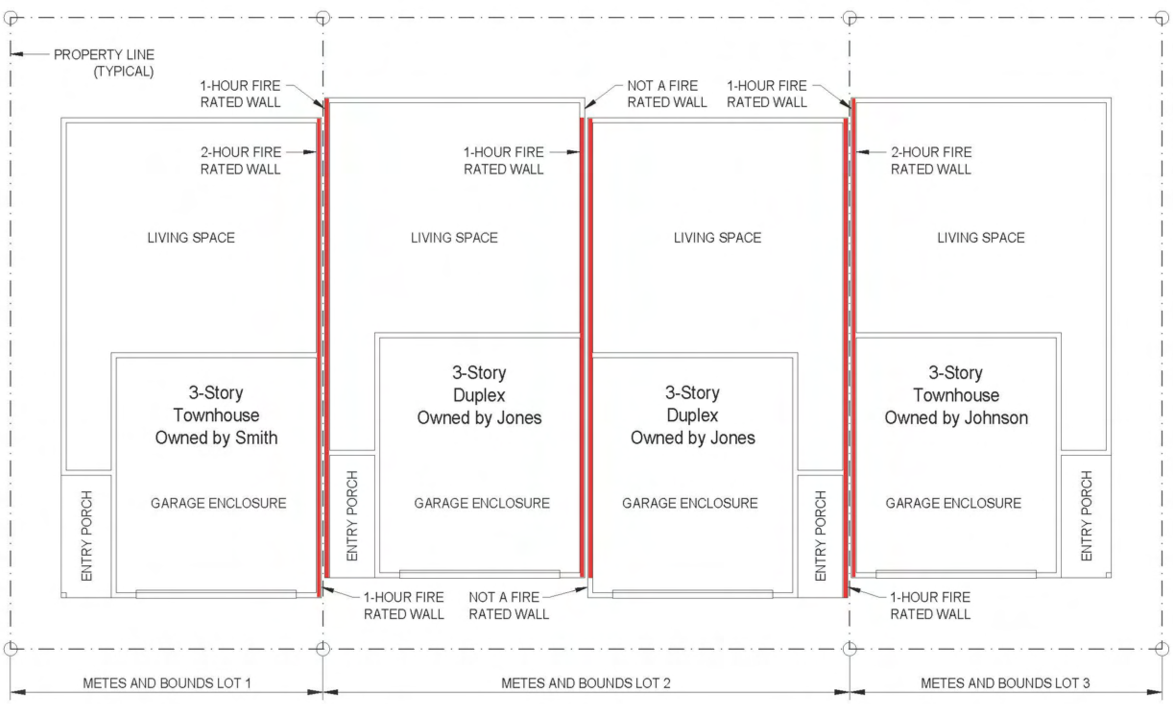


Exhibit 1: Building can be permitted as IRC without a sprinkler system

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

Justification for no cost impact:

This is a clarification item only. See reason.

Staff Analysis: Code changes to the IBC are G43-25 and G44-25.

RB58-25

RB59-25

IRC: R302.1, R302.1.1 (New), R302.1.2 (New)

Proponents: Eirene Knott, representing BRR Architecture (eirene.knott@brrarch.com); Kota Wharton, representing Self (kwharton@grovecityohio.gov)

2024 International Residential Code

SECTION R302 FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.1 Exterior walls. Construction, projections, openings and penetrations of exterior walls of *dwellings, townhouses* and accessory buildings shall comply with Table R302.1(1) based on *fire separation distance* ; or *dwellings* and *townhouses* equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(2) based on *fire separation distance* .

~~For the purposes of determining *fire separation distance*, *dwellings* and *townhouses* on the same *lot* shall be assumed to have an imaginary line between them. Where a new *dwelling* or *townhouse* is to be erected on the same lot as an existing *dwelling* or *townhouse*, the location of the assumed imaginary line with relation to the existing *dwelling* or *townhouse* shall be such that the existing *dwelling* or *townhouse* meets requirements of this section.~~

~~Where a *lot line* exists between adjacent *townhouse units*, *fire separation distance* of exterior walls shall be measured to the *lot line*. Where a lot line does not exist between adjacent *townhouse units*, an imaginary line shall be assumed between the adjacent *townhouse units* and *fire separation distance* of exterior walls shall be measured to the imaginary line. *Fire separation distance* and requirements of Section R302.1 shall not apply to walls separating *townhouse units* that are required by Section R302.2.~~

Exceptions:

1. Walls, projections, openings or penetrations in walls perpendicular to the line used to determine the *fire separation distance*.
2. Walls of *individual dwelling units* and their *accessory* buildings located on the same *lot*.
3. Detached tool sheds and storage sheds, playhouses and similar structures exempted from *permits* are not required to provide wall protection based on location on the *lot*. Projections beyond the exterior wall shall not extend over the *lot line*.
4. Detached garages accessory to a *dwelling unit* located within 2 feet (610 mm) of a *lot line* are permitted to have roof eave projections not exceeding 4 inches (102 mm).
5. Foundation vents installed in compliance with this code are permitted.

Add new text as follows:

<u>**R302.1.1 Fire separation distance for dwellings and townhouses on the same lot.** For the purposes of determining *fire separation distance*, *dwellings* and *townhouses* on the same *lot* shall be assumed to have an imaginary line between them. Where a new *dwelling* or *townhouse* is to be erected on the same lot as an existing *dwelling* or *townhouse*, the location of the assumed imaginary line with relation to the existing *dwelling* or *townhouse* shall be such that the existing *dwelling* or *townhouse* meets requirements of this section.</u>

<u>**R302.1.2 Fire separtions distance for townhouse units.** Where a *lot line* exists between adjacent *townhouse units*, *fire separation distance* of exterior walls shall be measured to the *lot line*. Where a lot line does not exist between adjacent *townhouse units*, an imaginary line shall be assumed between the adjacent *townhouse units* and *fire separation distance* of exterior walls shall be measured to the imaginary line. *Fire separation distance* and requirements of Section R302.1 shall not apply to walls separating *townhouse units* that are required by Section R302.2.</u>

Reason: There is no changes to the text in the requirements. However, with the three different mearurements grouped in one section - this is very confusing.

1) fire seperation for exterior walls to a proporty line,

2) fire seperation between multiple homes or townhouses on a lot, and

3) fire seperation for individual townhouse units all grouped into one secton.

This just splits the section into three parts for 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:

This is just seperation of requirements.

RB59-25

RB60-25

IRC: TABLE R302.1(1), TABLE R302.1(2)

Proponents: Alexander Haldeman, representing James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

TABLE R302.1(1) EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code with exposure from both sides	0 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[a, b], or noncombustible fiber-cement[a,b]	≥ 2 feet to < 5 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Openings in walls	Not allowed	NA	< 3 feet
	25% maximum of wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet

For SI: 1 foot = 304.8 mm.
NA = Not Applicable.

a. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where vent openings that communicate with the attic are not installed in the overhang or gable wall.

TABLE R302.1(2) EXTERIOR WALLS—DWELLINGS AND TOWNHOUSES WITH AN AUTOMATIC SPRINKLER SYSTEM

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet[a]
Projections	Not allowed	NA	< 2 feet
	Fire-resistance rated	1 hour on the underside, or heavy timber, or fire-retardant-treated wood[b, c], or noncombustible fiber-cement[b, c]	2 feet[a]
	Not fire-resistance rated	0 hours	3 feet
Openings in walls	Not allowed	NA	< 3 feet
	Unlimited	0 hours	3 feet[a]
Penetrations	All	Comply with Section R302.4	< 3 feet
		None required	3 feet[a]

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. For residential subdivisions where all dwellings and townhouses are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistance rated and for fire-resistance-rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

c. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where vent openings that communicate with the attic are not installed in the overhang or gable wall.

Reason: Just as with *fire-retardant-treated wood,* a material which by IRC definition exhibits reduced surface burning characteristics and resists propagation of fire; (1) where fireblocking is provided <u>and</u> (2) vent openings that communicate with the attic are not installed in the overhang or gable wall; materials which resist propagation of fire satisfy the intent of these tables. Fiber-cement products are required to have a flame-spread index of <u>zero</u>, per ASTM standards referenced within this code. Further outlining that fiber-cement shall also be noncombustible, ensures equal-to-or-greater performance to existing solutions while offering more choices and material availability to users.

an example of this ASTM mandatory supplementary requirement can be seen below, taken from ASTM C1186:

S6. *Surface Burning Characteristics*—Fiber cement sheets of ¼ in. (6 mm) shall have a reported flame spread index of 0 and a smoke developed index of not more than 5, when tested in accordance with Test Method E84. Sheets of thickness greater than ¼ in. (6 mm) shall meet this specification or shall be formed at ¼ in. (6 mm) thickness with the same formulation for test purposes.

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

Justification for no cost impact:

Pricing of various solutions will vary by region and materials availability. this proposal does not mandate use of additional materials, just offers additional options for builders.

RB60-25

RB61-25

IRC: TABLE R302.1(1), TABLE R302.1(2)

Proponents: Scot Harris, Preston Wood & Associates, LLC. Jack Preston Wood AIBD/NCBDC, representing self (scot@jackprestonwood.com)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

TABLE R302.1(1) EXTERIOR WALLS

Portions of table not shown remain unchanged.

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code* with exposure from both sides	0 feet
	Not fire-resistance rated	0 hours	≥ 5 feet
Unprotected openings ~~Openings~~ in walls	Not allowed	NA	< 3 feet
	25% maximum of wall area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Protected openings in walls[c]	10% maximum of wall area	3/4 hour- tested in accordance with ASTM E119 or UL 263[c]	< 3 feet
	Unlimited	0 hours	3 feet

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where vent openings that communicate with the attic are not installed in the overhang or gable wall.

c. Protected openings shall be installed in accordance with NFPA 80. Products shall be labeled with a fire-rated glazing marking of OH-45 or W60. There shall be a minimum fire separation distance of 3 feet (914.4 mm) between the protected opening and any structure on the abutting property. Where it is unknown that a structure on the abutting property will be built closer than 3 feet (914.4 mm), wall openings are prohibited.

TABLE R302.1(2) EXTERIOR WALLS—DWELLINGS AND TOWNHOUSES WITH AN AUTOMATIC SPRINKLER SYSTEM

Portions of table not shown remain unchanged.

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Unprotected openings ~~Openings~~ in walls	Not allowed	NA	< 3 feet
	Unlimited	0 hours	3 feet[a]
Protected openings in walls	Unlimited	3/4 hour- tested in accordance with ASTM E119 or UL 263[d]	< 3 feet
	Unlimited	0 hours	3 feet[a]

For SI: 1 foot = 304.8 mm.

NA = Not Applicable.

a. For residential subdivisions where all dwellings and townhouses are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the fire separation distance for exterior walls not fire-resistance rated and for fire-resistance-rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining lot provides an open setback yard that is 6 feet or more in width on the opposite side of the property line.

b. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave overhang if fireblocking is provided from the wall top plate to the underside of the roof sheathing.

c. The fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the rake overhang where vent openings that communicate with the attic are not installed in the overhang or gable wall.

d. Protected openings shall be installed in accordance with NFPA 80. Products shall be labeled with a fire-rated glazing marking of OH-45 or W60. There shall be a minimum fire separation distance of 3 feet (914.4 mm) between the protected opening and any structure on the abutting property. Where it is unknown that a structure on the abutting property will be built closer than 3 feet (914.4 mm), wall openings are prohibited.

Add new standard(s) as follows:

NFPA

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

80-22 Standard for Fire Doors and Other Opening Protectives

Reason: This proposal takes advantage of building materials that were not available at the time Table R302.1(1) and Table R302.1(2) was written. This will also align with the wording found in Table 705.9 of the IBC.

Request:

If this proposal is not approved, consider revising the table rows to include the phrases “Unprotected” and “Protected” as line items to the wall opening section of the table for future consideration.

"Garden Homes"

Garden homes are allowed to have a non-fire-resistive wall at the (side) property line provided there is a 10-foot setback on the abutting property. This wall shall not have any openings and penetrations. The wording shown in footnote "d" is adapted from footnote "a" of Table R302.1(2).

Background:

We have in the past used fire-rated glass block in exterior walls that are closer than 3 feet to a property line. The abutting property will typically have the building face 3 feet or greater from this property line due to the required egress path from the back yard to the front (non-townhouse projects). Where building faces have a separation distance of less than 3 feet, we advise our clients that glass block is not permitted on the subject exterior wall. The popularity of employing glass block has decreased over the years due to inherent leaking and our clients know this, but few are still requesting the glass block for natural lighting. However, the turnover jurisdiction officials will no longer allow this and other types of “protected” opening for walls that are facing to and less than 3 feet (914.4 mm) to a property line.

Cost Impact: The 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 discernible difference in cost. This is more of an aesthetic item by providing comfort to the occupants of the dwelling by use of natural lighting that would otherwise be nonexistent.

Staff Analysis: NFPA 80 is currently referenced in the IBC, IFC, IMC and IPMC.

RB61-25

RB62-25

IRC: R302.1.1 (New), FIGURE R302.1.1 (New)

Proponents: Scot Harris, Preston Wood & Associates, LLC. Jack Preston Wood AIBD/NCBDC, representing self (scot@jackprestonwood.com)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Add new text as follows:

R302.1.1 **Zero lot line separation.** Where perpetual, platting, and recorded easements create a non-buildable minimum fire separation distance of at least 6 feet between structures on adjacent properties, the one-hour fire-resistive ratings shall not apply as illustrated in Figure R302.1.1.

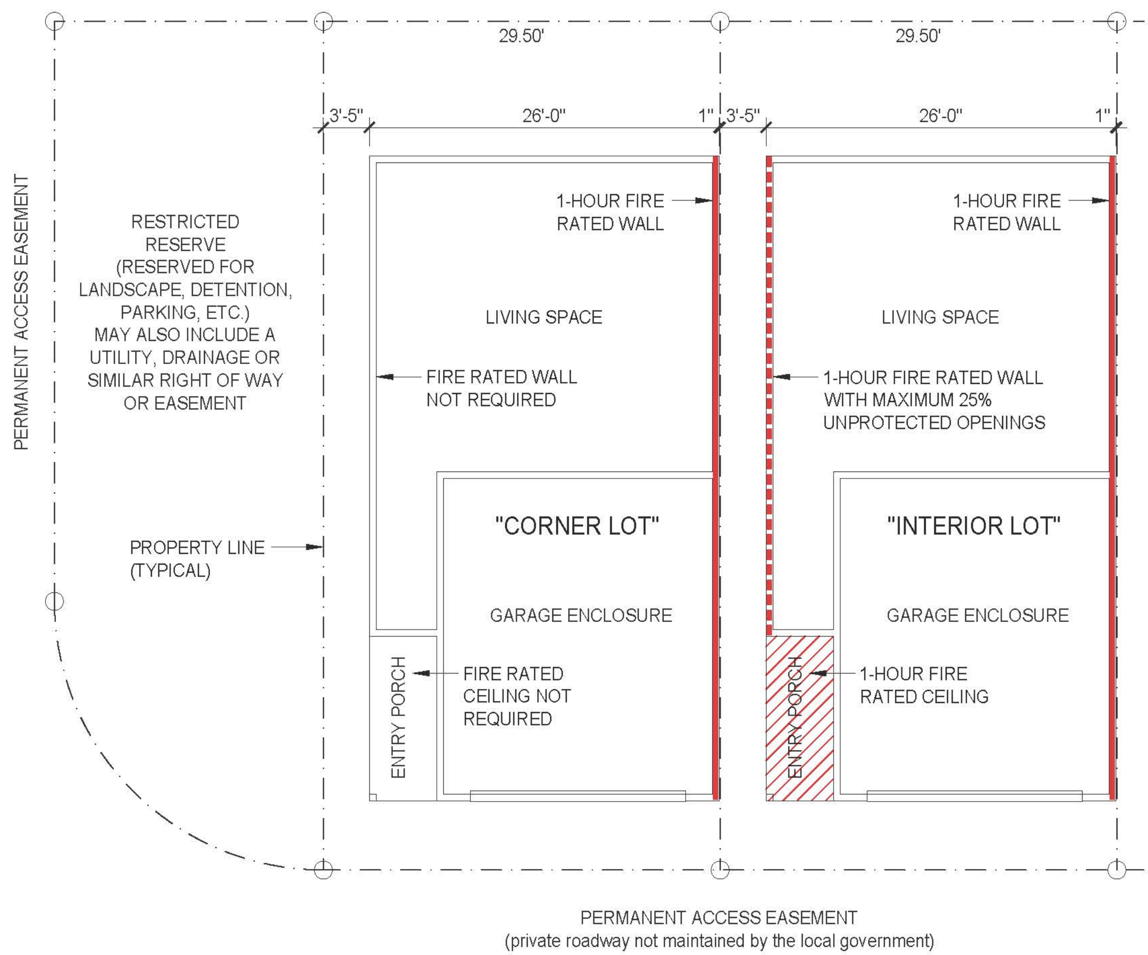


FIGURE R302.1.1 - DIAGRAMMATIC ZERO LOT LINE SEPARATION

FIGURE R302.1.1 DIAGRAMMATIC ZERO LOT LINE SEPERATION

Reason: The section as shown above is a direct quote from the City of Houston Amendments to 2012 International Residential Code. This jurisdiction has since adopted a newer IRC edition but have excluded this section from the amendments. What this section does not address is the use or denied use of protected and/or unprotected wall openings. The reason for this proposal is to address redundancy of the corner lot dwelling and other dwellings that will abut a non-buildable space.

Background:

We develop projects nationally in the Unites States where a tract of land is subdivided, and the dwellings will be accessed from a Shared Drive or a Permanent Access Easement (a roadway that is not maintained by the governing body). As part of the design there may be Restricted Reserves of greenspace, parking, or detention at the ends of each blockface. The “Corner” lot that is abutting a reserve may have a lot width equal to the adjacent “Interior” lot where the interior lot requires fire-resistive construction on both sides of the building. This proposal will allow the corner lot abutting the reserve to not be fire resistive for the wall that is facing the reserve.

Other situations we have encountered include natural gas pipeline right of ways, electrical transmission line right of ways, and storm drainage easements.

Request:

I left the direct quote above as is but request the separation distance be changed from 6- to **10-feet** as the City of Houston had an amendment that did not require any fire-resistive assemblies for walls greater than 36 inches from a property line. This amendment has since been rescinded.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The fire-resistive materials that will *not* be added to the exterior wall will reduce the overall cost of constructing the dwelling.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost of upgrading an exterior wall to be fire-resistive rated is about 7USD per square foot wall area requiring protection, as quoted from one outside source in the year 2023.

RB62-25

RB63-25

IRC: R302.2, R302.2.1 (New), R302.2.2 (New), R302.2.1, R302.2.2, R302.2.5 (New), R302.2.3

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

SECTION R302 FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.2 Townhouses. Townhouses shall be constructed in accordance with this section. Walls separating *townhouse units* shall be constructed in accordance with Section R302.2.1, ~~or~~ R302.2.2, R302.2.3, or R302.2.4, and shall comply with Sections R302.2.5 ~~R302.2.3~~ through R302.2.6 ~~R302.2.5~~.

Add new text as follows:

R302.2.1 Prescriptive assemblies. The assemblies in Table R302.2.1 shall be deemed to have the fire-resistance ratings prescribed therein and shall be permitted to be used to meet the fire-resistance-rating required in Section R302.2.3 or R302.2.4.

R302.2.1 RATED FIRE-RESISTANCE PERIODS FOR ASSEMBLIES [a,b,c,d]

LOCATION	RATING	CONSTRUCTION
Interior Wall	1-hour	• 2" × 4" wood studs 24" on center with 5/8" Type X gypsum wallboard applied vertically or horizontally nailed with 6d cooler or wallboard nails at 7" on center with end joints on nailing members. Stagger joints each side. • 0.018" (No. 25 carbon sheet steel gage) channel-shaped studs 24" on center with one full-length layer of 5/8" Type X gypsum wallboard applied vertically attached with 1"-long No. 6 dry wall screws to each stud. Screws are 8" on center around the perimeter and 12" on center on the intermediate stud. Where applied horizontally, the Type X gypsum wallboard shall be attached to 3-5/8" studs and the horizontal joints shall be staggered with those on the opposite side. Screws for the horizontal application shall be 8" on center at vertical edges and 12" on center at intermediate studs. • 2" × 4" wood studs 16" on center with 3/8" perforated or plain gypsum lath and 1/2" gypsum plaster each side. Lath nailed with 1-1/8" by No. 13 gage by 19/64" head plasterboard blued nails, 4" on center. Plaster mixed 1:2 by weight, gypsum to sand aggregate.
	2-hour	• 2" × 4" wood studs at 24" centers with double top plates, single bottom plate; interior and exterior side covered with two layers of $\frac{5}{8}$" Type X gypsum wallboard, 4′ wide, applied horizontally with vertical joints over studs. Base layer fastened with $2\frac{1}{4}$" Type S drywall screws, spaced 24" on center and face layer fastened with Type S drywall screws, spaced 8" on center, wallboard joints covered with paper tape and joint compound, fastener heads covered with joint compound. Cavity to be filled with $5\frac{1}{2}$" mineral wool insulation.
Floor/Ceiling or Roof/Ceilng	1-hour	• Wood joists, wood I-joists, floor trusses and flat or pitched roof trusses spaced a maximum 24" o.c. with 1/2" wood structural panels with exterior glue applied at right angles to top of joist or top chord of trusses with 8 d nails. The wood structural panel thickness shall be not less than nominal 1/2" nor less than required by Chapter 23. Base layer 5/8" Type X gypsum wallboard applied at right angles to joist or truss 24" o.c. with 1-1/4" Type S or Type W drywall screws 24" o.c. Face layer 5/8" Type X gypsum wallboard or veneer base applied at right angles to joist or truss through base layer with 1-7/8" Type S or Type W drywall screws 12" o.c. at joints and intermediate joist or truss. Face layer Type G drywall screws placed 2" back on either side of face layer end joints, 12" o.c • Steel joists, floor trusses and flat or pitched roof trusses spaced a maximum 24" o.c. with 1/2" wood structural panels with exterior glue applied at right angles to top of joist or top chord of trusses with No. 8 screws. The wood structural panel thickness shall be not less than nominal 1/2" nor less than required by Chapter 23. Base layer 5/ 8" Type X gypsum board applied at right angles to steel framing 24" on center with 1" Type S dry wall screws spaced 24" on center. Face layer 5/8" Type X gypsum board applied at right angles to steel framing attached through base layer with 1-5/8" Type S dry wall screws 12" on center at end joints and intermediate joints and 1-1/2" Type G dry wall screws 12 inches on center placed 2" back on either side of face layer end joints. Joints of the face layer are offset 24" from the joints of the base layer.

a. Framing members with a larger dimension are permitted to be substituted.

b. Framing members are permitted to be closer spacing.

c. Wood structural panels shall be permitted to be installed between the fire protection and the wood studs on either the interior or exterior side of the wood frame assemblies in this table, provided that the length of the fasteners used to attach the fire protection is increased by an amount not less than the thickness of the wood structural panel.

d. Screws meeting ASTM C1002 or ASTM C954 are permitted in place of nails at the same spacings when the length and head diameters meet or exceed the stated nailing requirements. All fasteners noted are minimums unless otherwise stated.

R302.2.2 Other assemblies.. Fire-resistance rated assemblies using Section 703.2.2 of the *International Building Code* to achieve the *fire-resistance-rating* required in Section R302.2.3 or R302.2.4 shall be permitted.

Revise as follows:

R302.2.3 ~~**R302.2.1**~~ **Double walls.** Each *townhouse unit* shall be separated from other *townhouse units* by two 1-hour fire-resistance-rated wall assemblies tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code.*

R302.2.4 ~~**R302.2.2**~~ **Common walls.** Common walls separating *townhouse units* shall be assigned a fire-resistance rating in accordance with Item 1 or 2 and shall be rated for fire exposure from both sides. ~~Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing.~~ The common wall shared by two *townhouse units* shall be constructed without openings, plumbing or mechanical equipment, ducts or vents, other than water-filled fire sprinkler piping in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

1. Where an automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.
2. Where an automatic sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.

~~**Exception:** Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.~~

Add new text as follows:

R302.2.5 Additions to walls.. The provisions of Sections R302.2.1 through R302.2.5 regulating openings, plumbing or mechanical equipment, ducts, or vents shall not apply to cavities in walls that are attached to, but not part of, the fire-resistance rated wall or assembly.

Revise as follows:

R302.2.6 ~~**R302.2.3**~~ **Continuity.** The fire-resistance-rated wall or assembly separating *townhouse units* shall comply with all of the following:

1. Be continuous from the foundation to the underside of the roof sheathing, roof deck, or slab.
2. Extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities.
3. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed *accessory structures.*

~~be continuous from the foundation to the underside of the roof sheathing, roof deck or slab. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed *accessory structures.*~~

Exception: Common walls are permitted to extend to and be tight against the inside of the exterior walls where the cavity between the end of the common wall and the exterior sheathing is filled with not less than two 2-inch nominal thickness wood studs.

Reason: This is a comprehensive cleanup of the section on townhouse separation to clear up areas of confusion.

It does three things:

1. It rearranges sections so that it flows in a more logical manner.
2. It adds a table with prescriptive options to provide the easiest method of compliance. These are existing options taken from the IBC.

3. It clarifies that unrated walls attached to common walls (in a common wall assembly referred to by the industry as Area Separation Firewalls) are not subject to restrictions regarding plumbing and mechanical equipment and penetrations.

This makes clear that there are 4 options for townhouse separation:

1. A prescriptive assembly from the table
2. An assembly that uses the analytical method from the IBC.
3. A tested double wall assembly (no change from existing text)
4. A tested common wall assembly (no change from existing text)

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and 2024 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

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

Justification for no cost impact:

In general, this will have no effect on construction costs. However, in some cases it could lower costs since it adds a compliance option (analytical methods) which could lower construction costs if selected, when compared to tested assemblies.

RB63-25

RB64-25

IRC: R302.2, R302.2.2 (New), R302.2.2

Proponents: Michael Schmeida, representing Gypsum Association (mschmeida@gypsum.org)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.2 Townhouses. Walls separating *townhouse units* shall be constructed in accordance with Section R302.2.1, R302.2.2 or R302.2.3 ~~R302.2.2~~ and shall comply with Sections ~~R302.2.3~~ R302.2.4 through ~~R302.2.5~~ R302.2.6.

R302.2.1 Double walls. Each *townhouse unit* shall be separated from other *townhouse units* by two 1-hour fire-resistance-rated wall assemblies tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code.*

Add new text as follows:

R302.2.2 Area Separation Wall. Seperation walls separting *townhouse units* shall be a two hour fire-resistance-rated wall assembly consisting of a central wall of 2, 1-inch-thick gypsum panels in an H-stud system with a non-rated wall on either side connected to the central wall via aluminum clips. The central wall assembly shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The central wall shared by two *townhouse units* shall not be penetrated by plumbing or mechanical equipment, electrical installations, ducts or vents, other than water-filled fire sprinkler piping. The adjacent non-rated walls shall be permitted to contain, and the wall membrane penetrated by plumbing or mechanical equipment, electrical installations, ducts or vents.

Revise as follows:

~~**R302.2.2**~~ **R302.2.3 Common walls.** Common walls separating *townhouse units* shall be assigned a fire-resistance rating in accordance with Item 1 or 2 and shall be rated for fire exposure from both sides. Common walls shall extend to and be tight against the exterior sheathing of the exterior walls, or the inside face of exterior walls without stud cavities, and the underside of the roof sheathing. The common wall shared by two *townhouse units* shall be constructed without openings, plumbing or mechanical equipment, ducts or vents, other than water-filled fire sprinkler piping in the cavity of the common wall. Electrical installations shall be in accordance with Chapters 34 through 43. Penetrations of the membrane of common walls for electrical outlet boxes shall be in accordance with Section R302.4.

1. Where an automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.
2. Where an automatic sprinkler system in accordance with Section P2904 is not provided, the common wall shall be not less than a 2-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the *International Building Code*.

Exception: Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.

Reason: This proposal seeks to define a unique, albeit common, construction that has been in existence for approximately forty years. The industry routinely receives inquiries as to what can or cannot be done with these systems, as they do not fit cleanly into the definition of a common wall nor a double wall. By defining these clearly and explicitly herein, it is clear their construction and the placement of utilities, etc. within these systems.

Utilities are allowed in the adjacent walls as explained in a 2020 engineering evaluation per Priest and Associates by going to https://gypsum.org/evaluation-reports-code-acceptances/ and clicking on the link entitled “Engineering Evaluation: Utilities in the Flanking Walls of Gypsum Area Separation Fire Walls.” A detailed explanation of these walls and the testing, etc. is available at: chrome extension://efaidnbmnnnibpcajpcglclefindmkaj/https://gypsum.org/wp-content/uploads/2019/04/Final-Position-Letter-Utilities-in-ASW-1-4-2019.pdf

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

Justification for no cost impact:

None. These systems are already being constructed and this clearly is just defining what they are and the construction of them.

RB64-25

RB65-25

IRC: R302.2.4

Proponents: Stuart Foster, representing self

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.2.4 Parapets for townhouses. Parapets constructed in accordance with Section R302.2.5 shall be constructed for *townhouses* as an extension of exterior walls or common walls separating *townhouse units* in accordance with the following:

1. Where roof surfaces adjacent to the wall or walls are at the same elevation, the parapet shall extend not less than 30 inches (762 mm) above the roof decks.
2. Where roof decks adjacent to the wall or walls are at different elevations and the higher *roof deck* is not more than 30 inches (762 mm) above the lower *roof deck* , the parapet shall extend not less than 30 inches (762 mm) above the lower roof deck.

   Exception: A parapet is not required in the preceding two cases where the *roof covering* complies with a minimum Class C rating as tested in accordance with ASTM E108 or UL 790 and the roof deck or sheathing is of *noncombustible materials* or *fire-retardant-treated wood* for a distance of 4 feet (1219 mm) on each side of the wall or walls, or one layer of $^{5}/_{8}$-inch (15.9 mm) *Type X gypsum board* is installed directly beneath the roof decking deck or sheathing, supported by not less than nominal 2-inch (51 mm) ledgers attached to the sides of the roof framing members, for a distance of not less than 4 feet (1219 mm) on each side of the wall or walls and any openings or penetrations in the roof deck <u>and roof projections</u> are not within 4 feet (1219 mm) of the common walls. *Fire-retardant-treated wood* shall meet the requirements of Sections R302.15 and R803.2.1.2.

3. A parapet is not required where roof surfaces adjacent to the wall or walls are at different elevations and the higher *roof deck* is more than 30 inches (762 mm) above the lower *roof deck* . The common wall construction from the lower *roof deck* to the underside of the higher *roof deck* shall have not less than a 1-hour fire-resistance rating. The wall shall be rated for exposure from both sides. Openings shall not be permitted in the wall.

Reason: It does not make sense that ventilation openings are prohibited in the roof deck, but not in roof projections. This serves to prohibit ventilation openings within 4 feet on either side of common walls, anywhere in the roof-ceiling system, so as to prevent fire propagation and the spread of smoke between adjacent townhouses.

Cost Impact: The 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 location of ventilation openings within roof projections is not cost-prohibitive, they can be located anywhere within the projection without compromising function or effectiveness.

RB65-25

RB66-25

IRC: R302.2.6

Proponents: John-Jozef Proczka, representing City of Phoenix Planning and Development Department (john-jozef.proczka@phoenix.gov)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.2.6 Structural independence. Each townhouse *unit* shall be structurally independent.

Exceptions:

1. Foundations supporting exterior walls or common walls.
2. Structural roof and wall sheathing from each unit fastened to the common wall framing.
3. Nonstructural wall and *roof coverings*.
4. Flashing at termination of *roof covering* over common wall.
5. ~~*Townhouse units* separated by a common wall as provided in Section R302.2.2, Item 1 or 2.~~
6. ~~*Townhouse units* protected by an automatic sprinkler system complying with Section P2904 or NFPA 13D.~~

Reason: This proposal will disallow using common walls as gravity load bearing walls. Double walls will remain an option for gravity load bearing walls if framing is desired to span towards the separation wall. Exception 2 is still present to allow the common walls to serve as braced/shear walls.

Townhouses are unlimited areas buildings. In order to allow townhouses to remain as unlimited area buildings, we should ensure that they function in the manner intended by the base provision before the exception: structural collapse under a fire condition of one townhouse unit will likely not pull down the common wall or adjacent townhouse unit(s). This will contain fire spread so very long townhouses are not entirely lost with a fire starting in one unit.

NFPA 13D and the IRC sprinkler system are designed to stop flashover for 10 minutes and are intended for life safety and not property protection. Therefore, these types of sprinkler systems don't have a tie to structural independence.

Townhouse units are also unique to the IRC or IBC in that their physical limits are defined. This raises ownership questions usually regulated by state laws for other types of multifamily buildings. Robust separation helps answer these questions.

The following is a partial quotation of the commentary to this section: This independence is useful not only in the event of a fire in one unit, but also during any remodeling or alteration. The objective of this structural independence is that a complete burnout could occur on one side of the wall without causing the collapse of the adjacent townhouse unit. This condition occurs rarely. The provision also helps, if there is ever a fire or other problem, by creating a clear separation between the units. With separate ownership and each having a different insurance company, the ability to gain access or get repairs made can be difficult and time consuming. By having clearly separated units, it is much easier to determine who is responsible to make any needed repairs.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This code change will disallow using common walls as bearing walls, and as such will cause designs that have used them as bearing walls to be redesigned with the potential to increase floor and roof framing sizes, introduce bearings walls in different locations, or change common wall designs to double wall designs.

Estimated Immediate Cost Impact Justification (methodology and variables):

$0. No dollar amounts have been generated for this potential cost increase.

RB66-25

RB67-25

IRC: R302.2.6

Proponents: David Renn, PE, SE, City and County of Denver, representing Code Change Committee of ICC Colorado Chapter (david.renn@denvergov.org)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Delete without substitution:

~~**R302.2.6 Structural independence.** Each townhouse *unit* shall be structurally independent.~~

~~**Exceptions:**~~

1. ~~Foundations supporting exterior walls or common walls.~~
2. ~~Structural roof and wall sheathing from each unit fastened to the common wall framing.~~
3. ~~Nonstructural wall and *roof coverings*.~~
4. ~~Flashing at termination of *roof covering* over common wall.~~
5. ~~*Townhouse units* separated by a common wall as provided in Section R302.2.2, Item 1 or 2.~~
6. ~~*Townhouse units* protected by an automatic sprinkler system complying with Section P2904 or NFPA 13D.~~

Reason: The townhouse unit structural independence requirement is proposed to be deleted since this requirement has been technically moot since the 2021 IRC when Exception 6 was added for units protected with a fire sprinkler system. Since IRC Section R309.1 requires townhouses to have a fire sprinkler system, structural independence is not required in the unamended IRC. Of course, Exception 6 was added with the realization that some jurisdictions amend the IRC to not require a fire sprinkler system, in which case the exception wouldn't apply. However, Exception 5 for units separated by a common wall still applies and most townhouses are constructed with common walls. Therefore, the only townhouse units required to have structural independence are those separated with double walls per IRC Section R302.2.1 that are also not provided with a fire sprinkler system. Note that in the 2015 IRC there was no option for a double wall separation, yet the exception for a common wall was in place, so structural independence was never required with this edition of the IRC.

Double walls inherently provide structural independence for vertical gravity loads since each unit has its own bearing wall, as opposed to a common wall that supports the units on each side of the wall. Yet, the code penalizes the double wall system by requiring essentially full structural independence, which means a complete lateral force resisting system must be provided for each unit (e.g., shear walls or braced wall lines for wind and seismic forces). Note that Exception 2 for roof and wall sheathing only applies to common walls, so sheathing cannot extend between double walls which would allow lateral loads to be transferred between units. From a structural standpoint, it is beneficial to transfer lateral loads between units and provide a lateral system that is designed for the townhouse building, rather than for each individual unit. In a seismic event, structurally independent units will move independent of each other and potentially in opposite directions - this can result in units impacting each other during the event, causing damage and potentially structural failure. By allowing sheathing to be continuous between units, this condition is avoided, which results in a better performing and safer structural system. In summary, the code currently requires the most structurally independent system for gravity loads to also be independent for lateral loads, resulting in a lower performing and less safe building. On the other hand, the code currently allows the least structurally independent system for gravity loads to also be also not be independent for lateral loads. It just doesn't make sense to penalize the most structurally independent system and reward the least structurally independent system.

This proposal will provide consistency to structural requirements between double wall and common wall townhouse separations and will provide for better performing and safer structures. Note that deleting the structural independence affects a very small percentage of projects - those separated with double walls and not provided with a fire sprinkler system (which is only allowed if the code is amended).

Cost Impact: The 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 projects designed according to the unamended IRC, this proposal will have no effect on structural independence requirements due to the fire sprinkler system exception and, therefore, will not impact the cost of construction.

For the small percentage of projects with double wall separations and no fire sprinkler system (where allowed through local amendments), this proposal will give an option to continue wall, roof, and/or floor sheathing between units, which may result in a slight decrease in construction cost if the designer takes advantage of this to reduce the lateral force resisting system (e.g., fewer shear walls or braced wall lines).

RB67-25

RB68-25

IRC: R302.3, R302.3.1 (New)

Proponents: Scot Harris, Preston Wood & Associates, LLC. Jack Preston Wood AIBD/NCBDC, representing self (scot@jackprestonwood.com)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.3 Two-family dwellings. Dwelling units in two-family dwellings shall be separated from each other in accordance with Sections ~~302.3.1~~ 302.3.2 through ~~302.3.5~~ 302.3.6~~, regardless of whether a lot line exists between two dwelling units~~.

Add new text as follows:

R302.3.1 Two-family dwellings on separate lots. Where metes and bounds establish separate ownership of each dwelling unit, the dwellings shall be separated from each other in accordance with Section R302.2.1 through R302.2.4.

Reason: Special attention shall be paid to separately owned dwelling units that are inclusive of one building.

A 2-family building located on 2 lots shall be treated the same as a townhouse (R302.2).

"2027 INTERNATIONAL RESIDENTIAL CODE FOR ONE- AND TWO-FAMILY DWELLINGS ON A SINGLE LOT"

Note: The quote above "R302.2.1 through R302.2.4" is referring to a **separate proposal for R302.2**.

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

Justification for no cost impact:

This is a clarification between a 2-dwelling unit building on a single lot verses a 2-dwelling unit building on separate lots.

RB68-25

RB69-25

IRC: R302.3.6, TABLE R302.3.6, R302.3.6.1, R302.3.6.2, R302.3.6.3

Proponents: Joseph Summers, Mashantucket Pequot Tribal Nation, representing Self

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

R302.3.6 ~~Shared accessory rooms~~ Common areas and spaces. ~~Shared accessory rooms~~ Common areas and spaces shall be separated from each individual *dwelling unit* in accordance with Table R302.3.6. Openings between the shared accessory room and *dwelling unit* shall comply with Section R302.3.6.1. Attachment of *gypsum board* shall comply with Table R702.3.5.

TABLE R302.3.6 DWELLING ~~SHARED ACCESSORY ROOM~~ COMMON AREAS AND SPACES SEPARATION

SEPARATION	MATERIAL
From the dwelling units and attics	Not less than $^1/_2$-inch gypsum board or equivalent applied to the accessory room side wall
From habitable rooms above or below the shared accessory room	Not less than $^5/_8$-inch Type X gypsum board or equivalent
Structures supporting floor/ceiling assemblies used for separation required by this section	Not less than $^1/_2$-inch gypsum board or equivalent

For SI: 1 inch = 25.4 mm.

R302.3.6.1 Opening protection. Openings from a ~~shared accessory room or area~~ common area or space directly into a room used for sleeping purposes shall not be permitted. Other openings between the ~~shared accessory room or area~~ common area or space and dwelling units shall be equipped with solid wood doors not less than $1^3/_8$ inches (35 mm) in thickness, solid or honeycomb core steel doors not less than $1^3/_8$ inches (35 mm) in thickness, or a fire door assembly with a 20-minute fire-protection rating, equipped with a self-closing or automatic-closing device.

R302.3.6.2 Duct penetration. Ducts penetrating the walls or ceilings separating the dwelling from the ~~shared accessory room~~ common area and spaces shall be constructed of sheet steel not less than No. 26 gage (0.48 mm) or other approved material and shall not have openings into the ~~shared accessory room~~ common area and space.

R302.3.6.3 Other penetrations. Penetrations through the walls, ceiling and floor-level separation required in Section R302.3.6 shall be protected as required by Section R302.11, Item 4.

Reason: The IRC does not define "shared accessory rooms" the terminology used mostly, especially with the two-family dwelling section, is common. The intent is to provide some consistency within the document and not add new terms.

Cost Impact: The 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 changing terms within the section of the IRC.

RB69-25

RB70-25

IRC: SECTION R302, R302.3.6, TABLE R302.3.6, R302.3.6.1, R302.3.6.2, R302.3.6.3

Proponents: Joseph Summers, Mashantucket Pequot Tribal Nation, representing Self

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.3.6 Shared accessory rooms. Shared accessory rooms shall be separated from each individual *dwelling unit* in accordance with ~~Table R302.3.6~~ Section R302.3. Openings between the shared accessory room and *dwelling unit* shall comply with Section ~~R302.3.6.1~~ R302.5.1. ~~Attachment of *gypsum board* shall comply with Table R702.3.5.~~

Delete without substitution:

~~TABLE R302.3.6 DWELLING-SHARED ACCESSORY ROOM SEPARATION~~

~~SEPARATION~~	~~MATERIAL~~
~~From the dwelling units and attics~~	~~Not less than $^1/_2$-inch gypsum board or equivalent applied to the accessory room side wall~~
~~From habitable rooms above or below the shared accessory room~~	~~Not less than $^5/_8$-inch Type X gypsum board or equivalent~~
~~Structures supporting floor/ceiling assemblies used for separation required by this section~~	~~Not less than $^1/_2$-inch gypsum board or equivalent~~

~~For SI: 1 inch = 25.4 mm.~~

~~**R302.3.6.1 Opening protection.** Openings from a shared accessory room or area directly into a room used for sleeping purposes shall not be permitted. Other openings between the shared accessory room or area and dwelling units shall be equipped with solid wood doors not less than 1$^3/_8$ inches (35 mm) in thickness, solid or honeycomb core steel doors not less than 1$^3/_8$ inches (35 mm) in thickness, or a fire door assembly with a 20-minute fire-protection rating, equipped with a self-closing or automatic-closing device.~~

Revise as follows:

~~R302.3.6.2~~ R302.3.6.1 Duct penetration. Ducts penetrating the walls or ceilings separating the dwelling from the shared accessory room shall ~~be constructed of sheet steel not less than No. 26 gage (0.48 mm) or other approved material and shall not have openings into the shared accessory room~~ comply with Section R302.5.2.

~~R302.3.6.3~~ R302.3.6.2 Other penetrations. Penetrations through the walls, ceiling and floor-level separation required in Section R302.3.6 shall be protected as required by Section R302.11, Item 4.

Reason: The intent of this proposal is to be clarification on what I believe the intent is and to provide references to other sections of the IRC that already address these features. The proposal is intended to be editorial in nature and to reduce redundent language within the code that has the potential to create conflicts and issues down the road.

without these changes it is possible to have a shared room between two dwelling units with only gypsum board on the shared room side increasing the possibility of fire spreading. Especially if the shared room is laundry room or similar space.

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

Justification for no cost impact:

It is my interpretation that the original intent was to provide fire separation between these rooms and this change should not increase the cost of construction.

RB70-25

RB71-25

IRC: R302.4.1

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council (tcrimi@sympatico.ca); Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org); Robert Marshall, representing FCAC (fcac@iccsafe.org)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.4.1 Through penetrations. Through penetrations of fire-resistance-rated wall or floor assemblies shall comply with Section R302.4.1.1 or R302.4.1.2.

Exceptions:

1. In concrete or masonry wall or floor assemblies, where ~~Where~~ the penetrating items are steel, ferrous or copper pipes, tubes or conduits, the annular space between the penetrating item and the fire-resistance-rated wall or floor is permitted to ~~shall~~ be protected ~~as follows:~~
   ~~1.1.~~ with ~~In concrete or masonry wall or floor assemblies,~~ concrete, grout or mortar ~~shall be permitted where~~ installed to the full thickness of the wall or floor assembly or the thickness required to maintain the fire-resistance rating, provided that both of the following are complied with:
      ~~1.1.1.~~ 1.1. The nominal diameter of the penetrating item is not more than 6 inches (152 mm).
      1.2. ~~1.1.2.~~ The area of the opening through the wall does not exceed 144 square inches (92 900 mm ^{2}).

   ~~1.2. The material used to fill the annular space shall prevent the passage of flame and hot gases sufficient to ignite cotton waste where subjected to ASTM E119 or UL 263 time temperature fire conditions under a positive pressure differential of not less than 0.01 inch of water (3 Pa) at the location of the penetration for the time period equivalent to the fire-resistance rating of the construction penetrated.~~

2. The annular space created by the penetration of water-filled fire sprinkler piping, provided the penetration is protected in accordance with Section R302.4.1.1 or R302.4.1.2. ~~that the annular space is filled using a material complying with Item 1.2 of Exception 1.~~

Reason: Identical language to that in R302.4.1 Exception 1.2 was deleted from the IBC in the Group A hearings by FS46-24. This proposal brings consistency with the 2027 IBC. With the deletion of R302.4.1 Exception 1.2, it is also necessary to revise R302.4.1 Exception 2 to reference the remaining provisions for protection of the penetration.

The Annular Space Protection Material (ASPM) language that was deleted in Section 714.4.1, Exception 2 and Section 714.5.1, Exception 1 of the IBC is the language which mandated the protection of penetrations before the development of the fire test standards ASTM E814 and UL 1479 now referenced in the IBC. When the ASPM language was included in the 1979 Uniform Building Code, it was an attempt to describe the fire test procedure and the acceptance criteria all within one short paragraph of the code in the absence of a published test standard. The acceptance criteria incorporated into the code simply required the material protecting the annular space be securely installed and capable of maintaining its integrity when subjected to an ASTM E119 or UL 263 time-temperature fire exposure. That early language morphed into what we see in the IBC today. With the inclusion of ASTM E814 and UL 1479 into the three legacy codes in the early 90s, the ASPM language was retained as an exception to the use of the two fire test standards. Now 30 plus years later it is time to delete this exception for the following reasons:

1. The important details on how that test is to be conducted are left up to the discretion of the testing laboratory. Items missing from this exception include the details of the furnace construction, the furnace size, the construction of the test sample, the

instrumentation of the furnace and test assembly, the procedures for conducting the test, including how the cotton waste is to be conditioned and applied to the test sample. Without these details it is impossible to consistently and reproducibly conduct this fire test.

2. The retention of this test procedure establishes a two-tier performance level for firestopping. The ASPM criteria simply relates to the ignition of cotton waste. Tests conducted in accordance with ASTM E814 or UL 1479 require the system to maintain either an F (fire) rating or a T (temperature) rating, both of which require the system to meet the hose stream test following fire exposure. Firestop systems through horizontal assemblies, with some exceptions, are required by the IBC to maintain a T rating. The T rating limits the temperature on the unexposed side of the assembly to a 325°F temperature rise.

3. Since 1987, there is only one known series of fire tests conducted using this ASPM method.

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

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction. There are simply no tested systems which will be negated by the deletion of this antiquated test method. Design professionals and contractors will continue to use the over 7000 firestop systems, most containing multiple construction variations, tested in accordance with ASTM E814 or UL 1479.

RB71-25

RB72-25

IRC: R302.4.2

Proponents: Tony Crimi, A.C. Consulting Solutions Inc., representing International Firestop Council (tcrimi@sympatico.ca)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.4.2 Membrane penetrations. Membrane penetrations shall comply with Section R302.4.1. Where walls are required to have a fire-resistance rating, recessed fixtures shall be installed so that the required fire-resistance rating will not be reduced.

Exceptions:

1. Membrane penetrations of not more than 2-hour fire-resistance-rated walls and partitions by steel electrical boxes that do not exceed 16 square inches (0.0103 m^2) in area provided that the aggregate area of the openings through the membrane does not exceed 100 square inches (0.0645 m^2) in any 100 square feet (9.29 m^2) of wall area. The annular space between the wall membrane and the box shall not exceed $^1/_8$ inch (3.1 mm). Such boxes on opposite sides of the wall shall be separated by one of the following:
   1.1. By a horizontal distance of not less than 24 inches (610 mm) where the wall or partition is constructed with individual noncommunicating stud cavities.
   1.2. By a horizontal distance of not less than the depth of the wall cavity where the wall cavity is filled with cellulose loose-fill, rockwool or slag mineral wool insulation.
   1.3. By solid *fireblocking* in accordance with Section R302.11.
   1.4. By protecting both boxes with *listed* putty pads.
   1.5. By other *listed* materials and methods.
2. Membrane penetrations by *listed* electrical boxes of any materials provided that the boxes have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the *listing*. The annular space between the wall membrane and the box shall not exceed $^1/_8$ inch (3.1 mm) unless *listed* otherwise. Such boxes on opposite sides of the wall shall be separated by one of the following:
   2.1. By the horizontal distance specified in the *listing* of the electrical boxes.
   2.2. By solid *fireblocking* in accordance with Section R302.11.
   2.3. By protecting both boxes with *listed* putty pads.
   2.4. By other *listed* materials and methods.
3. The annular space created by the penetration of a fire sprinkler ~~or water-filled fire sprinkler piping,~~ provided that the annular space is covered by a metal escutcheon plate.
4. Ceiling membrane penetrations by *listed* luminaires or by luminaires protected with *listed* materials that have been tested for use in fire-resistance-rated assemblies and are installed in accordance with the instructions included in the *listing*.

Reason: RB67-19 introduced new text to R302.2.2 (now R302.4.1) to permit both metal and plastic water filled sprinkler piping to penetrate townhouse separation walls without proper protection. This proposal will provide language that would require sprinkler piping penetrations to be protected as intended, while maintaining the allowance to penetrate membranes with a sprinkler and escutcheon plate.

The need to penetrate a common wall with water filled sprinkler pipping is acknowledged. However, penetrations of fire-resistance rated assemblies need to be properly protected. Fire testing has demonstrated that relying solely on a metal escutcheon plate for protection of water-filled sprinkler pipe penetrations does not work. First, the assertion in RB67-19 that water within the pipe will somehow extinguish a fire at the opening does not even apply to metal sprinkler pipe. While metal sprinkler pipe is noncombustible, fire from the room of fire origin will still breach an opening in a fire separation that is not properly protected. Secondly, the rationale provided with RB67-19 that plastic sprinkler pipe is ignition resistant and would therefore minimize the need for firestopping materials is incorrect. The ignition resistance and flame spread rating are not relevant to the fire resistance performance required to protect penetrations when successful membrane or through-penetration firestop systems are tested. Our experience with testing thousands of assemblies with plastic pipe penetrations clearly confirms this. Common plastic sprinkler pipe does ignite, has a flame spread rating when tested to ASTM E84 or UL 723, and will melt or decompose when subjected to the exposure of an ASTM E119 fire. When protection of plastic pipe penetrations fails in an ASTM E814 or UL 1479 test, it is because the pipe is compromised at the penetration, allowing flames and hot gases to enter into and through the breach.

Although a sprinkler, not a sprinkler pipe, has long been permitted to penetrate a fire resistance rated wall with only a metal escutcheon plate to cover the annular space, it is a limited exception recognizing that a sprinkler, once activated, would discharge a heavy spray of water droplets in very close proximity to the sprinkler’s membrane-penetration, making the zone directly next to the sprinkler head the most heavily protected and with the least-elevated temperature of the entire fire compartment. This is addressed in the ICC publication on Firestopping, Joint Systems and Dampers.[1]

There are many proven systems available for these conditions. Based on years of collective fire testing experience, we are very concerned that the existing language will not provide the protection assumed, and required, for these townhome common walls. The protection of penetrations in fire rated wall assemblies is independent of whether a sprinkler system is installed or not.

Bibliography: Firestopping, Joint Systems and Dampers, International Code Council, 2015, https://shop.iccsafe.org/firestopping-joint-systems-and-dampers-43260.html.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The Code change may increase the cost of construction, but restores the IRC requirements and removes an untested exemption.

Estimated Immediate Cost Impact Justification (methodology and variables):

The installed cost ranges from $12 to $15 per penetration.

RB72-25

RB73-25

IRC: SECTION R302.5, R302.5.1, R302.5.2, R302.5.3, R302.6, TABLE R302.6; SECTION R317.1, R317.2,

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R317
GARAGES AND CARPORTS

Revise as follows:

R317.1 Floor surface. Garage and carport floor surfaces shall be of *approved noncombustible material*. The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.

Exception: Asphalt surfaces shall be permitted at ground level in carports open on two or more sides.

Delete without substitution:

~~**R317.2 Carports.** Carports shall be open on not less than two sides. Carport floor surfaces shall be of *approved noncombustible material*. Carports not open on two or more sides shall be considered to be a garage and shall comply with the provisions of this section for garages.~~

~~The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.~~

~~**Exception:** Asphalt surfaces shall be permitted at ground level in carports.~~

SECTION R302
FIRE-RESISTANT CONSTRUCTION

~~**R302.5 Dwelling unit garage opening and penetration protection.** Openings and penetrations through the walls or ceilings separating the *dwelling unit* from the garage shall be in accordance with Sections R302.5.1 through R302.5.3.~~

Revise as follows:

~~**R302.6**~~ **R302.5 Dwelling unit garage fire separation.** Garages shall comply with comply with the provisions of this section. Carports not open on two or more sides shall comply with the provisions of this section for garages. The garage shall be separated as required by Table ~~R302.6.~~ R302.5.~~Openings in garage walls shall comply with Section R302.5.~~ Attachment of *gypsum board* shall comply with Table R702.3.5. The wall separation provisions of Table ~~R302.6~~ R302.5 shall not apply to garage walls that are perpendicular to the adjacent *dwelling unit* wall.

R302.5.1 Opening protection. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and *dwelling unit* shall be equipped with solid wood doors not less than $1^3/_8$ inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than $1^3/_8$ inches (35 mm) thick, or 20-minute fire-rated doors. Doors shall be self-latching and equipped with a self-closing or automatic-closing device.

R302.5.2 ~~Duct~~ penetration protection. Penetrations through the wall or ceiling membranes separating the garage from the dwelling unit shall be protected in accordance with Section R302.11, Item 4. Ducts in the garage that penetrate ~~and ducts penetrating~~ the wall or ceiling membranes ~~walls or ceilings~~ separating the dwelling unit from the garage shall be constructed of a minimum No. 26 gage (0.48

mm) sheet steel or other *approved* material and shall not have openings into the garage.

Delete without substitution:

~~**R302.5.3 Other penetrations.** Penetrations through the separation required in Section R302.6 shall be protected as required by Section R302.11, Item 4.~~

Revise as follows:

TABLE ~~R302.6~~ R302.5 DWELLING UNIT GARAGE SEPARATION

SEPARATION	MATERIAL
From the dwelling unit and attics	Not less than $^{1}/_{2}$-inch gypsum board or equivalent applied to the garage side
From portions of the dwelling unit above the garage	Not less than $^{5}/_{8}$-inch Type X gypsum board or equivalent
Structure supporting floor/ceiling assemblies used for separation required by this section	Not less than $^{1}/_{2}$-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than $^{1}/_{2}$-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Reason: Prior to changes made in the 2009 IRC, this section on garages and carports included the details for garage-dwelling unit fire separation. The statement in the "carport" section about carports "not open on two or more sides must comply with the section as garages" included compliance with the fire separation provisions. However, in the 2009 IRC when fire separation was moved to R302, the only remaining use for that statement is for the exception allowing asphalt surfaces in carports. With that understanding, Section R317.2 in the 2024 IRC could be eliminated and replaced by simply including "carports" in Section R317.1 and moving the asphalt exception.

The statement about carports not open on two or more sides needing to comply as a garage is added to the beginning of Section R302.6 as was the original intent through the 2006 IRC, as described above. This section is relocated to come before the requirements for openings. Openings and penetrations, Section R302.5 is deleted and replaced to two subsections under the section regarding the separation (R302.6)

"Other penetrations" sounds like it applies to penetrations "other" than duct penetrations in the previous subsection. However, even a duct penetration of 26 ga steel would need the annual space filled around it so as to not allow passage of smoke and hot gasses, as is required by the "other penetrations" subsection and its reference to fireblocking method, #4. It is cleaner to have one sub section for openings and another for penetrations.

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

Justification for no cost impact:

I believe the common interpretation in the building code industry is that a carport closed on more than two sides is regulated as a garage for dwelling-garage separation purposes. This change in the 2009 IRC appears to simply be an oversight, as the Significant Changes to the 2009 IRC book describes the relocation of the separation requirements to Section R302 as having "no technical change". Unless there is a different interpretation being used for what is a "garage" and requires the separation, there is no increase in the cost of construction.

RB73-25

RB74-25

IRC: TABLE R302.6

Proponents: Tim Earl, GBH International, representing the Gypsum Association (tearl@gbhint.com)

2024 International Residential Code

SECTION R302 FIRE-RESISTANT CONSTRUCTION

Revise as follows:

TABLE R302.6 DWELLING UNIT GARAGE SEPARATION

SEPARATION	MATERIAL
From the dwelling unit and attics	Not less than $^1/_2$-inch gypsum board or equivalent applied to the garage side
From portions of the dwelling unit above the garage	Not less than $^5/_8$-inch Type X gypsum board or <u>other material with a 40-minute *fire-resistance rating*</u> ~~equivalent~~
Structure supporting floor/ceiling assemblies used for separation required by this section	Not less than $^1/_2$-inch gypsum board or equivalent
Garages located less than 3 feet from a dwelling unit on the same lot	Not less than $^1/_2$-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Reason: Type X gypsum board is a special type of gypsum panel product with core additives to increase fire resistance (in accordance with applicable ASTM standards). Proving equivalency to Type X is not straightforward, and there is no known alternative to it. When we conducted an informal poll of code users, many of the answers to the question “What do you consider equivalent to Type X gypsum board” were alarming.

Although nothing is exactly “equivalent” to Type X gypsum board, the primary property of interest is fire-resistance. The IBC assigns a fire-resistance rating of 40 minutes for type X board in vertical assemblies as part of the calculated method. Allowing any material with the same calculated fire-resistance rating in this application is a reasonable substitution. Beyond that, alternate materials should be approved as specified in Section 104.11, which was comprehensively revised last cycle.

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

Justification for no cost impact:

None. Anyone wishing to use an alternate material can still do so in accordance with Section 104.11.

RB74-25

RB75-25

IRC: R302.9, R302.9.1 (New), R302.9.1.1 (New), R302.9.1, R302.9.5, R302.9.2, R302.9.3, R302.9.4, R303.4, R303.5.10, R303.6

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.9 ~~Flame spread indexand smoke-developed index~~ Fire testing for wall and ceiling finishes. *Interior wall and ceiling finish* materials shall be classified for fire performance and smoke development in accordance either with Section R302.9.1 or with Section R302.9.2. Materials tested in accordance with Section R302.9.1 shall not be required to be tested in accordance with Section R302.9.2. High-density polyethylene (HDPE) and polypropylene (PP) shall comply with Section R302.9.3. ~~*Flame spread* and *smoke-developed indices* for wall and ceiling finishes shall be in accordance with Sections R302.9.1 through R302.9.4.~~

Add new text as follows:

R302.9.1 Interior wall and ceiling finish materials tested in accordance with NFPA 286. Interior wall and ceiling finish materials shall be classified in accordance with NFPA 286 and comply with Section R302.9.1.1. Materials complying with Section R302.9.1 shall be considered to also comply with Section R302.9.2.

R302.9.1.1 Acceptance criteria for NFPA 286. Interior finish materials tested in accordance with NFPA 286 shall comply with the following:

1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
3. Flashover, as defined in NFPA 286, shall not occur.
4. The peak heat release rate throughout the test shall not exceed 800 kW.
5. The total smoke released throughout the test shall not exceed 1,000 m^2.

Revise as follows:

~~R302.9.1~~ R302.9.2 Flame spread index and smoke developed index. Wall and ceiling finishes shall have a *flame spread index* of not greater than 200 and a smoke developed index of not greater than 450 when tested in accordance with ASTM E84 or UL 723.

> **Exception:** *Flame spread index* requirements for finishes shall not apply to *trim* defined as picture molds, chair rails, baseboards and *handrails*; to doors and windows or their frames; or to materials that are less than $^1/_{28}$ inch (0.91 mm) in thickness cemented to the surface of walls or ceilings if these materials exhibit *flame spread index* values not greater than those of paper of this thickness cemented to a noncombustible backing.

~~R302.9.5~~R302.9.3 High-density polyethylene (HDPE) and polypropylene (PP). Where high-density polyethylene or polypropylene is used as an interior finish material, it shall be tested in accordance with NFPA 286 and comply with the criteria in Section R302.9.1.1 ~~R302.9.4~~.

~~**R302.9.2 Smoke-developed index.** Wall and ceiling finishes shall have a *smoke-developed index* of not greater than 450.~~

~~**R302.9.3 Testing.** Tests shall be made in accordance with ASTM E84 or UL 723.~~

~~**R302.9.4 Alternative test method.** As an alternative to having a *flame spread index* of not greater than 200 and a *smoke-developed index* of not greater than 450 where tested in accordance with ASTM E84 or UL 723, wall and ceiling finishes shall be permitted to be tested in accordance with NFPA 286. Materials tested in accordance with NFPA 286 shall meet the following criteria:~~

~~The interior finish shall comply with the following:~~

1. ~~During the 40 kW exposure, flames shall not spread to the ceiling.~~
2. ~~The flame shall not spread to the outer extremity of the sample on any wall or ceiling.~~
3. ~~Flashover, as defined in NFPA 286, shall not occur.~~
4. ~~The peak heat release rate throughout the test shall not exceed 800 kW.~~
5. ~~The total smoke released throughout the test shall not exceed 1,000 m^2.~~

SECTION R303
FOAM PLASTIC

R303.4 Thermal barrier. Unless otherwise allowed in Section R303.5, foam plastic shall be separated from the interior of a *building* by an *approved* thermal barrier of not less than $^1/_2$-inch (12.7 mm) *gypsum wallboard*, $^{23}/_{32}$-inch (18.2 mm) *wood structural panel* or a material that is tested in accordance with and meets the acceptance criteria of both the Temperature Transmission Fire Test and the Integrity Fire Test of NFPA 275.

R303.5.10 Interior finish. Foam plastics used as interior finishes shall comply with Section R303.6 and shall meet the *flame spread index* and *smoke-developed index* requirements of ~~Sections R302.9.1 and~~ <u>Section</u> R302.9.2.

R303.6 Specific approval. Foam plastic not meeting the requirements of Sections R303.3 through R303.5 shall be specifically *approved* on the basis of an *approved* large-scale test reflecting the actual end-use configuration and performed on the finished foam plastic assembly in the maximum thickness intended for use. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use. The approved large-scale test shall comply with one of the following: NFPA 286 with the acceptance criteria of Section <u>R302.9.1.1</u> ~~R302.9.4~~, FM 4880, UL 1040 or UL 1715.

Reason: This proposal does not change any of the requirements but reverses the order in which the test methods are referenced, making NFPA 286 the default test, just as it is in the IBC and in other documents.

It is essential to emphasize that this proposed change will <u>**not**</u> require any change in the way that materials are tested, as compared to what is required in the existing IRC code: the choice remains the same. <u>**This proposal does not add any new requirements for any material.**</u>

This proposal does not require any change in the severity of testing but simply provides a logical sequence.

The reason for proposing this change is that the present IRC (just like the IBC and many other codes and standards) allows any interior finish material to be tested to NFPA 286. However, the IRC does not allow every interior finish material to be tested to ASTM E84.

For example the code (the IRC) does not allow high-density polyethylene (HDPE) or polypropylene (PP) to be tested to ASTM E84 or UL 723 (present section R302.9.5, which is proposed to be renumbered without change).

Also, the IRC does not allow foam plastic insulation to be used exposed when it has only been tested to ASTM E84 or UL 723. In order to use foam plastic insulation (as described in R303) it must either (a) be separated from the interior of the building by an approved thermal barrier (as required by R303.4, shown for information) or (b) have been tested in accordance with NFPA 286 (or one of the other accepted tests shown in R303.6) and have met the corresponding requirements.

This proposal combines in a single section the requirements for flame spread index and smoke developed index (without changing them) since both are obtained when conducting the same ASTM E84 or UL 723 test and having 2 sections for that is potentially confusing.

One other aspect of this proposal is that it clarifies, in the charging section, that there are special requirements for testing of HDPE and

PP, as they are in the present code, but which the present IRC does not state explicitly. This is a simple clarification not a change in requirements. It is not considered an "exception" because exceptions imply a lower level of severity.

The change proposed for section R303.5.10 is simply a correlation with the other changes, to reference the correct section. Note that, since the requirements for flame spread index and smoke developed index have been combined in the same section (namely section R302.9.2) instead of being separated into 2 sections (R302.9.1 and R302.9.2) section R303.5.10 refers only to R302.9.2, which contains both the flame spread index and the smoke developed index.

The change proposed for section R303.6 is simply the section number referenced, consistent with the other changes.

The language used is consistent with the language in the IBC, but the IRC requirements are being retained: when tested to ASTM E84 or UL 723 materials still simply need to meet a Class C (FSI of no more than 200 and SDI no more than 450). Note that the IBC has areas where a Class A or a Class B in accordance with ASTM E84 or UL 723 is required. Such requirements are not included here.

See IBC language below.

803.1 General. *Interior wall and ceiling finish materials shall be classified for fire performance and smoke development in accordance with Section 803.1.1 or 803.1.2, except as shown in Sections 803.1.3 through 803.15. Materials tested in accordance with Section 803.1.1 shall not be required to be tested in accordance with Section 803.1.2.*
803.1.1 Interior wall and ceiling finish materials tested in accordance with NFPA 286*. Interior wall and ceiling finish materials shall be classified in accordance with NFPA 286 and comply with Section 803.1.1.1. Materials complying with Section 803.1.1.1 shall be considered to also comply with the requirements of Class A.*
803.1.1.1 Acceptance criteria for NFPA 286*. The interior finish shall comply with the following:*
1. During the 40 kW exposure, flames shall not spread to the ceiling.
2. The flame shall not spread to the outer extremity of the sample on any wall or ceiling.
3. Flashover, as defined in NFPA 286, shall not occur.
4. The peak heat release rate throughout the test shall not exceed 800 kW.
5. The total smoke released throughout the test shall not exceed 1,000 m^2.
803.1.2 Interior wall and ceiling finish materials tested in accordance with ASTM E84 or UL 723*. Interior wall and ceiling finish materials shall be classified in accordance with ASTM E84 or UL 723. Such interior finish materials shall be grouped in the following classes in accordance with their flame spread and smoke-developed indices.*
Class A = Flame spread index 0–25; smoke-developed index 0–450.
Class B = Flame spread index 26–75; smoke developed index 0–450.
Class C = Flame spread index 76–200; smoke-developed index 0–450.

Cost Impact: The 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 alters the hierarchy of the fire test methods for interior finish without adding any new requirement.

RB75-25

RB76-25

IRC: R302.9.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R302 FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.9.1 Flame spread index. Wall and ceiling finishes shall have a *flame spread index* of not greater than 200.

Exception: *Flame spread index* requirements for finishes shall not apply to *trim* ~~defined as picture molds, chair rails, baseboards and *handrails*; to doors and windows or their frames;~~ or to materials that are less than $^{1}/_{28}$ inch (0.91 mm) in thickness cemented to the surface of walls or ceilings if these materials exhibit *flame spread index* values not greater than those of paper of this thickness cemented to a noncombustible backing.

Reason: "Trim" is defined in chapter two so the term can be used correctly in the IRC. There is no reason to provide the definition within a code section. It has been this way since the original 2000 edition. Note the appropriate use of the defined term in Section R303.5.9.

Reference:
Chapter Two, Trim: Picture molds, chair rails, baseboards, *handrails*, door and window frames, and similar decorative or protective materials used in fixed applications.

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

Justification for no cost impact:

This change is clarification and simplification only. No change to intent or application.

RB76-25

RB77-25

IRC: R302.13, ASTM Chapter 44 (New)

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); Jason Smart, representing American Wood Council (jsmart@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

SECTION R302 FIRE-RESISTANT CONSTRUCTION

Revise as follows:

R302.13 Fire protection of floors. Floor assemblies that are not required elsewhere in this code to be fire-resistance rated, shall be provided with a $^{1}/_{2}$-inch (12.7 mm) *gypsum wallboard* membrane, $^{5}/_{8}$-inch (16 mm) *wood structural panel* membrane, or equivalent on the underside of the floor framing member. Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.

Exceptions:

1. Floor assemblies located directly over a space protected by an automatic sprinkler system in accordance with Section P2904, NFPA 13D, or other *approved* equivalent sprinkler system.
2. Floor assemblies located directly over a *crawl space* not intended for storage or for the installation of fuel-fired or electric-powered heating *appliances*.
3. Portions of floor assemblies shall be permitted to be unprotected where complying with the following:
   3.1. The aggregate area of the unprotected portions does not exceed 80 square feet (7.4 m^2) per *story*.
   3.2. *Fireblocking* in accordance with Section R302.11.1 is installed along the perimeter of the unprotected portion to separate the unprotected portion from the remainder of the floor assembly.
4. Wood floor assemblies using dimension lumber or *structural composite lumber* equal to or greater than 2-inch by 10-inch (50.8 mm by 254 mm) nominal dimension, or other *approved* floor assemblies demonstrating equivalent fire performance.
5. Wood floor assemblies less than 600 square feet (55.7 m^2) within detached *accessory structures* with no *habitable space* above them.
6. <u>Wood floor assemblies using framing members demonstrating equivalent fire performance to dimension lumber or *structural composite lumber* equal to or greater than 2-inch by 10-inch (50.8 mm by 254 mm) nominal dimension in accordance with ASTM D8391.</u>

Add new standard(s) as follows:

ASTM

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

<u>D8391-22</u>	<u>Standard Specification for Demonstrating Equivalent Fire Performance for Wood-Based Floor Framing Members to Unprotected 2 by 10 Dimension Lumber or Equal-Sized Structural Composite Lumber</u>

Reason: A new standard, ASTM D8391-22, has been developed to provide a standardized approach for code and fire officials to approve floor framing members as demonstrating fire performance equivalent to unprotected 2x10 dimension lumber or equal-sized structural composite lumber, consistent with the intent of Exception #4. The ASTM standard referenced in this proposal uses the same method as currently used by the International Code Council Evaluation Service (ICC-ES). Adding ASTM D8391 to new Exception #6, provides a standard baseline for testing products and ensuring their durability.

ASTM D8391 builds upon the criteria provided by ICC-ES by expanding the scope beyond trusses (ICC-ES AC224) and I-joists (ICC-ES AC14) to include any wood-based residential framing member. It also includes floor framing members with or without applied treatments or materials used to increase fire resistance, such as fire-resistive paints, coatings, chemical treatments, and mechanically attached or adhered fire protection materials. The ASTM D8391 standard also includes robust quality control criteria for applied treatments. This proposal maintains all existing code options available for providing fire protection of floors.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal adds an additional option in the code for demonstrating equivalent fire performance. Therefore, it does not result in an increase in the cost of construction, because the existing compliance options are still available. This proposal could potentially decrease construction costs if this option is used, but will have no effect on construction costs if it is not used. Therefore, the decrease in cost is conservatively estimated as $0.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
ASTM D8391-22 Standard Specification for Demonstrating Equivalent Fire Performance for Wood-Based Floor Framing Members to Unprotected 2 by 10 Dimension Lumber or Equal-Sized Structural Composite Lumber

RB77-25

RB78-25

IRC: R302.15.1 (New), ASTM Chapter 44 (New)

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

R302.15 Fire-retardant-treated wood. *Fire-retardant-treated wood* (FRTW) is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a *listed flame spread index* of 25 or less. In addition, the ASTM E84 or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the center line of the burners at any time during the test.

Add new text as follows:

R302.15.1 Alternate fire testing. Fire-retardant-treated wood is also any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E2768, a listed flame spread index of 25 or less and where the flame front does not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test.

Revise as follows:

~~R302.15.1~~ R302.15.2 **Pressure process.** For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under pressures not less than 50 pounds per square inch gauge (psig) (344.7 kPa).

~~R302.15.2~~ R302.15.3 **Other means during manufacture.** For wood products impregnated with chemicals by other means during manufacture, the treatment shall be an integral part of the manufacturing process of the wood product. The treatment shall provide permanent protection to all surfaces of the wood product. The use of paints, coating, stains or other surface treatments is not an *approved* method of protection as required by this section.

~~R302.15.3~~ R302.15.4 **Testing.** For *fire-retardant-treated wood* products, the front and back faces of the wood product shall be tested in accordance with and produce the results required in Section R302.15.

~~R302.15.3.1~~ R302.15.4.1 **Fire testing of fire-retardant-treated wood structural panels.** *Fire-retardant-treated wood structural panels* shall be tested with a ripped or cut longitudinal gap of $^1/_8$ inch (3.2 mm).

Add new standard(s) as follows:

ASTM

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

E2768-2018	Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)

Reason: The proposed added language is identical to the language included in section 2303.2.1 of the IBC, but that language is missing in the IRC. The remaining language in the IBC and IRC are equivalent. ASTM E2768 is already referenced in both the IBC and IWUIC.

Section 2303.2 of the IBC reads as follows:

***[BF] 2303.2 Fire-retardant-treated wood**. Fire-retardant-treated wood is any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E84 or UL 723, a listed flame* *spread index of 25 or less. The ASTM E84 or UL 723 test shall be continued for an additional 20-minute period and the flame front shall not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test.*

***[BF] 2303.2.1 Alternate fire testing**. Fire-retardant-treated wood is also any wood product that, when impregnated with chemicals by a pressure process or other means during manufacture, shall have, when tested in accordance with ASTM E2768, a listed flame spread index of 25 or less and where the flame front does not progress more than 10.5 feet (3200 mm) beyond the centerline of the burners at any time during the test.*

***[BF] 2303.2.2 Pressure process**. For wood products impregnated with chemicals by a pressure process, the process shall be performed in closed vessels under pressures not less than 50 pounds per square inch gauge (psig) (345 kPa).*

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

***[BF] 2303.2.4 Fire testing of wood structural panels**. Wood structural panels shall be tested with a ripped or cut longitudinal gap of 1/8 inch (3.2 mm).*

This change in code language does not change any of the requirements but it simply brings the IRC in line with the IBC and the IWUIC as well as in line with NFPA 703 and other codes and standards dealing with fire-retardant-treated wood.

ASTM E2768 was developed specifically as a way of standardizing testing in the ASTM E84 (Steiner) tunnel for the full 30 minutes required for obtaining fire-retardant-treated wood. ASTM E84 does not provide any information about a 30 minute test but is simply a 10 minute test. Also, ASTM E84 does not provide any information (or ways to assess) flame front progress. ASTM E84 specifically states in its scope that for 30 minute tests, the user needs to refer to ASTM E2768. Consequently, many of the fire test reports reference ASTM E2768 instead of referencing ASTM E84 when conducting tests for FRTW.

The following is the corresponding sentence from the scope of ASTM E84:

1.2.1 Materials required by the user to meet an extended 30-min duration tunnel test shall be tested in accordance with Test Method E2768.

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

Justification for no cost impact:

ASTM E2768 is equivalent to the "extended ASTM E84" required at present.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.

ASTM E2768-2018 Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)

RB78-25

RB79-25

IRC: R302.15.11 (New), R302.15.11.1 (New), R302.15.11.2 (New), R304.3, R304.3.3, R304.3.4

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

SECTION R302
FIRE-RESISTANT CONSTRUCTION

Add new text as follows:

R302.15.11 Fasteners and connectors in contact with fire-retardant-treated wood. Fasteners, including nuts and washers, and connectors in contact with *fire-retardant-treated wood* shall be in accordance with this section. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A153. The coating weight for zinc-coated nails shall be in accordance with ASTM A153 Class D or ASTM A641 Class 3S. Stainless steel driven fasteners shall be in accordance with the material requirements of ASTM F1667.

R302.15.11.1 Fasteners for fire-retardant-treated wood used in exterior applications or wet or damp locations. Fasteners, including nuts and washers, for *fire-retardant-treated wood* used in exterior applications or wet or damp locations shall be of hot-dipped, zinc-coated galvanized steel, stainless steel, silicon bronze or copper. Fasteners other than nails, staples and timber rivets shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B695, Class 55 minimum.

R302.15.11.2 Fasteners for fire-retardant-treated wood used in interior applications. Fasteners, including nuts and washers, for *fire-retardant-treated wood* used in interior locations shall be in accordance with the manufacturer's recommendations. In the absence of the manufacturer's recommendations, Section R302.15.11.1 shall apply.

SECTION R304
PROTECTION OF WOOD AND WOOD-BASED PRODUCTS AGAINST DECAY

Revise as follows:

R304.3 Fasteners and connectors in contact with preservative-treated~~and fire-retardant-treated~~ wood. Fasteners, including nuts and washers, and connectors in contact with preservative-treated wood~~and *fire-retardant-treated wood*~~ shall be in accordance with this section. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A153. The coating weight for zinc-coated nails shall be in accordance with ASTM A153 Class D or ASTM A641 Class 3S. Stainless steel driven fasteners shall be in accordance with the material requirements of ASTM F1667.

Delete without substitution:

~~**R304.3.3 Fasteners for fire-retardant-treated wood used in exterior applications or wet or damp locations.** Fasteners, including nuts and washers, for *fire-retardant-treated wood* used in exterior applications or wet or damp locations shall be of hot-dipped, zinc-coated galvanized steel, stainless steel, silicon bronze or copper. Fasteners other than nails, staples and timber rivets shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B695, Class 55 minimum.~~

~~**R304.3.4 Fasteners for fire-retardant-treated wood used in interior applications.** Fasteners, including nuts and washers, for *fire-retardant-treated wood* used in interior locations shall be in accordance with the manufacturer's recommendations. In the absence of the manufacturer's recommendations, Section R304.3.3 shall apply.~~

Reason: This is an editorial change to move requirements for fasteners and connectors used in fire-retardant-treated wood (FRTW) into Section R302.15. The requirements for fasteners used in FRTW belong in the section that has specific requirements and provisions for FRTW.

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

Justification for no cost impact:

There are no technical changes proposed in this code change. This proposal relocates the requirements for fasteners and connectors used with FRTW to a more appropriate location in the code.

RB79-25

RB80-25

IRC: R303.5.7

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R303
FOAM PLASTIC

Revise as follows:

R303.5.7 Foam backer board. The thermal barrier specified in Section R303.4 is not required where *foam backer board* ~~siding backer board~~ ~~*foam plastic insulation*~~ has a thickness of not more than 0.5 inch (12.7 mm) and a potential heat of not more than 2000 Btu per square foot (22 720 kJ/m^2) when tested in accordance with NFPA 259 and it complies with one or more of the following:

1. The *foam plastic insulation* is separated from the interior of the *building* by not less than 2 inches (51 mm) of mineral fiber insulation.
2. The *foam plastic insulation* is installed over existing exterior wall finish in conjunction with re-siding.
3. The *foam plastic insulation* has been tested in accordance with Section R303.6.

Reason: "Foam backer board" is defined in chapter two. This is the only code section regarding foam backer board, so the defined term should be used if the definition is to have any purpose.

FOAM BACKER BOARD. Foam plastic used in siding applications where the foam plastic is a component of the siding.

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

Justification for no cost impact:

This proposal is for clarification and simplification only. There is no change to the intent or application.

RB80-25

RB81-25

IRC: R303.5.13

Proponents: Paul Duffy, Paul Duffy and Associates, representing Spray Foam Coalition (jpaduffy@gmail.com)

2024 International Residential Code

SECTION R303
FOAM PLASTIC

Revise as follows:

R303.5.13 Floors. The thermal barrier specified in Section R303.4 is not required to be installed on the walking surface of a structural floor system that contains *foam plastic insulation* where the foam plastic is covered by not less than a nominal $^{1}/_{2}$-inch-thick (12.7 mm) *wood structural panel*, a non-combustible structural floor system, or equivalent. The thermal barrier specified in Section R303.4 is required on the underside of the structural floor system that contains *foam plastic insulation* where the underside of the structural floor system is exposed to the interior of the *building*.

Reason: This code section allows combustible wood flooring (or something equivalent) to satisfy the requirement of separating foam plastic insulation from the interior of a building in lieu of a prescribed Thermal Barrier. The wood flooring option is very specific but other alternatives are more vague and this has led to confusion in the field.

The proposed revision clarifies the type of other approved equivalents that would be considered acceptable as alternatives by providing an example. This should limit (and perhaps eliminate) the need for an engineering judgement for alternatives that are obviously less combustible than the minimum (i.e. 1/2" plywood.) The commentary to the code states:

> *"Foam plastic is required to be protected by a thermal barrier that typically is 1/2-inch (12.7 mm) gypsum wallboard. In the case of flooring, gypsum wallboard or other common thermal barrier materials cannot be used on the walking surfaces due to their friability to load, etc. This section allows for the 1/2-inch-thick plywood or equivalent to provide thermal protection to the foam plastic insulation. While 1/2-inch plywood is not by itself a thermal barrier, in the case of a floor, the plywood provides sufficient protection since in the event of an interior fire, the floor is typically the last building element to be significantly exposed by the fire."*

Certainly, any type of non-combustible flooring system will provide greater fire separation than the 1/2" wood flooring system which is cited as the minimum and it would be helpful if this was stipulated in the code.

Bibliography: N/A

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Minimum $1000 in cases where an engineering judgement is required.

Estimated Immediate Cost Impact Justification (methodology and variables):

The proposed change provides clarifying language so in the case where an alternate (non combustible) flooring system is used, the criteria for acceptance are clear enough so that no third party engineering opinion is required.

RB81-25

RB82-25

IRC: R303.6, UL Chapter 44

Proponents: Eric Banks, e.w.banks consulting llc, representing North American Modern Building Alliance (eric.banks@ewbanksconsulting.com)

2024 International Residential Code

SECTION R303
FOAM PLASTIC

Revise as follows:

R303.6 Specific approval. Foam plastic <u>and assemblies containing foam plastic</u> not meeting the requirements of Sections R303.3 through R303.5 shall be specifically *approved* on the basis of an *approved* large-scale test reflecting the actual end-use configuration and performed on the finished foam plastic assembly in the maximum thickness intended for use. Assemblies tested shall include seams, joints and other typical details used in the installation of the assembly and shall be tested in the manner intended for use. The approved large-scale test shall comply with one of the following: NFPA 286 with the acceptance criteria of Section R302.9.4, <u>Room Test of</u> FM 4880, ~~UL 1040~~ or UL 1715.

Delete without substitution:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

~~1040—1996~~ ~~Fire Test of Insulated Wall Construction—with Revisions through April 2017~~

Reason: The proposed change improves the consistency / comparability of the evaluation provided by the test methods prescribed by R303.6 and brings it more in-line with the intent of the section and its reference to the requirements of Sections R303.3 through R303.5. The proposed change is similar to proposal FS121-24 in Group A addressing the same topic in IBC Section 2603.9 Special Approval. Proposal FS121-24 was Approved by Comment in Group A Committee Action Hearing 2 and will likely go to the Consent Agenda. In practice, Section R303.6 is used to qualify uses of foam plastic insulation either without the protective covering materials prescribed in Sections R303.4 and R303.5 or using protective covering materials other than those prescribed. The IRCs scope of one- and two-family dwellings and townhomes of three stories in height or less questions the need for the very large-scale test options provided by FM 4880 and UL 1040.

FM 4880 is an approval standard includes four (4) different large-scale fire tests (Room Test, 16-ft High Parallel Panel Test, 25-ft High Corner Test, and 50-ft High Corner Test), each with different ignition source and exposure condition, along with a matrix of acceptance criteria. The specific combination of testing and acceptance criteria is determined by the makeup of the panel product under evaluation and the scope of approval desired. Of the tests described, only the test specimen size of the Room Test of FM 4880 aligns with the IRC's scope and intent of Sections R303.4, R303.5, and R303.6.

The UL 1040 is also a very large-scale test, using a 20-ft by 20-ft by 30-ft high open-corner configuration, a 764-pound wood crib ignition source and a 30-minute test duration. Such a large test specimen is inconsistent with the scope of buildings regulated under the IRC and intent of Sections R303.4, R303.5, and R303.6. Under FS121-24, Approved by Comment, UL 1040 was retained in IBC Section 2603.9, however, retaining the test as an option in the IBC is reasonable given the scope of buildings regulated under the IBC and the types of products maintaining listings for UL 1040.

The changes will improve the consistency of the evaluations performed under Section 303.6 and its intent in terms of the Specific Approval under Section 303.6 and the scope of the IRC.

The North American Modern Building Alliance (NAMBA) is focused on addressing fire safety through the development and enforcement of building codes. Members of NAMBA are: ACC Center for the Polyurethanes Industry, ACC North American Flame Retardant Alliance, Atlas Roofing Corp., BASF Corporation, Covestro, DuPont, EIFS Industry Members Association, EPS Industry Alliance, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax

- A Business Unit of the Sika Corporation.

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

Justification for no cost impact:

The proposed code change provides clarification regarding the existing tests required for compliance with Section R303.6.

RB82-25

RB83-25

IRC: R304.1, TABLE R304.1 (New), R304.1.1, R304.1.2

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

SECTION R304 PROTECTION OF WOOD AND WOOD-BASED PRODUCTS AGAINST DECAY

Delete and substitute as follows:

~~**R304.1 Location required.** Protection of wood and wood-based products from decay shall be provided in the following locations by the use of *naturally durable wood* or wood that is preservative-treated in accordance with AWPA U1.~~

1. ~~In *crawl spaces* or unexcavated areas located within the periphery of the building foundation, wood joists or the bottom of a wood structural floor where closer than 18 inches (457 mm) to exposed ground, wood girders where closer than 12 inches (305 mm) to exposed ground, and wood columns where closer than 8 inches (204 mm) to exposed ground.~~
2. ~~Wood framing members, including columns, that rest directly on concrete or masonry exterior foundation walls and are less than 8 inches (203 mm) from the exposed ground.~~
3. ~~Sills and sleepers on a concrete or masonry slab that is in direct contact with the ground unless separated from such slab by an impervious moisture barrier.~~
4. ~~The ends of wood girders entering exterior masonry or concrete walls having clearances of less than $^1/_2$ inch (12.7 mm) on tops, sides and ends.~~
5. ~~Wood siding, sheathing and wall framing on the exterior of a *building* having a clearance of less than 6 inches (152 mm) from the ground or less than 2 inches (51 mm) measured vertically from concrete steps, porch slabs, patio slabs and similar horizontal surfaces exposed to the weather.~~
6. ~~Wood structural members supporting moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs, unless separated from such floors or roofs by an impervious moisture barrier.~~
7. ~~Wood furring strips or other wood framing members attached directly to the interior of exterior masonry walls or concrete walls below *grade* except where an *approved* vapor retarder is applied between the wall and the furring strips or framing members.~~
8. ~~Portions of wood structural members that form the structural supports of *buildings*, decks, balconies, porches or similar permanent building appurtenances where those members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering that prevents moisture or water accumulation on the surface or at joints between members.~~

   ~~**Exception:** Sawn lumber used in structures located in a geographical region where experience has demonstrated that climatic conditions preclude the need to use naturally durable or preservative-treated wood where the structure is exposed to the weather.~~

9. ~~Wood columns in contact with *basement* floor slabs unless supported by concrete piers or metal pedestals projecting not less than 1 inch (25 mm) above the concrete floor and separated from the concrete pier by an impervious moisture barrier.~~

<u>**R304.1** **Preservative treatment.** Wood and wood-based products used in locations identified in Table R304.1 shall be preservative treated in accordance with AWPA U1 for the Use Category indicated in Table R304.1.</u>

<u>**Exceptions:**</u>

1. Naturally durable wood shall be permitted to be substituted for preservative-treated wood in locations requiring Use Category UC2, UC3A or UC3B protection, as indicated in Table R304.1.
2. Wood used entirely below groundwater level or continuously submerged in fresh water shall not be required to be preservative treated.

Add new text as follows:

TABLE R304.1 PROTECTION FROM DECAY

Location	AWPA U1 Minimum Use Category
1. Wood in contact with the ground that supports permanent structures intended for human occupancy.	UC4A, UC4B, or UC4C[a]
2. Wood embedded in concrete in direct contact with the ground that supports permanent structures intended for human occupancy.	UC4A, UC4B, or UC4C[a]
3. Wood embedded in concrete exposed to the weather that supports permanent structures intended for human occupancy.	UC4A, UC4B, or UC4C[a]
4. Portions of wood structural members that form the structural supports of buildings, decks, balconies, porches or similar permanent building appurtenances where those members are exposed to the weather without adequate protection from a roof, eave, overhang or other covering that prevents moisture or water accumulation on the surface or at joints between members. **Exception:** Preservative treatment is not required for sawn lumber used in structures located in a geographical region where experience has demonstrated that climatic conditions preclude the need.	UC3B[b]
5. Wood structural members supporting moisture-permeable floors or roofs that are exposed to the weather, such as concrete or masonry slabs. **Exception:** Preservative treatment is not required for such wood structural members separated from the floor or roof by an impervious moisture barrier.	UC3B[b]
6. Wood sheathing and framing in the exterior wall of a building having a clearance of less than 6 inches (152 mm) from the ground.	UC3B[b]
7. Wood sheathing and framing in the exterior wall of a building less than 2 inches (51 mm) measured vertically from concrete steps, porch slabs, patio slabs and similar horizontal surfaces exposed to the weather.	UC3B[b]
8. Wood siding on the exterior of a building having a clearance of less than 6 inches (152 mm) from the ground.	UC3A
9. Wood siding on the exterior of a building less than 2 inches (51 mm) measured vertically from concrete steps, porch slabs, patio slabs and similar horizontal surfaces exposed to the weather.	UC3A
10. Wood columns, not exposed to the weather, where closer than 8 inches (203 mm) to exposed ground.	UC2
11. Wood columns, not exposed to the weather, in contact with basement floor slabs unless supported by concrete piers or metal pedestals projecting not less than 1 inch (25 mm) above the concrete floor and separated from the concrete pier by an impervious moisture barrier.	UC2
12. Wood framing members, not exposed to the weather, that rest directly on concrete or masonry exterior foundation walls and are less than 8 inches (203 mm) from the exposed ground.	UC2
13. Wood furring strips or other wood framing members, not exposed to the weather, attached directly to the interior of exterior masonry walls or concrete walls below grade. **Exception:** Preservative treatment is not required for such wood furring strips or wood framing members separated from walls by an impervious moisture barrier.	UC2
14. Wood joists or the bottom of a wood structural floor, not exposed to the weather, where closer than 18 inches (457 mm) to exposed ground.	UC2
15. Wood girders, not exposed to the weather, where closer than 12 inches (305 mm) to exposed ground.	UC2
16. Ends of wood girders, not exposed to the weather, entering exterior masonry or concrete walls having clearances of less than 1/2 inch (12.7 mm) on tops, sides and ends.	UC2
17. Wood sills and sleepers, not exposed to the weather, on a concrete or masonry slab that is in direct contact with the ground. **Exception:** Preservative treatment is not required for such wood sills and sleepers that are separated from the concrete or masonry slab by an impervious moisture barrier.	UC2

a. Use Category depends on exposure severity as defined in AWPA U1.
b. In accordance with AWPA U1, sawn lumber joists and beams shall be treated to requirements for Use Category 4A when they are difficult to maintain, repair, or replace and are critical to the performance and safety of the entire system/construction.

Revise as follows:

~~R304.1.1~~R304.2 Field treatment. Field-cut ends, notches and drilled holes of preservative-treated wood shall be treated in the field in accordance with AWPA M4.

Delete without substitution:

~~**R304.1.2 Ground contact.** All wood in contact with the ground, embedded in concrete in direct contact with the ground or embedded in concrete exposed to the weather that supports permanent structures intended for human occupancy shall be *approved* pressure-~~

~~preservative-treated wood suitable for ground contact use, except that untreated wood used entirely below groundwater level or continuously submerged in fresh water shall not be required to be pressure-preservative treated.~~

Reason: Section R304.1 currently provides only a general reference to the AWPA U1 standard with no further guidance regarding Use Category requirements for each location. In addition, requirements are presented in multiple formats and locations in this section. This code change restructures the locations where preservative-treated wood is required into one table and clarifies the required minimum Use Categories from the AWPA U1 standard. In the creation of the table, some location requirements were divided for clarity and/or to be more specific for the wood element being protected. Consistent with the current code, if a wood member fits into multiple categories, the most restrictive Use Category will apply.

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

Justification for no cost impact:

There are no technical changes proposed in this code change. The current code already requires compliance with AWPA U1.

RB83-25

RB84-25

IRC: R304.1.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R304 PROTECTION OF WOOD AND WOOD-BASED PRODUCTS AGAINST DECAY

Revise as follows:

R304.1.1 Field treatment. Field-cut ends, notches and drilled holes of preservative-treated wood exposed to the weather shall be treated in the field in accordance with AWPA M4 or in accordance with the treated lumber *manufacturer's installation instructions*.

Reason: The reference to the AWPA M4 standard for field treatment of treated lumber has been in the IRC since the 2006 edition. However, 18 years later, it is far from an industry standard. Very few builders and even less building authorities are requiring field treatment or even aware of it. Unlike ICC, NFPA, UL, AWC, AISI, and many other standard publishers, the AWPA M4 standard is not viewable for free and is currently $40. It is less than three pages of information and very little of it is of significance to the residential construction industry. This $40 standard is essentially the building code (i.e. government) mandated installation instructions for treated lumber available at every lumberyard and home improvement store across the country. Treated lumber is heavily purchased by average DIY owners and deck builders, yet the instructions for proper installation to achieve the expected useful life is behind a paywall and then mandated.

The instructions to build an entire house and deck are available for free view in the 2021 IRC. In the preface of the IRC under the title “Effective Use of the International Residential Code” the text twice refers to the IRC in this manner: “It has been said that the IRC is the complete cookbook for residential construction.” “This is consistent with the cookbook philosophy of the IRC.” I do not believe the IRC is effective as a cookbook if a common ingredient requires the purchase of another cookbook.

I brought a proposal to the hearings for the development of the 2024 IRC with the reason statement above. In that proposal, I had included some basic information adapted from the M4 standard directly in the IRC for the benefit of the end user. The AWC and members of the AWPA opposed the proposal and ultimately I withdrew it. I am bringing this discussion back again this cycle, as I still believe the IRC is not appropriately addressing this subject.

In this proposal, the requirement for treatment is reduced only to wood used in exterior, exposed environments, such as decks. It is not realistic to believe that those framing houses are going to treat the ends of the sill plate they place on the foundation. I have never seen this done. If this were that important, we should not send people to a $40 two page reference to get the requirements. I have also included an alternative for following the manufacturer's installation instructions of the treated lumber.

It might be reasonable to consider removing the reference to the M4 standard entirely. We are setting people up to fail.

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

Justification for no cost impact:

This code change proposal would reduce the cost of code compliant installations, but no one is doing this anyway. The importance of this change is less about cost reduction and more about principle.

RB84-25

RB85-25

IRC: R304.1.1, R305.1.2

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

SECTION R304
PROTECTION OF WOOD AND WOOD-BASED PRODUCTS AGAINST DECAY

Revise as follows:

R304.1.1 Field treatment. Field-cut ends, notches and drilled holes of preservative-treated wood shall be treated in the field in accordance with AWPA M4.

<u>**Exception:** Field treatment of field-cut ends, notches and drilled holes shall not be required where the preservative-treated wood product manufacturer’s instructions permit use without such field treatment.</u>

SECTION R305
PROTECTION AGAINST SUBTERRANEAN TERMITES

R305.1.2 Field treatment. Field-cut ends, notches and drilled holes of pressure-preservative-treated wood shall be retreated in the field in accordance with AWPA M4.

<u>**Exception.** Field treatment of field-cut ends, notches and drilled holes shall not be required where the preservative-treated wood product manufacturer’s instructions permit use without such field treatment.</u>

Reason: Some engineered wood products have a preservative-treatment process which distributes the treatment through the cross-section. This precludes the need to field-apply treatment to field-cut ends, notches or drilled holes. This exception retains the requirement for field treatment of sawn lumber and other wood-based products, while giving an exception to prevent unnecessary field treatment to products which have specific requirements in their manufacturer's instructions.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

Field treatment should not be required on engineered wood products which have specific manufacturer's instructions which state that field treatment is not required. This code change proposal codifies that, which could decrease costs. We have conservatively estimated this cost decrease at $0.

RB85-25

RB86-25

IRC: R304.3.2

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

SECTION R304
PROTECTION OF WOOD AND WOOD-BASED PRODUCTS AGAINST DECAY

Revise as follows:

R304.3.2 ~~Fastenings~~ Fasteners and connectors for wood foundations. ~~Fastenings, including nuts and washers,~~ Fasteners and connectors for wood foundations shall be as required in AWC PWF.

Reason: “Fastenings” is an outdated term and is proposed to be replaced by "fasteners and connectors" which is consistent with terminology used in ANSI/AWC *Permanent Wood Foundation* (PWF) *Design Specification* in Section 2.4.1.

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

Justification for no cost impact:

There are no technical changes proposed in this code change. This proposal editorially coordinates with terminology used in the PWF.

RB86-25

RB87-25

IRC: R305.1

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org)

2024 International Residential Code

SECTION R305
PROTECTION AGAINST SUBTERRANEAN TERMITES

Revise as follows:

R305.1 Subterranean termite control methods. In areas subject to damage from termites as indicated by Table R301.2, protection shall be by one, or a combination, of the following methods:

1. Chemical termiticide treatment in accordance with Section R305.2.
2. Termite-baiting system installed and maintained in accordance with the *label*.
3. Pressure-preservative-treated wood in accordance with the AWPA U1 specifications for termite protection, ~~provisions of~~ used in the locations as specified in Section R304.1.
4. Naturally durable termite-resistant wood.
5. Physical barriers in accordance with Section R305.3 and used in locations as specified in Section R304.1.
6. Cold-formed steel framing in accordance with Sections R505.2.1 and R603.2.1.

Reason: The code currently directs the code user to Section R304.1 for preservative-treated wood requirements. This change proposal adds a direct reference to AWPA U1 for requirements for termite protection, including specific treatments for protection against Formosan termites. Preservative wood treatment requirements for termite protection may differ from the preservative treatment requirements for decay protection only. For consistency, the structure of the revised item #3 is modeled after item #5 to point to Section R304.1 for locations where preservative-treated wood is required.

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

Justification for no cost impact:

There are no technical changes proposed in this code change. A reference to AWPA U1 has been added for clarity.

RB87-25

RB88-25

IRC: R305.1

Proponents: Alexander Haldeman, representing James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Residential Code

SECTION R305
PROTECTION AGAINST SUBTERRANEAN TERMITES

Revise as follows:

R305.1 Subterranean termite control methods. In areas subject to damage from termites as indicated by Table R301.2, protection shall be by one, or a combination, of the following methods:

1. Chemical termiticide treatment in accordance with Section R305.2.
2. Termite-baiting system installed and maintained in accordance with the *label*.
3. Pressure-preservative-treated wood in accordance with the provisions of Section R304.1.
4. Naturally durable termite-resistant wood.
5. Physical barriers in accordance with Section R305.3 and used in locations as specified in Section R304.1.
6. Cold-formed steel framing in accordance with Sections R505.2.1 and R603.2.1.
7. Fiber-cement in accordance with Section R703.10

Reason: Fiber-cement compliant with ASTM C1186 is similarly durable to attack from subterranean termites as other products listed (e.g. "naturally durable termite-resistant wood" and "pressure-preservative-treated wood").This resistance to termite attack is also covered in fiber-cement manufacturer's warranties as shown in attached files.

Fiber-cement has also been recognized as a termite-resistant material per Practice 602.1.6 of ICC-700 - the National Green Building Standard (p. 50 of the standard, also attached is an example certificate showing compliance)

ICC-700 is available to view in the following locations:
ICCsafe.org (with appropriate subscription): https://codes.iccsafe.org/content/ICC7002020P1
NAHB's website (free with registration): https://www.nahb.org/forms/open/icc-700-2020-ngbs-signup
SIPA website PDF (Free to view): https://www.sips.org/documents/NAHB-National-Green-Building-Standard-2020.pdf

excerpt screenshots from warranties can be seen below:

structure to which Product is applied (each a "Covered Person").

2. ALLURA®'S OBLIGATIONS. If, during the Limited Warranty Period, the Product is determined not to meet the terms of the Limited Warranty because it was not manufactured in compliance with ASTM C1186, was not resistant to damage caused by hail or termite attacks, or was not free from manufacturing defects in material and workmanship (a "Warranty Defect"), Allura® will, in its sole discretion, either: (a) refund or provide replacement pieces of the defective portion of the Product, or (b) reimburse the Covered Person for up to twice the original retail cost of the defective portion of the Product. After the 30th year of the Limited Warranty Period, this Limited Warranty will expire and shall no longer be applicable. If the original retail cost cannot be established by the Covered Person to Allura®'s reasonable satisfaction, the retail cost

PESTS:

- Will not be damaged by termites or other wood-boring insects.
- Resists damage caused by woodpeckers.

additional information on the pest-resistant / termite-resistant properties of fiber-cement products can be found on example manufacturer's websites:

https://allurausa.com/blog/protecting-your-home-from-termites

https://www.nichiha.com/resilience

https://www.jameshardie.com/blog/siding-durability/prevent-damage-with-siding-that-doesnt-appeal-to-pests/

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

Justification for no cost impact:

Additional termite-resistant materials listed in this section (305.1) will certainly not increase cost of construction, and has potential to reduce costs if other similarly-resistant products are either unavailable or higher cost in that market.

RB88-25

RB89-25

IRC: SECTION R306 (New), R306.1 (New), R306.1.1 (New), R306.1.1.1 (New), R306.1.1.2 (New), R306.1.1.3 (New), R306.1.2 (New), R306.1.2.1 (New), R306.1.2.2 (New), R306.1.2.3 (New), TABLE R306.1 (New),R502.1.8 (New), R502.3.1 (New), R505.2.5.1 (New), R507.2.3, TABLE R507.2.3, R602.1.12 (New), R603.2.5.1 (New), R604.3.1 (New), R608.9.1, R608.9.4 (New), R610.3.4 (New), R703.3.3.1 (New), R704.2 (New), R802.1.8 (New), R803.2.3.1 (New), R804.2.5.1 (New), R905.2.5.1 (New), R905.3.7.1 (New), R905.4.5.1 (New), R905.5.5.1 (New), R905.6.6.1 (New), R905.10.4.1 (New), R905.12.3.1 (New), R905.15.5.1 (New), R905.16.6.1 (New), ASTM Chapter 44 (New)

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

2024 International Residential Code

Add new text as follows:

SECTION R306 CORROSION RESISTANCE - SALTWATER ENVIRONMENTS

R306.1 Fasteners and connectors exposed to saltwater environments. In *hurricane-prone regions*, fasteners and connectors in areas within 3,000 ft (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.1.1 and R306.1.2.

R306.1.1 Screws, bolts and nails. Screws, bolts and nails shall be corrosion resistant by composition, stainless steel or nonferrous metal, or by coating or galvanization as specified in this section and Table R306.1.

R306.1.1.1 Stainless steel. Where required by Table R306.1, fasteners shall be manufactured from ASTM A240 Type 304, Type 305 or Type 316 stainless steel.

R306.1.1.2 Galvanized. Where required by Table R306.1, fasteners shall be in accordance with the following:

1. For fasteners with diameters greater than 3/8 inch (9.5 mm), the minimum corrosion resistance shall comply with or be equivalent to ASTM A153, Class C.
2. For fasteners with diameters 3/8 inch (9.5 mm) and less, the minimum corrosion resistance shall comply with or be equivalent to one of the following methods:
   - 2,1. ASTM A153, Class D.
   - 2.2. ASTM A641, Class 3S.
   - 2.3. Corrosion resistance exhibiting not more than 5 percent red rust after 1,000 hours of exposure in accordance with ASTM B117.
   - 2.4. Corrosion resistance exhibiting not more the 5 percent red rust after 280 hours of exposure for nails, 1000 hours of exposure for roof tile fasteners or 360 hours of exposure for other carbon steel fasteners in accordance with ASTM G85, Annex 5.

R306.1.1.3 Compatibility. Fasteners used with connectors or other metal plates shall have a corrosion-resistant coating or composition that is compatible with the corrosion-resistant coating or composition of the connectors to prevent corrosion from galvanic action between dissimilar materials.

R306.1.2 Connectors and metal plates. Connectors and metal plates shall be corrosion resistant by composition, stainless steel or nonferrous metal, or by coating or galvanization as specified in this section and Table R306.1.

R306.1.2.1 Stainless steel. Where required by Table R306.1, connectors and metal plates shall be manufactured from ASTM A240 Type

316 stainless steel.

R306.1.2.2 Enhanced galvanizing. Where required by Table R306.1, connectors and metal plates shall be hot-dipped galvanized prior to fabrication to meet ASTM A653, Coating Designation G185, hot-dipped galvanized after fabrication to meet ASTM A123, or provided with a protective coating as specified by TPI 1.

R306.1.2.3 Standard galvanizing. Where required by Table R306.1, connectors and metal plates shall be hot-dipped galvanized prior to fabrication to meet ASTM A653, Coating Designation G90, hot-dipped galvanized after fabrication to meet ASTM A123, or provided with a protective coating as specified by TPI 1.

TABLE R306.1 CORROSION RESISTANCE OF FASTENERS AND CONNECTORS

Exposure Description[a]	Building Location			
	Less than or equal to 300 ft from saltwater coastline		Greater than 300 ft and up to 3000 ft from a saltwater coastline	
	Screws, bolts, lag screws, including nuts and washters, nails and glulam rivets	Connectors and metal plates	Screws, bolts, lag screws, including nuts and washters, nails and glulam rivets	Connectors and metal plates
Exterior-Partially Sheltered and Exterior-Open Exposed	Stainless Steel in accordance with Section R306.1.1.1	Stainless Steel in accordance with Section R306.1.2.1	Galvanized in accordance with Section R306.1.1.2	Galvanized in accordance with Section R306.1.2.2
Interior - Vented Enclosed	Galvanized in accordance with Section R306.1.1.2	Enhanced Galvanized in accordance with Section R306.1.2.2	Galvanized in accordance with Section R306.1.1.2	Enhanced Galvanized in accordance with Section R306.1.2.2
Interior - Unvented Enclosed	Galvanized in accordance with Section R306.1.1.2	Standard Galvanized in accordance with Section R306.1.2.3	Galvanized in accordance with Section R306.1.1.2	Standard Galvanized in accordance with Section R306.1.2.3

a. Exposure Descriptions:
Exterior-Partially Sheltered locations are areas where fasteners and connectors are exposed to salt air, but not exposed to fresh rainwater to remove accumulated salt.
Exterior-Open Exposed locations are areas where fasteners and connectors are exposed to salt air, but also exposed to rainwater to allow rinsing of the accumulated salt, and also more likely to dry after rain.
Interior-Vented Enclosed locations are those where fasteners and connectors inside a part of the building that also has vents to the outside environment that would allow salt air to enter.
Interior-Unvented Enclosed locations are those that are inside the building, but not in the conditioned space.

CHAPTER 5
FLOORS

R502.1.8 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R502.3.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R505.2.5.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

Revise as follows:

R507.2.3 Fasteners and connectors. Metal fasteners and connectors used for all decks shall be in accordance with Section R304.3 and Table R507.2.3. Holes for through bolts shall be drilled to a diameter of $^{1}/_{32}$ inch to $^{1}/_{16}$ inch larger than the bolt diameter. Connectors shall be installed in accordance with the manufacturer's *approved* instructions.In *hurricane-prone regions*, fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

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TABLE R507.2.3 FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKS[a, b]

ITEM	MATERIAL	MINIMUM FINISH/COATING	ALTERNATE FINISH/COATING [c]
Nails and glulam rivets	In accordance with ASTM F1667	Hot-dipped galvanized per ASTM A153, Class D or ASTM A641 Class 3S for $^3/_8$-inch diameter and less	Stainless steel, silicon bronze or copper
Bolts Lag screws (including nuts and washers)	In accordance with ASTM A307 (bolts), ASTM A563 (nuts), ASTM F844 (washers)	Hot-dipped galvanized per ASTM A153, Class C (Class D for $^3/_8$-inch diameter and less) or mechanically galvanized per ASTM B695, Class 55 or 410 stainless steel	Stainless steel, silicon bronze or copper
Metal connectors	Per manufacturer's specification	ASTM A653 type G185 zinc-coated galvanized steel or post hot-dipped galvanized per ASTM A123 providing a minimum average coating weight of 2.0 oz./ft^2 (total both sides)	Stainless steel

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Equivalent materials, coatings and finishes shall be permitted.

b. In *hurricane-prone regions*, fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306. Outside *hurricane-prone regions*, fasteners and connectors within 300 feet of a saltwater coastline shall be stainless steel.
~~Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.~~

c. Stainless-steel-driven fasteners shall be in accordance with ASTM F1667.

CHAPTER 6
WALL CONSTRUCTION

Add new text as follows:

R602.1.12 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R603.2.5.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R604.3.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

Revise as follows:

R608.9.1 Connections between concrete walls and light-frame floor, ceiling and roof systems. Connections between concrete walls and light-frame floor, ceiling and roof systems using the prescriptive details of Figures R608.9(1) through R608.9(12) shall comply with this section and Sections R608.9.2, ~~and~~ R608.9.3 and R608.9.4.

Add new text as follows:

R608.9.4 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

Exception: One-half inch (12.7 mm) diamter or greater steel bolts.

R610.3.4 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

CHAPTER 7
WALL COVERING

R703.3.3.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R704.2 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

CHAPTER 8
ROOF-CEILING CONSTRUCTION

R802.1.8 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R803.2.3.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R804.2.5.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

CHAPTER 9
ROOF ASSEMBLIES

R905.2.5.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R905.3.7.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R905.4.5.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R905.5.5.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R905.6.6.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R905.10.4.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R905.12.3.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R905.15.5.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914 m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

R905.16.6.1 Fasteners and connectors exposed to saltwater environments. Fasteners and connectors in areas within 3,000 feet (914

m) of a saltwater coastline, or other areas subject to salt corrosion, shall comply with Section R306.

Add new standard(s) as follows:

ASTM

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

B117-19	Standard Practice for Operating Salt Spray (Fog) Apparatus
G85-19	Standard Practice for Modified Salt Spray (Fog) Testing

Reason: Post-disaster assessments of wood-framed buildings following natural hazard events such as high winds, floods, and earthquakes have revealed that structural failures frequently occur at connections rather than in framing members. In coastal areas, where higher moisture and humidity levels exist and buildings are exposed to salt spray, corroded metal connectors and fasteners have been observed to contribute to the loss of an adequate load path. The loss of an adequate load path often results in damage to or failure of the structure.

This proposal is based on the corrosion resistance requirements in ICC 600-2020 and is also consistent with the requirements for an IBHS FORTIFIED designation. The FORTIFIED Home™ program was developed to reduce avoidable suffering and financial loss caused by hurricanes, high winds, and hail. The program requirements provide a systems-based, multi tiered approach for improving the resistance of homes and their contents to damage caused by wind, wind-driven rain, and hail. There are three designation levels—FORTIFIED Roof™, FORTIFIED Silver™, and FORTIFIED Gold™—that build on each other and address different systems of the home.

While ICC 600-2020 is referenced in Section R301.2.1.1, it is not required by the code and therefore not mandatory for buildings goverend by the IRC.

Research has shown that fasteners and connectors near the coastline exhibit corrosion where they are readily exposed to salt air and humidity, particularly if they are in a partially sheltered location where the salt is not washed off by rain. While the proposed IRC table is adapted from ICC 600-2020 Section 505.3, the ICC 600 requirements and this proposal are based on the recommendations in the FEMA NFIP Technical Bulletin (TB) 8, Corrosion Protection for Metal Connectors and Fasteners in Coastal Areas in Accordance with the National Flood Insurance Program (June 2019). TB 8 can be viewed and downloaded at https://www.fema.gov/sites/default/files/2020-07/tb8-corrosion_protection_metal_connectors_coastal_areas.pdf.

Metal connectors and fasteners are important elements in transferring loads from natural hazards (e.g., flood, wind, seismic) through a building. Corrosion rates for metal are dramatically higher in coastal environments than in less harsh, non-coastal environments as illustrated below by severely corroded deck connectors (FEMA P-55, Coastal Construction Manual, Figure 14-3). Therefore, it is important to increase the corrosion protection for metal connectors and fasteners in coastal environments. Studies have shown that stainless steel and thick hot-dip galvanized (G185 or higher) metal connectors and fasteners improve corrosion protection.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The overall cost of replacing uncoated connectors and fasteners with corrosion-resistant connectors and fasteners will vary depending on type and number of connectors and fasteners needed for any specific situation. Generally, the cost of fasteners and connectors, whether uncoated, galvanized, or stainless, are small percentage of the overall cost of a particular job.

At one building supplies retailer, the cost for a box of 4000 3-inch uncoated common nails was $100.00. The cost for a box of 4000 3-inch galavanized common nails was $150.00. For a typical 2000 square foot roof, the approximate number fasteners required to attach a wood structural panel roof deck would be 2,813. The cost per uncoated nail is $0.025. The cost per galvanized nail is $0.0375. The use of galvanized nails over uncoated nails in this example works out to a cost increase of about $35.00.

At a separate retailer, the cost for a box of 304 stainless steel 2 1/2-inch ring shank nails was $16.97 ($0.056 per nail). The cost for a box 99 galvanized 2 1/2-inch ring shank nails was $7.98 ($0.08 per nails). For this example, the stainless steel nails are less than a similar galvanized nail. These fasteners are from the same manufacturer.

At another building supplies retailer, the cost for a box of 62 stainless steel 10x2 1/2" deck screws was $21.98 ($0.35 per screw). The cost for a box of 110 galvanized 10x2 1/2" deck screws was $9.98 ($0.09 per screw). For a 300 square foot deck, the approximate number fasteners required to attached the deck boards would be 1,227 screws. The use of stainless steel screws over galvanized screws in this example works out to a cost increase of about $319.00. This example is provided to demonstrate the potential immediate cost impact resulting from increasing corrosion protection from galvanized to stainless steel fasteners but it should be noted that exterior decks within 300' of saltwater shorelines are already required to use stainless steel fasteners and connectors in accordance with 2024 IRC Section R507.2.3.

Although this code change proposal will increase costs, the additional costs are modest and will significantly reduce the likelihood of failure under anticipated wind loads, and thus will decrease future costs associated with repairs and rebuilding after high wind events.

Estimated Immediate Cost Impact Justification (methodology and variables):

Information in the estimated cost impact was obtained by discussion with a metal connector and fastener manufacture in addition to cost surveys at a couple of building supplies retailers.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.

UL B117-19 Standard Practice for Operating Salt Spray (Fog) Apparatus
UL G85-19 Standard Practice for Modified Salt Spray (Fog) Testing

RB89-25

RB90-25

IRC: R306.1.8, ASTM Chapter 44 (New)

Proponents: Rebecca Quinn, RCQuinn Consulting, representing Association of State Floodplain Managers (rebecca@rcquinnconsulting.com); Chad Berginnis, representing Association of State Floodplain Managers (cberginnis@floods.org)

2024 International Residential Code

SECTION R306
FLOOD-RESISTANT CONSTRUCTION

Revise as follows:

R306.1.8 Flood-resistant materials. Building materials and installation methods used for flooring and interior and exterior walls and wall coverings below the elevation required in Section R306.2 or R306.3 shall be flood damage-resistant materials that conform to the provisions of FEMA TB-2 or flood damage-resistant materials that conform to the provisions of ASTM E3075 and ASTM E3369.

Add new standard(s) as follows:

ASTM

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

E3075-24	Standard Test Method for Water Immersion and Drying for Evaluation of Flood Damage Resistance
E3369-24	Standard Specification for Determining the Flood Damage Resistance Rating of Building Materials

Reason:

This proposal expands the references cited in the IRC for contractors, designers, and local officials to use to determine which materials are flood damage-resistant materials. The IRC requires that flood damage-resistant materials are used below the elevation to which buildings must be elevated when they are located in flood hazard areas. The IBC requires the same, by reference to the standard ASCE 24.

For many years, the only source of information on flood damage-resistant materials has been FEMA Technical Bulletin 2, Flood Damage-Resistant Materials Requirements. TB 2 is already referenced in the IRC. FEMA reissued a new edition of TB 2 in 2024. The new edition is included in the standards promulgator proposal to update standards that are already referenced in the code.

The proposal allows use of materials that may not be explicitly listed in TB 2, or that may be listed but have been tested and evaluated and found to meet the expectation for resisting flood damage. Over the past several years, FEMA has reported on its work with the ASTM to develop the two new standards proposed to be included in the IRC. ASTM E3075 is used for immersion and drying of the test sample, and ASTM E3369 is used for evaluating and determining the flood damage-resistance of the test sample.

Cost Impact: The 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 offers an alternative standard to meet existing requirements in the code. There is no change to the technical content of the provisions, just an additional option to meet the provisions. By adding an alternative standard there will be no cost impact when approving this proposal.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
ASTM E3075-24 Standard Test Method for Water Immersion and Drying for Evaluation of Flood Damage Resistance
ASTM E3369-24 Standard Specification for Determining the Flood Damage Resistance Rating of Building Materials

RB90-25

RB91-25

IRC: R306.2.2.1, FIGURE R306.2.2.1 (New)

Proponents: Scot Harris, Preston Wood & Associates, LLC. Jack Preston Wood AIBD/NCBDC, representing self (scot@jackprestonwood.com)

2024 International Residential Code

SECTION R306 FLOOD-RESISTANT CONSTRUCTION

Revise as follows:

R306.2.2.1 Installation of openings. The walls of enclosed areas shall have openings installed such that:

1. ~~There shall be not less than two openings on different sides of each enclosed area; if a *building* has more than one enclosed area, each area shall have openings.~~ Flood relief openings shall be located as follows:

   See Figure R306.2.2.1 for additional information.

   1.1. Flood relief openings where permitted as indicated in Tables R302.1(1) or R302.1(2).

   1.2. Flood relief openings shall be made of non-combustible material when the opening is facing to and less than 5 feet (1524 mm) to a property line or facing to and less than 5 feet (1524 mm) to an imaginary property line as described in Section R302.

   1.3. There shall not be less than two flood relief openings per enclosed space where the openings are placed on different exterior wall segments. The flood relief openings shall be arranged diagonally to the enclosed space, or as design permits.

   1.4. Where a dwelling unit has more than one enclosed space, each enclosed space shall have a minimum of two flood relief openings installed as described in Item 1.3.

   1.5. Where an interior cripple wall is introduced in an enclosed space, the cripple wall shall have adequate openings to allow for passage of water. See Figure R306.2.2.1, “Unit A”.

   1.6. Flood relief openings are prohibited in a fire-resistive assembly that separates attached dwelling units.

   1.7. Flood relief openings in separation walls between enclosed spaces:

      1.7.1. The larger enclosed space requires flood relief openings in the separation wall.The total number of flood relief openings to be placed on all exterior walls shall be determined by the sum of the abutting spaces where the smaller enclosed space satisfies the total number of openings for that space without openings placed in the separation wall. The separation wall shall be fitted with additional flood relief openings that will satisfy the total number of required openings for the larger enclosed space. The ratio of separation wall openings to exterior wall openings for the larger enclosure shall be no greater than twenty five percent. See Figure R306.2.2.1, “Unit B”.

      1.7.2. The smaller enclosed space requires flood relief openings in the separation wall.Where the smaller enclosure requires flood relief openings in the separation wall, the intervening space that will provide the relief shall provide one flood relief opening on the exterior wall for every flood relief opening in the separation wall between the enclosed spaces. The flood relief opening on the exterior wall shall be of equal or greater capacity to the flood relief opening between enclosed spaces. See Figure R306.2.2.1, “Unit C”.

   1.8. Additional installation requirements as indcated in Section R306.2.2.2.

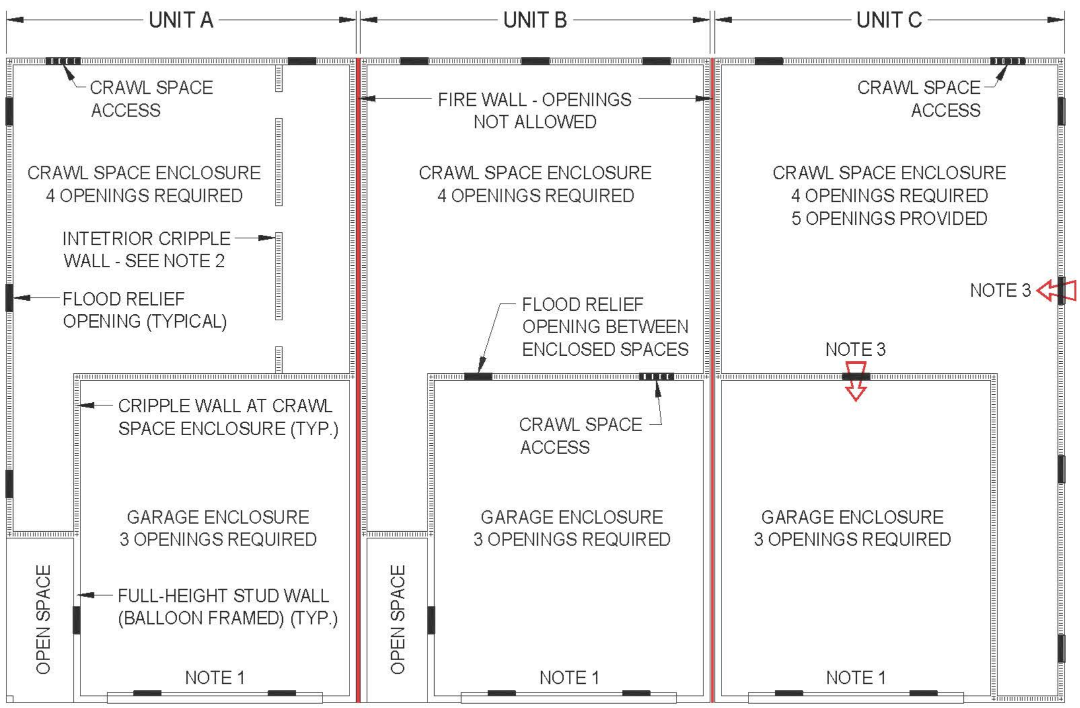
2. The bottom of each opening shall be not more than 1 foot (305 mm) above the higher of the final interior grade or floor and the finished exterior *grade* immediately under each opening.

3. Openings shall be permitted to be installed in doors and windows; doors and windows without installed openings do not meet the requirements of this section.

Exceptions:

1. Where it can be shown that the walls enclosing a crawl space are placed at or above the design flood elevation and the crawl space floor is below the design flood elevation, the following requirements shall apply:
   1.1. Where the crawl space has openings)that will provide unobstructive gravitational surface conveyance to the outside, flood relief openings along the enclosing walls are not required.
   1.2. Where the crawl space is at or up to 12 inches (304.8 mm) below the adjacent exterior grade, and the crawl space employs an underground drainage system, the crawl space shall be designed for flood relief openings along the enclosing walls as indicated in Section R306.2.2.
2. Where it can be shown that the walls enclosing a garage are placed at or above the design flood elevation and the vehicle parking area is below the design flood elevation, flood relief openings are not required.

Add new text as follows:



Notes:
1. Two (2) flood relief openings are provided on the overhead door.
2. Where an interior cripple wall is part of the enclosure, the cripple wall shall have adequate openings to allow for passage of water.
3. One additional opening shall be provided along the exterior wall for the intervening space receiving flood relief from the adjacent enclosure.

FIGURE R306.2.2.1 - DIAGRAMMATIC FLOOD RELIEF OPENING AND CRAWL SPACE ACCESS LOCATIONS FOR TOWNHOUSES

FIGURE R306.2.2.1 DIAGRAMMATIC FLOOD RELIEF OPENING AND CRAWL SPCE ACCESS LOCATIONS FOR TOWNHOUSES

Reason: Interpretations occur when there are no written definitions to the proposed situation, or the current code wording is too generalized.

The reason for this proposal is to:

1. More clearly define flood relief opening horizontal placement along exterior walls,
2. Define placement of flood relief openings in a separating wall between enclosures and
3. Provide clarification to some real-world situations I have encountered for projects requiring flood relief openings.

Interpretation Example:

See Exhibit 1.

The left diagram satisfies the wording as shown in Section R306.2.2.1, Item 1. By rewording R306.2.2.1, Item 1, flood relief openings are more properly spaced around the enclosure as shown in the right diagram.

See Exhibit 2

No written definitions available in the current code that states this geometry is prohibited. The geometry shown in this exhibit is a diagrammatic recreation of an actual design by others I have encountered.

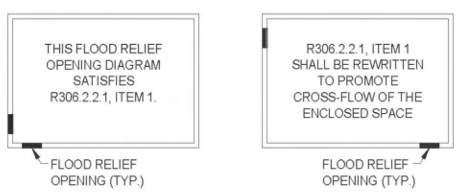


Exhibit 1: Diagrammatic Flood Relief Interpretation

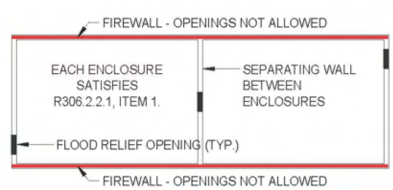


Exhibit 2: Diagrammatic Flood Relief Interpretation (continued)
Each enclosure requires two flood relief openings.
Each enclosure as shown satisfies R306.2.2.1, Item 1.
The sum of the flood relief openings along the exterior walls does not satisfy the sum of the enclosures.

Background:

Our primary architectural product is for use in urban settings. The product has an attached garage with a fire-resistive exterior wall on at least one side of the dwelling. Where we employ this product on a tract of land located in a flood-prone area, the placement of flood relief openings is limited to two exterior walls or, in some instances, one exterior wall for the garage enclosure.

I have seen other design and engineering firms design for flood relief openings where an opening is placed in the separating wall between enclosures. Both enclosures satisfy the required opening areas. However, the sum of the required flood relief openings located on the exterior walls <u>does not</u> satisfy the sum of the enclosed area minimum requirements. Currently there is no code wording to address this situation.

Recommendations:

Line items 7.1.1 and 7.1.2 in the proposal are open for review. Where there is a middle unit of a townhouse project, flood relief opening locations per enclosure is not able to satisfy the wording as currently shown in Section R306.2.2.1, Item 1. Stand-alone and two-dwelling unit urban products may also require referencing this proposed 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:

By reducing interpretations of the code wording, the builder, contractor, architectural firm, structural engineering firm, and permit reviewer will now have the same information available as the interpretating building official. Completion of the dwelling will not be delayed.

RB91-25

RB92-25

IRC: R306.2.2.2 (New), R306.2.2.2.1 (New), R306.2.2.2.2 (New)

Proponents: Scot Harris, Preston Wood & Associates, LLC. Jack Preston Wood AIBD/NCBDC, representing self (scot@jackprestonwood.com)

2024 International Residential Code

SECTION R306
FLOOD-RESISTANT CONSTRUCTION

Add new text as follows:

R306.2.2.2 Cripple wall opening protection between enclosed areas. Cripple walls separating the garage enclosure from the crawl space enclosure shall not have openings unless the openings are installed in accordance with Sections R306.2.2.2.1 and R306.2.2.2.2.

R306.2.2.2.1 Crawl space access. Openings between the garage and the *crawl space* under the dwelling unit shall be equipped with solid wood doors not less than 1-3/8 inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than 1-3/8 inches (35 mm) thick, or 20-minute fire-rated doors. Doors shall be self-latching and equipped with a self-closing or automatic-closing device.

R306.2.2.2.2 Flood relief openings. Flood relief openings shall comply with the following:

1. Flood relief openings between the garage and the *crawl space* under the dwelling unit space shall be made of non-combustible material and be equipped with a UL-listed fire damper attachment.
2. Flood relief openings between the garage and the sunken *dwelling unit* space shall be made of non-combustible material, be insulated, and be equipped with a UL-listed fire damper attachment.

Reason: The continuity of the separating wall between an attached garage and the dwelling unit space as shown in Section R302.5.1 is compromised when an unprotected wall opening is introduced between the attached garage and the crawl space enclosure beneath the dwelling unit space. This proposal establishes the maintaining of separation wall continuity between an attached garage and the dwelling unit.

Background:

Our primary architectural product is for use in urban settings. The product has an attached garage with a fire-resistive exterior wall on at least one side of the dwelling. Where we employ this product on a tract of land located in a flood-prone area, the placement of flood relief openings is limited to two exterior walls or, in some instances, one exterior wall for the garage enclosure. To satisfy the requirements as shown in Section R306.2.2.1, flood relief openings will need to be installed in the cripple wall separating the garage enclosure from the crawl space enclosure under the dwelling unit.

Recommendation:

This proposal originally written for Section R302.5 but has since relocated and proposed for Section R306. If you feel this proposal is more appropriate for R302.5, then please adjust the proposed section numbering above.

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

Justification for no cost impact:

By reducing interpretations of the code wording, the builder, contractor, architectural firm, structural engineering firm, and permit reviewer will now have the same information available as the interpretating building official.

RB92-25

RB93-25

IRC: R306.2.2.3 (New)

Proponents: Scot Harris, Preston Wood & Associates, LLC. Jack Preston Wood AIBD/NCBDC, representing self (scot@jackprestonwood.com)

2024 International Residential Code

SECTION R306
FLOOD-RESISTANT CONSTRUCTION

Add new text as follows:

R306.2.2.3 Installation of floor drains. Where an enclosed space requires flood relief openings, and the enclosed space floor has one or more floor drains connected to an underground detention or outfall system, and the connector pipe from the floor drain to the detention or outfall system does not have a back flow preventer valve, the net flow rate of the floor drain can be included as part of the engineered and non-engineered openings as required by Section R306.2.2, Item 2.1 provided the system provides for gravitational drainage. Sump pump systems do not qualify as part of this requirement.

Reason: Slab on Grade with perimeter curbs around the enclosure and Open to Grade with perimeter beams around the enclosure are part of the design where a jurisdiction requires mitigation to demonstrate “Net Zero Fill” of the flood waters. The perimeter curbs and beams are a result of Section R404.1.6. Civil engineer design may set the enclosure floor at or below the adjacent exterior grade. Floor drains will be required.

The primary concern here is equalizing hydrostatic forces on the exterior walls. Much attention has been addressed in the code publication to demonstrate the net size of openings, horizontal placement of openings, and vertical placement of openings, but no consideration is given for floor drains and the role they will play when equalizing hydrostatic forces.

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

Justification for no cost impact:

Civil engineer design dictated the use of floor drains to satisfy jurisdictional requirements. Flood relief openings in an enclosure wall may be reduced.

RB93-25

RB94-25

IRC: R306.2.2.4 (New)

Proponents: Scot Harris, Preston Wood & Associates, LLC. Jack Preston Wood AIBD/NCBDC, representing self (scot@jackprestonwood.com)

2024 International Residential Code

SECTION R306
FLOOD-RESISTANT CONSTRUCTION

Add new text as follows:

R306.2.2.4 Mix of engineered and non-engineered flood relief openings. Mix of engineered and non-engineered flood relief openings are not permitted for a single enclosure. Where there are multiple enclosures and at least one enclosure wall is shared by each enclosure, each enclosure shall have only one type of flood relief opening with no flood relief openings in the shared enclosure wall.

Reason: This proposal is for dwellings that have an attached garage and crawl space. The garage enclosure may have insulated flood relief openings - which requires engineered openings, while the crawl space employs non-engineered openings (lattice included).

This proposal is to clarify the use of engineered and non-engineered flood relief openings per enclosure and to reduce interpretations.

There may be a situation where there is not enough linear wall to add non-engineered openings and the owner or a representative of the owner, to minimize the cost of construction, uses one engineered opening and makes up for the rest by providing non-engineered openings.

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

Justification for no cost impact:

Engineered flood relief openings cost more than non-engineered. However, more non-engineered openings are required that will offset the cost.

RB94-25

RB95-25

IRC: R306.2.3 (New), R306.2.3, R306.2.3.2 (New), R404.1.1, R404.1.2.2 (New)

Proponents: Rebecca Quinn, RCQuinn Consulting, representing Association of State Floodplain Managers (rebecca@rcquinnconsulting.com); Chad Berginnis, representing Association of State Floodplain Managers (cberginnis@floods.org)

2024 International Residential Code

SECTION R306
FLOOD-RESISTANT CONSTRUCTION

Add new text as follows:

R306.2.3 Foundation design and construction. In flood hazard areas, foundation walls for *buildings* and structures shall meet the requirements of Section R306.2.3.1 or R306.2.3.2.

Revise as follows:

~~**R306.2.3**~~ **R306.2.3.1** ~~**Foundation design and construction**~~ **Non-coastal flood source.** ~~Foundation walls for *buildings* and structures erected in flood hazard areas shall meet the requirements of Chapter 4.~~In flood hazard areas where the source of flooding is determined as non-coastal originating from riverine waterways, lakes, and areas where floodwaters collect, foundation walls for *buildings* and structures shall meet the requirements of Chapter 4.

Exception: Unless designed in accordance with Section ~~R404~~ R404.1.2:

1. The unsupported wall height of 6-inch (152 mm) plain masonry walls shall be not more than 3 feet (914 mm).
2. The unsupported wall height of 8-inch (203 mm) plain masonry walls shall be not more than 4 feet (1219 mm).
3. The unsupported wall height of 8-inch (203 mm) reinforced masonry walls shall be not more than 8 feet (2438 mm).

For the purpose of this exception, the unsupported wall height is the ~~distance from the finished grade of the under floor space to the~~ difference in height between ~~to~~ the top of the foundation wall and the top of the concrete footing that supports the foundation wall.

Add new text as follows:

R306.2.3.2 Coastal flood source. In flood hazard areas where the source of flooding is determined as coastal originating from oceans, gulfs, bays, and large lakes, not including coastal high hazard areas and Coastal A Zones, foundation walls for buildings and structures shall meet the requirements of Section R404.1.2.2.

Exception: Foundation walls designed in accordance with Section R404.1.2.

SECTION R404
FOUNDATION AND RETAINING WALLS

Revise as follows:

R404.1.1 Design required. Concrete or masonry foundation walls shall be designed in accordance with accepted engineering practice where one or more ~~either~~ of the following conditions exists:

1. Walls are subject to hydrostatic pressure from ground water.

2. Walls supporting more than 48 inches (1219 mm) of unbalanced backfill that do not have permanent lateral support at the top or bottom.
3. Walls in flood hazard areas that do not conform to Section R306.2.3 or Section R404.1.2.2.

Add new text as follows:

R404.1.2.2 Flood hazard areas. In flood hazard areas where the source of flooding is determined as coastal originating from oceans, gulfs, bays, and large lakes, not including coastal high hazard areas and Coastal A Zones, concrete masonry and clay masonry foundation walls for buildings and structures shall be constructed as set forth in Table R404.1.2.2 and shall comply with the applicable provisions of Section R606.

R404.1.2.2 8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d >= 5 INCHES[a, b]

MAXIMUM UNSUPPORTED WALL HEIGHT[c]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (INCHES)[d]
2 feet 0 inches	#4 at 72
2 feet 8 inches	#4 at 40 or #5 at 56
3 feet 4 inches	#4 at 24 or #5 at 48
4 feet 0 inches	#4 at 24 or #5 at 40
4 feet 8 inches	#4 at 16 or #5 at 32
5 feet 4 inches	#4 at 16 or #5 at 32
6 feet 0 inches	#4 at 16 or #5 at 32
6 feet 8 inches	#4 at 16 or #5 at 24
7 feet 4 inches	#4 at 16 or #5 at 24
8 feet 0 inches	#4 at 16 or #5 at 24
8 feet 8 inches	#4 at 16 or #5 at 24
9 feet 4 inches	#4 at 16 or #5 at 24
10 feet 0 inches	#4 at 8 or #5 at 16

a. Applicable in flood hazard areas where the source of flooding is determined as coastal originating from oceans, gulfs, bays, and large lakes, not including coastal high hazard areas and Coastal A Zones.
b. Vertical reinforcement shall be Grade 60 minimum. The distance, d, from the face of the outer side of the wall to the center of vertical reinforcement shall be not less than 5 inches.
c. Unsupported wall height is the difference in height between the top of foundation wall and the top of the concrete footing that supports the foundation wall.
d. Where unbalanced fill conditions exist, the vertical reinforcement shall be the greater of that required by this table or Table R404.1.2.1(2).

Reason: This code change proposal seeks to update the foundation wall requirements for flood hazard areas to meet the standards currently referenced in the 2024 IRC and to address foundation wall failures documented in Federal Emergency Management Agency (FEMA) Mitigation Assessment Team (MAT) Reports. Flood hazard area requirements for enclosed areas, including crawl spaces, located below the required minimum elevations are provided in Section R306.2.2.

Prescriptive solutions for masonry foundation walls in flood hazard areas that are not designated as coastal high hazard areas (Zones V) or Coastal A Zones (CAZs), are provided in Section 306.2.3. This proposal does not change elevation requirements for buildings in flood hazard areas. Instead, it modifies the current prescriptive masonry foundation wall solutions to resist minimum flood and wind loads on sites subject to coastal flooding.

IRC Section R306.2.3 permits construction of masonry foundation walls in flood hazard areas per Section R404 with height restrictions on plain masonry and 8” reinforced masonry walls. The wall height limitations in Section R306.2.3 are based on analyses performed in 1998 for a range of flood depths and flood velocities. FEMA examined those limitations in 2012 after observing foundation wall damage from Hurricane Sandy. The requirements were re-examined following the 2022 Group B Committee Action Hearings with input provided by industry groups, including National Concrete Masonry Association (NCMA) and American Concrete Institute (ACI), to reconsider earlier assumptions and to account for changes resulting from updates to referenced standards.

Foundation walls in flood hazard areas may be susceptible to hydrostatic forces (addressed by the requirement for flood openings in R306.2.2) and hydrodynamic forces imposed by moving water and moderate breaking wave loads on vertical walls with wave heights not greater than 1 ½ feet (see R306.2, if areas subject to wave heights between 1 ½ and 3 feet are delineated, they are designated “Coastal A Zones” and must comply with Section R306.3). FEMA evaluated the structural capacity of 8" masonry walls of variable heights to a range of velocities (for riverine-sourced flooding) and a range of wave heights (for coastal-sourced flooding) to determine whether the current IRC solutions could resist the minimum loads. Key assumptions in the current analyses include:

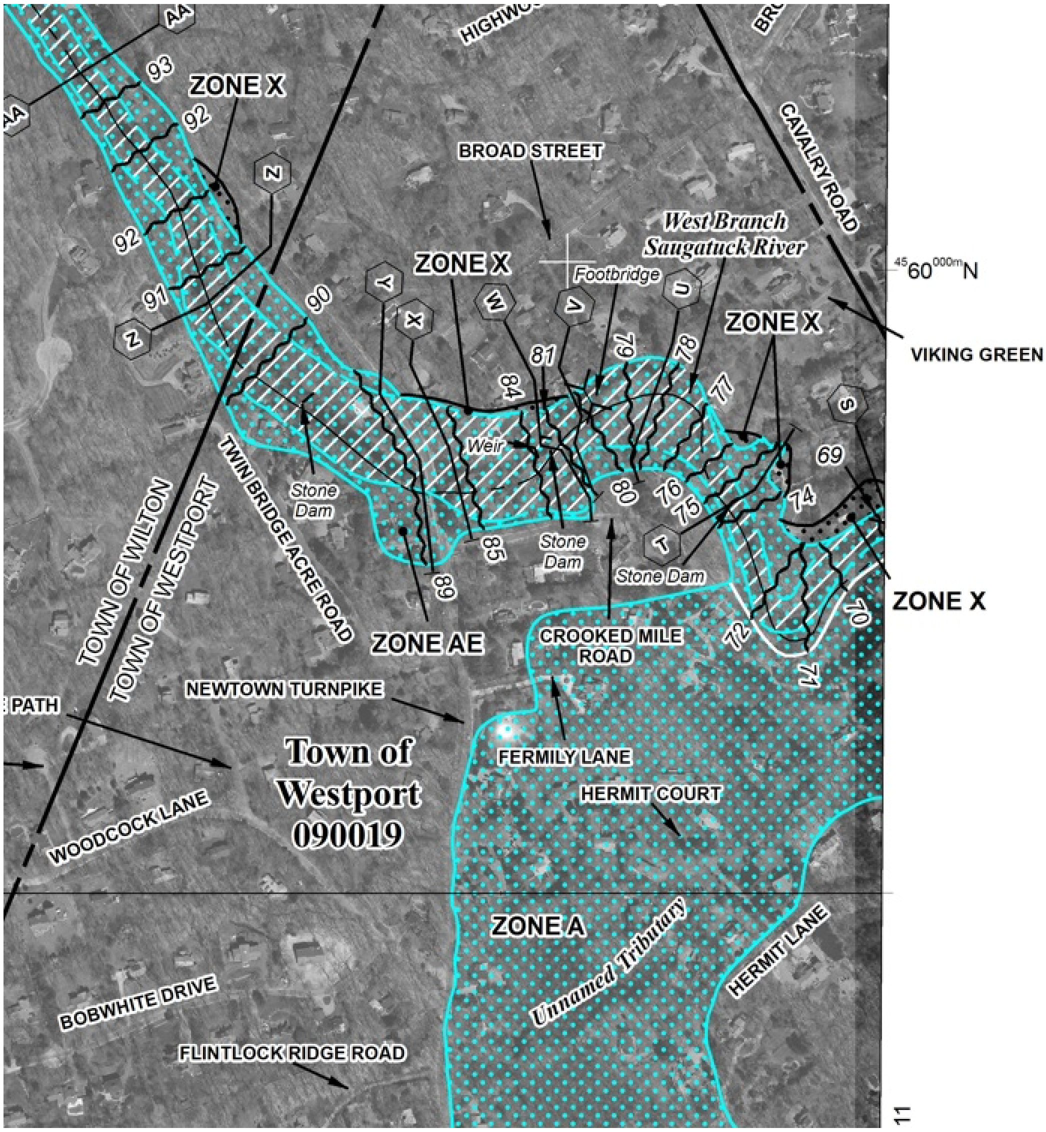
1. 1- story wood-framed residential structure supported on masonry foundation walls with flood openings installed per IRC Section R306.2.2.
2. Top of foundation wall braced by elevated floor system.
3. Material properties used to determine wall resistances are in accordance with standards referenced in the 2024 IRC.
4. For analysis of wall resistance to hydrodynamic loads, the maximum flood velocity evaluated is 9 fps with flood depth set equal to wall height.
5. For analysis of wall resistance to breaking wave loads, the maximum breaking wave height is 1.5 feet and the minimum design wind load (16 psf per ASCE 7-22 Section 30.2.2) is applied above the stillwater depth. (Note that for areas without designated Coastal A Zones, the breaking wave heights can be as high as 3 feet)
6. All loads were determined using Allowable Stress Design (ASD) Load Combination 7b in non-coastal A-Zones (not Zones V or CAZ) per ASCE 7-22 Section 2.4.2.

The analyses concluded that current solutions provided in Section R306.2.3 are sufficient for hydrostatic and hydrodynamic loading when flood openings are installed in accordance with Section 306.2.2 such that floodwaters of equal elevation are present on both sides of the foundation walls for sites without coastal sources of flooding causing wave loads. However, for sites with coastal sources of flooding, the analyses indicate that even small breaking wave loads induced failure across the current prescriptive solutions and increased reinforcement as provided in proposed Table R404.1.2.2 is necessary to resist the minimum required loads.

The Hurricane Sandy in New Jersey and New York MAT Report (FEMA P-962) included observations of shallow masonry foundation wall failures, including the example shown below. As noted in the report, the destroyed Union Beach, New Jersey residence was located in flood hazard area Zone A, elevated on a masonry wall foundation, and appeared to be no more than a few years old. All of the remaining masonry wall sections shown scattered across the site appear to be unreinforced. Although the report cannot conclude the sequence of failure, the example illustrates the vulnerability of unreinforced masonry walls in areas subject to coastal sources of flooding.

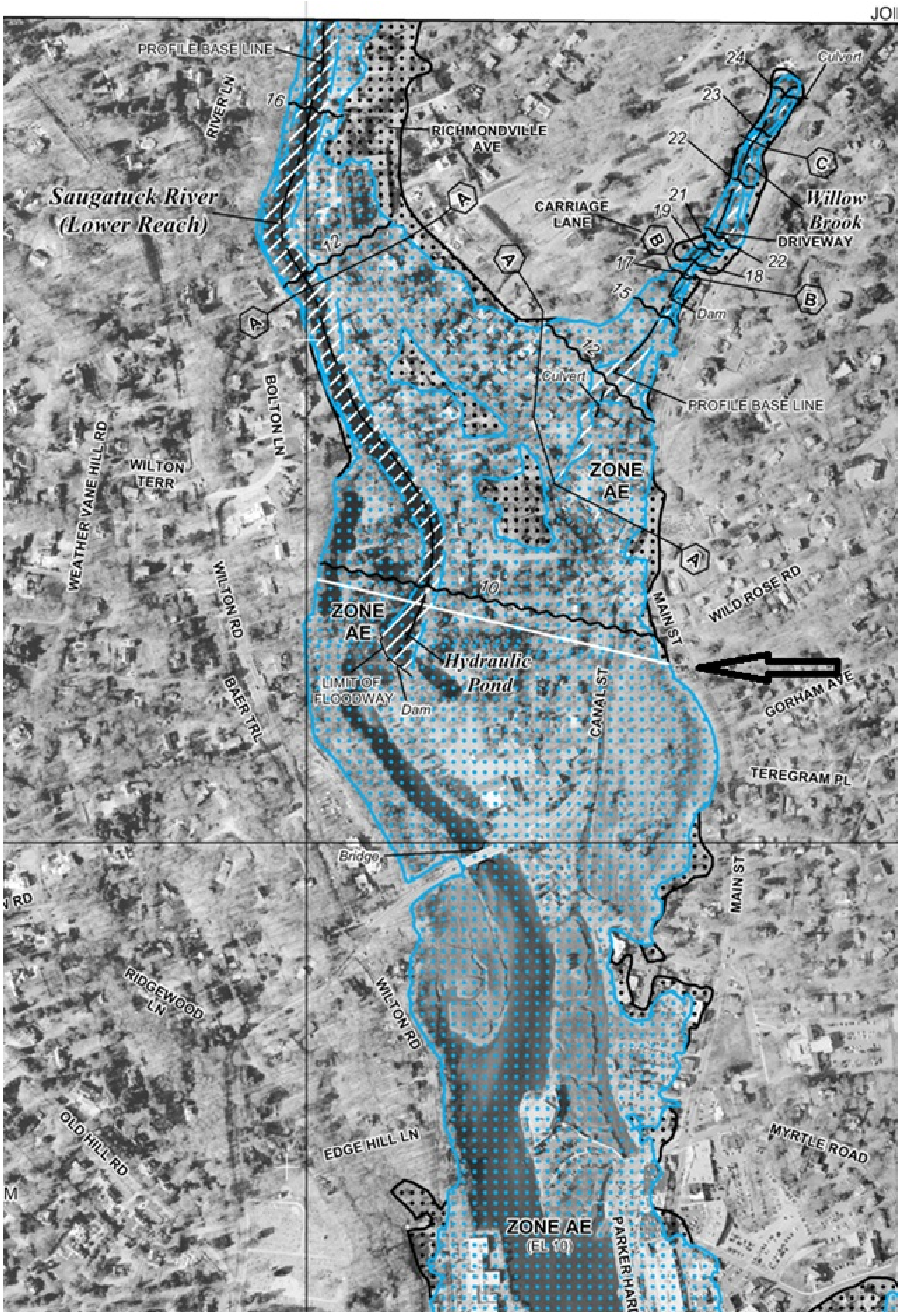
As a result of failed foundation wall observations, the Sandy MAT Report recommended (see Recommendation 22, Propose changes to the I-Codes) that FEMA should propose changes to the I-codes including, “Remove prescriptive provisions allowing unreinforced masonry foundation walls for new construction in Zone A.”

This proposal requires users to distinguish between coastal and non-coastal sources of flooding for flood hazard areas other than coastal high hazard areas and Coastal A Zones. Sources of flooding may be obvious based on geographic location, such as in states with no coastal or Great Lakes shorelines. However, where there are questions about the sources of flooding, the FEMA Flood Insurance Studies readily provide information as to whether riverine or coastal flood analyses was used to develop the Flood Insurance Rate Map. Flood Insurance Rate Maps look different for coastal and non-coastal sources of flooding (see map examples below). In areas where sources of flooding may be both coastal and non-coastal, such as near the mouth of a river where it meets the coast, maps show a “limit of study” where there is a distinct line between riverine and coastal analysis types (see map example). An area adjacent to a creek or riverine waterway may still be modeled as coastal source flooding where the coastal source flooding dominates (see Figure 2, Charles Creek is located within a coastal source flooding Zone AE).



1 – Non-coastal source of flooding is depicted as a series of elevations along the waterway for Zone AE with BFE, otherwise labeled as Zone A (no associated elevation). Base flood elevation is interpolated between elevation lines.

2-Coastal source of flooding is depicted as areas with a single base flood elevation for each area shown in parentheses under the Zone AE or Zone VE labels.



3- “Limit of study” is shown on this FIRM as a thick white line to distinguish between coastal and non-coastal analyses on the map (black arrow added for emphasis)

Cost Impact: Increase

Estimated Immediate Cost Impact:

Where required, additional materials and labor costs for most masonry foundation walls should average between approximately $1.00 (2 feet high) and $0.84 (6 feet high) per square foot of foundation wall surface area when compared to unreinforced 8" masonry (for 2' high walls) or lesser reinforced 8" masonry (as required for 6' high walls per Section R323.2.3).

Total costs for individual residences will vary linearly according to the foundation enclosure’s perimeter wall length and nonlinearly according to wall height since reinforcement requirements increase with wall height. The following total cost examples are based on the 60’x30’ wood-framed residence (180’ long perimeter wall) used to model flood load resistance for this proposal. For 2’ high masonry foundation walls requiring #4 bar at 72” on center, the cost increase over unreinforced masonry would average approximately $1.00 per square foot ($13.47 vs. $12.47). The total wall surface area is 360 square feet for a total cost increase of approximately $360. For a 6' high wall requiring #5 bar at 32" on center, the cost increase over the current requirements for 8" masonry with #4 bar at 48" on center (per Section R306.2.3 and Table R404.1.2.1(2)) would average approximately $0.84 per square foot ($14.80 vs. $13.96) for a total cost increase of approximately $907.

This code change proposal will increase the cost of construction for a limited set of perimeter wall foundations in flood hazard areas with coastal sourced flooding, not including Zones V or CAZ. But the additional costs are modest and will significantly reduce the likelihood of failure under anticipated flood loads, and thus will decrease future costs associated with repairs and rebuilding after flood and flood/high wind events.

Estimated Immediate Cost Impact Justification (methodology and variables):

Estimates are based on 8"x8"x16" hollow concrete masonry units having no core fill and a compressive strength of 2000 psi as provided by 2024 RSMeans Construction Costs Index.

RB95-25

RB96-25

IRC: R306.3.6.1

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2024 International Residential Code

SECTION R306
FLOOD-RESISTANT CONSTRUCTION

Revise as follows:

R306.3.6.1 Protection of building envelope. <u>A solid wood or composite door not less than 1-3/8 inches (35 mm) nominal in thickness, a solid or honeycomb-core steel door not less than 1-3/8 inches (35 mm) nominal in thickness, or an equivalent door</u> ~~An exterior door that meets the requirements of Section R609~~ shall be installed at the top of *stairs* that provide access to the *building* and that are enclosed with walls designed to break away in accordance with Section R306.3.5.

Reason: This code change revises the requirement added in the 2015 IRC that an exterior door be provided at the top of a stairway enclosed by breakaway walls and providing access to a dwelling located in a Coastal A Zone or Zone V special flood hazard area and elevated on piers or piles.

While having a door at the top of such a stair may be good practice as it provides a way to secure the dwelling if the breakaway walls are washed away, the additional requirements associated with it being an exterior door are overly conservative, particularly if the door at the bottom of the enclosed stair is also an exterior door.

By requiring compliance with all of the requirements of Section R609, the specified door would need to have a design pressure rating consistent with the design wind speed for the site, the door frame would need to be stiffened to resist the loads from such a door, proper anchorage of the door to the frame would need to be provided, and the door opening would need head, jamb, and sill flashing, even if the door is to be installed in a wall that would otherwise be considered an interior, non-structural wall.

The specified nominal door thicknesses and types (e.g., solid wood doors) are consistent with typical exterior doors and will provide some structural resistance beyond just a standard hollow-core wood interior door. It just would not need to be wind rated or meet other performance requirements associated with exterior doors.

It is noted that this requirement does not appear in the basic construction requirements of the National Flood Insurance Program in accordance with 44 CFR 60.3. It is also not specified as a practice that a community would earn credit for mandating and enforcing under FEMA's Community Rating Service and would not lead to discounted flood insurance premiums under the CRS or under Risk Rating 2.0.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The minimum added cost to provide a standard wind-rated exterior door with flashing in lieu of a standard interior door is around $300. A hurricane wind-rated door adds an additional $200-$300 to the minimum costs. Hence the code change would save on the order of $500 to $600 per home.

Estimated Immediate Cost Impact Justification (methodology and variables):

The minimum added cost to provide a standard wind-rated exterior door with flashing in lieu of a standard interior door is around $300. A hurricane wind-rated door adds an additional $200-$300 to the minimum costs. Hence the code change would save on the order of $500 to $600 per home.

RB96-25

RB97-25

IRC: R310.3

Proponents: Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Larissa DeLango, representing NYSDOS (larissa.delango@dos.ny.gov); Stephen Van Hoose, representing NYS DOS (stephen.vanhoose@dos.ny.gov); Chad Sievers, NYS, representing NYS Dept of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing NYSDOS (kevin.duerr-clark@dos.ny.gov); Bryant Arms, representing NYS DOS (bryant.arms@dos.ny.gov); Daniel Carroll, New York State Department of State, representing Division of Building Standards and Codes (daniel.carroll@dos.ny.gov)

2024 International Residential Code

SECTION R310
SMOKE ALARMS

Revise as follows:

R310.3 Location. Smoke alarms shall be installed in the following locations:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedrooms.
3. On each additional *story* of the *dwelling unit,* including *basements* and *habitable attics* and not including *crawl spaces* and uninhabitable *attics*. In *dwelling units* with split levels and without an intervening door between the adjacent levels, a smoke alarm installed on the upper level shall suffice for the adjacent lower level provided that the lower level is less than one full *story* below the upper level.
4. Not less than 3 feet (914 mm) horizontally from the door or opening of a bathroom that contains a bathtub or shower unless this would prevent placement of a smoke alarm required by this section.
5. In the hallway and in the room open to the hallway in *dwelling units* where the *ceiling height* of a room open to a hallway serving bedrooms exceeds that of the hallway by 24 inches (610 mm) or more.
6. Within the room to which a *sleeping loft* is open, in the immediate vicinity of the *sleeping loft*.
7. Where the floor area for a level of a dwelling unit is 1000 ft^2 (93 m^2) or greater, smoke alarms shall be installed in accordance with all of the following:
   7.1. All points on the ceiling shall have a smoke alarm 30 ft (9.1 m) or less apart measured horizontally or shall have an equivalent of one smoke alarm per each 500 ft^2 (46 m^2) of floor area.
   7.2. Where dwelling units include great rooms, or include vaulted or cathedral ceilings extending over multiple floors, smoke alarms located on the upper floor that are intended to protect such areas shall be considered part of the lower floor's protection scheme.

Reason: Due to the volume of air in such large rooms, smoke has the potential to collect in a non-uniform manner across the ceiling - that is, some areas may have more smoke than others. Without adequate smoke alarms as required by these provisions, detection of smoke and notification of occupants could be significantly delayed depending on the location of the fire in relation to the location of the smoke alarm, since it takes longer for the smoke to fill a large room than it does to fill a small one.

Section R310 requires smoke alarms to comply with NFPA 72. NFPA 72, Sections 29.8.1.3, 29.8.1.3.1, and 29.8.1.3.2 provide requirements for rooms with large floor areas. This proposal adds these requirements into the list of required locations for smoke alarms, to ensure these requirements are not missed and to minimize problems when utilizing both standards. Since these provisions are already required in NFPA 72, and the IRC requires compliance with NFPA 72, these provisions are already required - this proposal simply adds these provisions into the IRC, to prevent confusion in the application of these provisions.

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

Justification for no cost impact:

Since the IRC requires compliance with NFPA 72 for smoke alarms, and NFPA 72 already has these provisions, there is no change in the requirements for smoke alarms. This proposal simply adds the language from NFPA 72 into the IRC to prevent confusion in the application of these provisions.

RB97-25

RB98-25

IRC: R310.7, R310.7.3, R311.7, R311.7.3

Proponents: Kota Wharton, representing City of Grove City (kwharton@grovecityohio.gov)

2024 International Residential Code

SECTION R310
SMOKE ALARMS

Revise as follows:

R310.7 Fire alarm systems. Fire alarm systems <u>that are not leased, and that are owned by the building owner,</u> shall be permitted to be used in lieu of smoke alarms and shall comply with Sections R310.7.1 through R310.7.4.

R310.7.3 Permanent fixture. Where a household fire alarm system is installed, it shall become a permanent fixture of the occupancy~~, and owned by the homeowner~~.

SECTION R311
CARBON MONOXIDE ALARMS

R311.7 Carbon monoxide detection systems. Carbon monoxide detection systems <u>that are not leased, and that owned by the building owner,</u> shall be permitted to be used in lieu of *carbon monoxide alarms* and shall comply with Sections R311.7.1 through R311.7.4.

R311.7.3 Permanent fixture. Where a household carbon monoxide detection system is installed, it shall become a permanent fixture of the occupancy ~~and owned by the homeowner~~.

Reason: This code change is has two targets: first, to remove the point of the IRC facilitating property ownership and, second, to remove the term "homeowner" from the code.

Under a strict reading, the existing code language positions the IRC to dictate that fire warning and carbon monoxide detection systems installed into residences, once installed, are immediately a permanent fixture of the occupancy and are then owned by the homeowner/building owner. The intent of the code was not to facilitate or mandate a transfer of ownership but rather delineate which systems could be used in lieu of smoke alarms and carbon monoxide alarms, respectively. The proposed language reaffirms the intent and moves the burden of ownership to before the IRC's interaction.

The second target, is to remove the term "homeowner" from the code, which is only used three times across the I-Codes. Homeowner synonymous for property/building *owner* where used. The proposed language replaces the language.

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

Justification for no cost impact:

This is primarily language cleanup to remove unintended inferences of the code's intent and to delete a misnomer. There is no direct cost impact.

RB98-25

RB99-25

IRC: R310.4, R311.5

Proponents: Kota Wharton, representing City of Grove City (kwharton@grovecityohio.gov)

2024 International Residential Code

SECTION R310
SMOKE ALARMS

Revise as follows:

R310.4 Interconnection. Where more than one smoke alarm is required to be installed within an individual *dwelling unit* in accordance with Section R310.3, the smoke alarm devices shall be interconnected in such a manner that the actuation of one smoke alarm will activate all of the smoke alarms in the individual *dwelling 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.

SECTION R311
CARBON MONOXIDE ALARMS

R311.5 ~~Interconnectivity~~ Interconnection. Where more than one *carbon monoxide alarm* is required to be installed within an individual *dwelling unit* in accordance with Section R311.3, the*carbon monoxide* alarm devices shall be interconnected in such a manner that the actuation of one *carbon monoxide* alarm will activate all of the *carbon monoxide* alarms in the individual *dwelling unit*. Physical interconnection of *carbon monoxide alarms* shall not be required where *listed* wireless alarms are installed and all alarms sound upon activation of one alarm.

> **Exception:** Interconnection of *carbon monoxide alarms* in existing areas shall not be required where *alterations* or *repairs* do not result in removal of interior wall or ceiling finishes exposing the structure, unless there is an *attic*, *crawl space* or *basement* available that could provide access for interconnection without the removal of interior finishes.

Reason: This code change clarifies that interconnection of alarms is intended to only require interconnection of like alarms.
Where combination smoke/carbon monoxide alarms are interconnected they should be interconnected within the function they serve.

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

Justification for no cost impact:

This code change is editorial and provides clarification for smoke and carbon monoxide alarms.

RB99-25

RB100-25

IRC: R311.3

Proponents: Allen Burris, Clark County Nevada, representing Southern Nevada Chapter (allen.burris@clarkcountynv.gov); Jeffrey Grove, representing Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Residential Code

SECTION R311
CARBON MONOXIDE ALARMS

Revise as follows:

R311.3 Location. *Carbon monoxide alarms* in *dwelling units* shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning *appliance* is located within a bedroom or ~~its attached bathroom~~ a room or space only accessed through a bedroom or sleeping area, a *carbon monoxide alarm* shall be installed within the ~~bedroom~~ sleeping area.

Reason: The code currently only requires carbon monoxide detectors to be added to a bedroom when there is a fuel burning appliance in the adjacent bathroom. Builders are installing gas appliances in the closet that opens to the bedroom. The risk is that a room containing a fuel burning appliance that opens to the bedroom could potentially fill the bedroom with dangerous levels of carbon monoxide before the detectors in the hallway outside of the bedroom go off. Adding this language will require a carbon monoxide detector for bedrooms that have any adjacent rooms accessed only through the bedroom containing fuel burning appliances.

The term bedroom is problematic as it is not a defined term and does not capture other sleeping areas such as sleeping lofts and sleeping units.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$15

Estimated Immediate Cost Impact Justification (methodology and variables):

Adding a carbon monoxide detector to the bedroom will add approximately $15 as the wiring is already there for a smoke detector and the cost would only be the difference in the price of a smoke detector and a combination detector. Where the builder may choose to install a separate CO detector at an additional cost, the combination detector would satisfy the minimum code requirements.

RB100-25

RB101-25

IRC: R312.1, R312.2

Proponents: Lisa Hartwig, City of Minneapolis, representing Self (lisa.hartwig@minneapolismn.gov)

2024 International Residential Code

SECTION R312
MINIMUM ROOM AREAS

Revise as follows:

R312.1 Minimum area. Habitable rooms shall have a contiguous floor area of not less than 70 square feet (6.5 m^2).

Exception: *Kitchens*.

R312.2 Minimum dimensions. The required floor area of habitable ~~Habitalbe~~ rooms shall be not less than 7 feet (2134 mm) in any horizontal dimension.

Exception: *Kitchens*.

Reason: This proposal aims to clarify current code requirements. The code requires habitable rooms other than kitchens to be 70 square feet or larger, with the smallest dimension no less than 7 feet. Thus, habitable rooms (such as bedrooms) must be at least 7'x10' to meet the space criteria of R312.

However, habitable rooms - especially bedrooms - may not be a simple rectangle. Per the letter of the code, if a room has a horizontal dimension of less than 7 feet at any location that it would not qualify as a habitable room.

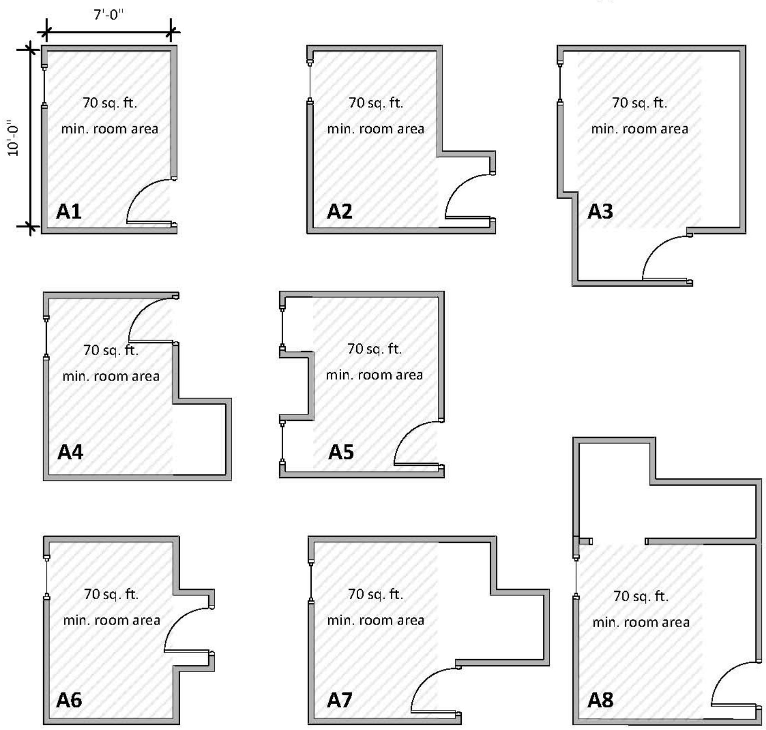
I believe that the intent of the code is to ensure that the 7 foot required minimum horizontal dimension should apply to the minimum floor area (70 square feet) and that portions of a room having dimensions of less than 7 feet are not a concern so long as the primary egress door (bedroom door) and emergency escape and rescue opening are located within the compliant 70 square foot minimum room area (that is also not less than 7 feet in any horizontal dimension).

See the illustrations of bedrooms in shapes other than a simple rectangle would comply per the proposed changes in this proposal.

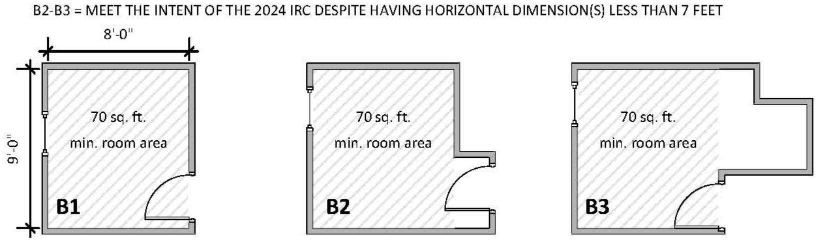
Minimum room areas (11962)

R312.1 MINIMUM AREA.
HABITABLE ROOMS SHALL HAVE A CONTIGUOUS FLOOR AREA OF NOT LESS THAN 70 SQUARE FEET
R312.2 MINIMUM DIMENSIONS.
THE REQUIRED FLOOR AREA OF HABITABLE ROOMS SHALL BE NOT LESS THAN 7 FEET IN ANY HORIZONTAL DIMENSION.

EXAMPLES OF CONTIGUOUS MINIMUM ROOM AREA WITH 1) ONE DIMENSION NO LESS THAN 7 FEET AND 2) THE OTHER DIMENSION NO LESS THAN 7 FEET AND SUFFICIENT TO MEET 70 SQUARE FEET (**7'x10' = 70 SQUARE FEET**)
A1 = MEETS THE LETTER OF THE 2024 IRC
A2-A8 = MEET THE INTENT OF THE 2024 IRC DESPITE HAVING HORIZONTAL DIMENSION(S) LESS THAN 7 FEET



EXAMPLES OF CONTIGUOUS MINIMUM ROOM AREA WITH 1) ONE DIMENSION NO LESS THAN 7 FEET AND 2) THE OTHER DIMENSION NOT LESS THAN 7 FEET AND SUFFICIENT TO MEET 70 SQUARE FEET (**8'x9' = 72 SQUARE FEET**)
B1 = MEETS THE LETTER OF THE 2024 IRC
B2-B3 = MEET THE INTENT OF THE 2024 IRC DESPITE HAVING HORIZONTAL DIMENSION(S) LESS THAN 7 FEET



Cost Impact: The 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 just a clarification of the existing code requirements.

RB101-25

RB102-25

IRC: R312.1, R312.2

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R312
MINIMUM ROOM AREAS

Revise as follows:

R312.1 Minimum area. Habitable rooms shall be not less than 7 feet (2134 mm) in any horizontal dimension for ~~have~~ a floor area of not less than 70 square feet (6.5 m^2).

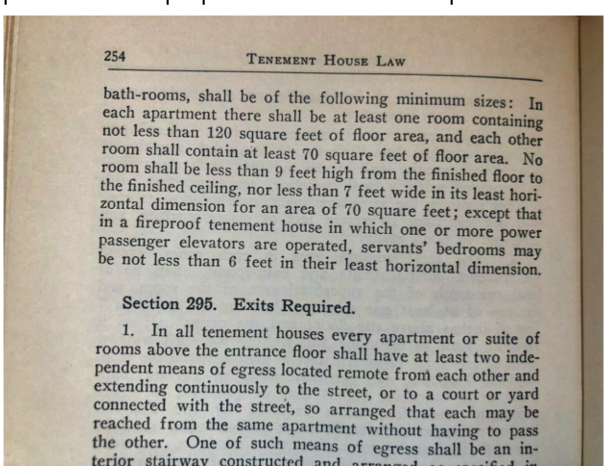
Exception: *Kitchens*.

Delete without substitution:

~~**R312.2 Minimum dimensions.** Habitable rooms shall be not less than 7 feet (2134 mm) in any horizontal dimension.~~

~~**Exception:** *Kitchens*.~~

Reason: There is no reason to mandate that every portion of a habitable room be a minimum of 7 feet wide. This requirement dates to tenement housing laws recommended by the National Board of Fire Underwriters in the 1920 (or earlier) National Building Code. The intent was to provide a limit to how small of a room could be rented to tenants. In this code, the minimum 7 feet was only required within the minimum required 70 square feet, which appears to make sense (see attached photo from 1920 NBC) If the minimum required area of 70 feet is provided and is not less than 7 feet wide, I see no logically reason to prohibit the room from being larger and less than 7 feet wide. There are many instances where if the current minimum 7-foot dimension was enforced strictly, unnecessary design limitations would result. I have provided two examples that I use when educating building officials across the country and not once has anyone said they have a problem with these areas being less than 7 feet. The 2024 IRC is over 1100 pages and should be simplified where possible. This proposal combines two separate sections into one and uses less lines of repeating text.

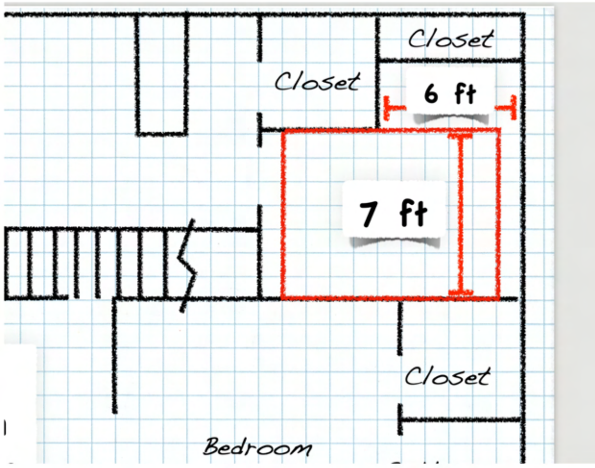


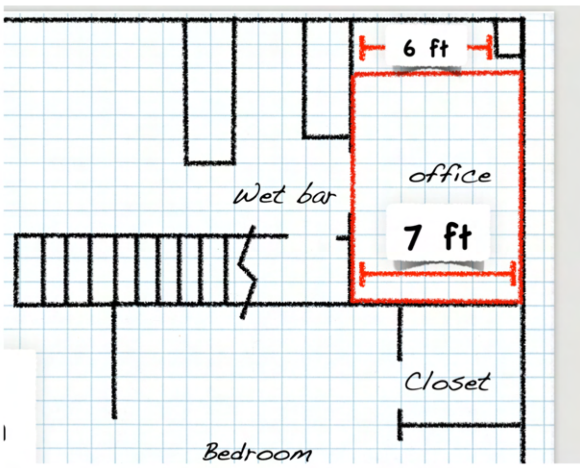
254 TENEMENT HOUSE LAW

bath-rooms, shall be of the following minimum sizes: In each apartment there shall be at least one room containing not less than 120 square feet of floor area, and each other room shall contain at least 70 square feet of floor area. No room shall be less than 9 feet high from the finished floor to the finished ceiling, nor less than 7 feet wide in its least horizontal dimension for an area of 70 square feet; except that in a fireproof tenement house in which one or more power passenger elevators are operated, servants' bedrooms may be not less than 6 feet in their least horizontal dimension.

Section 295. Exits Required.

1. In all tenement houses every apartment or suite of rooms above the entrance floor shall have at least two independent means of egress located remote from each other and extending continuously to the street, or to a court or yard connected with the street, so arranged that each may be reached from the same apartment without having to pass the other. One of such means of egress shall be an interior stairway constructed and





Cost Impact: The 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 increases design freedom and thus has no regulatory effect on the cost of construction.

RB102-25

RB103-25

IRC: R312.2

Proponents: Jay Osborne, representing FreeFarmhouse LLC (jay@freefarmhouse.com)

2024 International Residential Code

SECTION R312 MINIMUM ROOM AREAS

Revise as follows:

R312.2 Minimum dimensions. Habitable rooms shall include a usable floor area of not less than 7 feet by 7 feet (2134 mm by 2134 mm) that is free of permanent obstructions, such as walls, columns, and guards. ~~be not less than 7 feet (2134 mm) in any horizontal dimension.~~

Exception: *Kitchens*.

Reason: I know how to design small houses. Rule 1: Provide Flexibility.

I've designed dozens of small houses that are being constructed all around America. Each of these designs includes one or more furniture arrangements, so I know how well everything fits in the rooms. The projects often compel me to push the limits, making spaces that barely meet code. It's not ideal, but it can still work perfectly fine for the situation. I know that best practices (and rules of thumb) should not become rigid requirements. Any competent architect or builder should also know that.

Regulations need to give flexibility so people can respond to nuanced, site-specific needs. Bedroom door widths are not mandated by code, but designers and builders still make them just fine. A door at a loft reached by a tiny spiral staircase doesn't need to be as wide as one that a king size bed fits through. In the same way, small rooms need to be allowed to have some flexibility. If requested, I could provide you many diagrams showing how practical my proposal would be, even in the worst case scenarios.

How small homes are under attack.

Some code enforcers think they can forbid bay windows and alcoves unless they're more than 7' wide. Such a code interpretation is utterly idiotic. Obviously, those people have never designed a house. Unfortunately, many anti-creative code enforcers seem to have a vendetta against all new development (especially homes meant for poorer people). So this part of the building code may need to be rewritten— not for builders or architects, but because of prejudicial code enforcers who use it as a means to block the construction of small houses. They shamelessly exacerbate today's housing crisis.

Seven feet is what you need to stretch out.

The 7' room dimension is extremely important. You can't fit a bed in a room unless it's about 7 feet wide. In a living area, this requirement lets you stretch out your arms and twirl around without hitting the walls. Seven feet is an ergonomic reality. Hammurabi himself could have specified a code requirement like that, and it would still be relevant after thousands of years.

Why it's bad to make it "7 feet wide for only the minimum floor area"?

Compared to the 7 feet requirement, the 70 square feet minimum room area is quite arbitrary. That's why some places require 80 square feet. (Or even 90, for whatever reason.) Square footage is more about convention than ergonomic reality. So 7'x7' provides adequate space for a bed or for stretching out your arms, but the remaining 21 square feet (about 1/3) of the floor area should be allowed to be designed based on individual circumstances. After all, why would bay windows be banned in 70 square foot rooms? And if it's 90 square feet required, what's the necessity of a 7'x13' dimension? It's completely arbitrary. Give me the chance, and I'll show you a wide variety of useful rooms that would be banned by such a restriction.

A room is often constrained by outside circumstances, so 7'-wide rooms are common. But why is 7'x10' a terrible minimum requirement? It forces all small rooms to be boxes. It leaves no room for discretion-- like fitting a 5'-wide bed alcove between structural supports. Or wrapping an L-shaped bedroom around a staircase. So with a 7'x10 requirement, small bedrooms couldn't fit in many places. And because rooms often have to be placed around obstacles, 7'x10' would prevent even existing *large rooms* from being code-compliant.

Small houses are practical and safe. Yet many people block their construction for horrible reasons.

Unless you're trying to block the construction of small houses, requiring a 7'x10' clear area is a terrible idea. And since we have an ethical obligation to do something about today's housing crisis, we need to make it clear that code enforcers cannot block the construction of inexpensive, yet enduringly practical homes. My 7'x7' proposal allows things like bay windows and bed alcoves in small bedrooms, which makes them better. And it makes them easier to build in the first place.

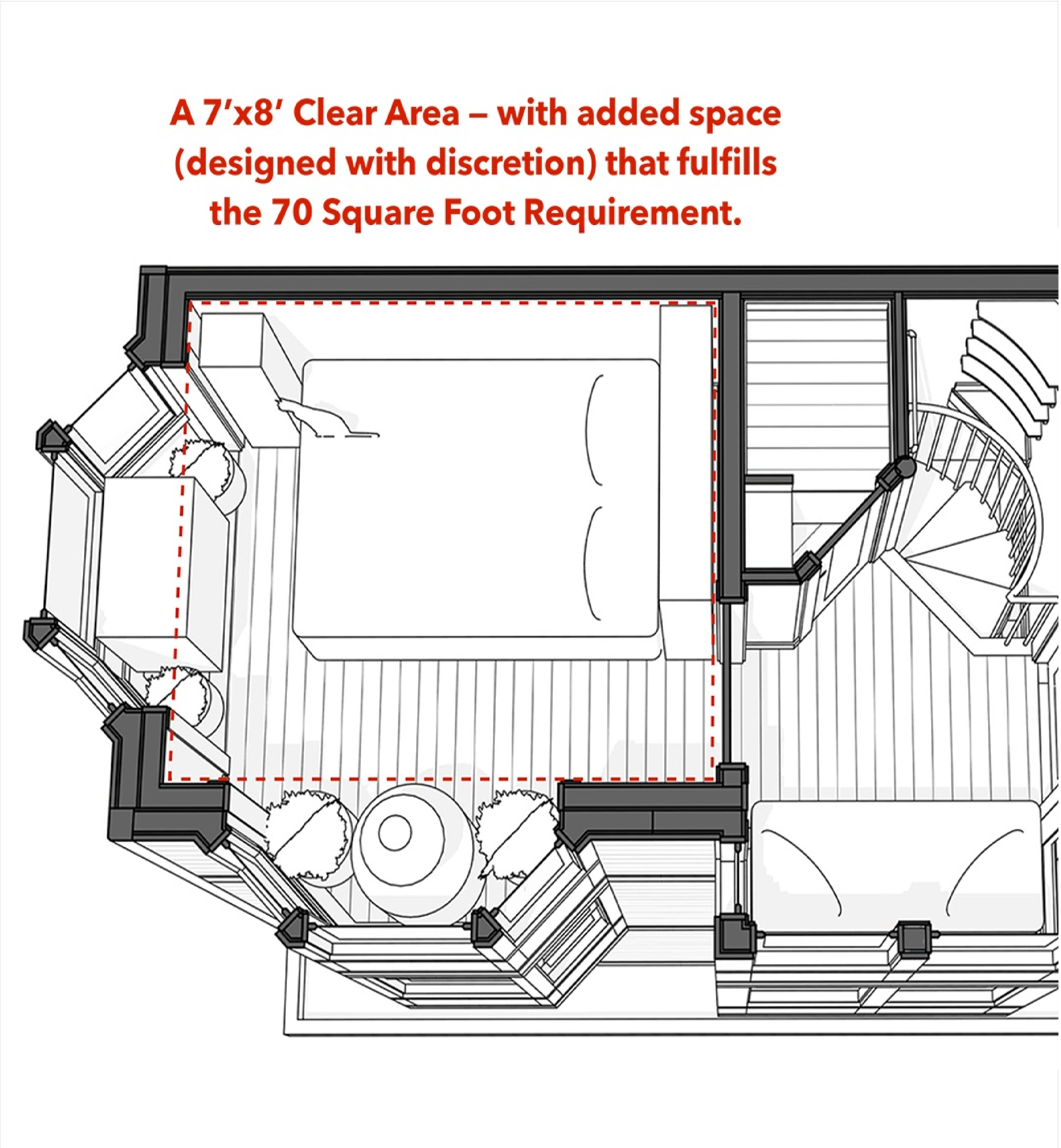
Is there any reason we should make small houses harder to build by enforcing new requirements? If someone can't imagine living in a small house, should their prejudices be considered?

Please support this 7'x7' minimum room area proposal.

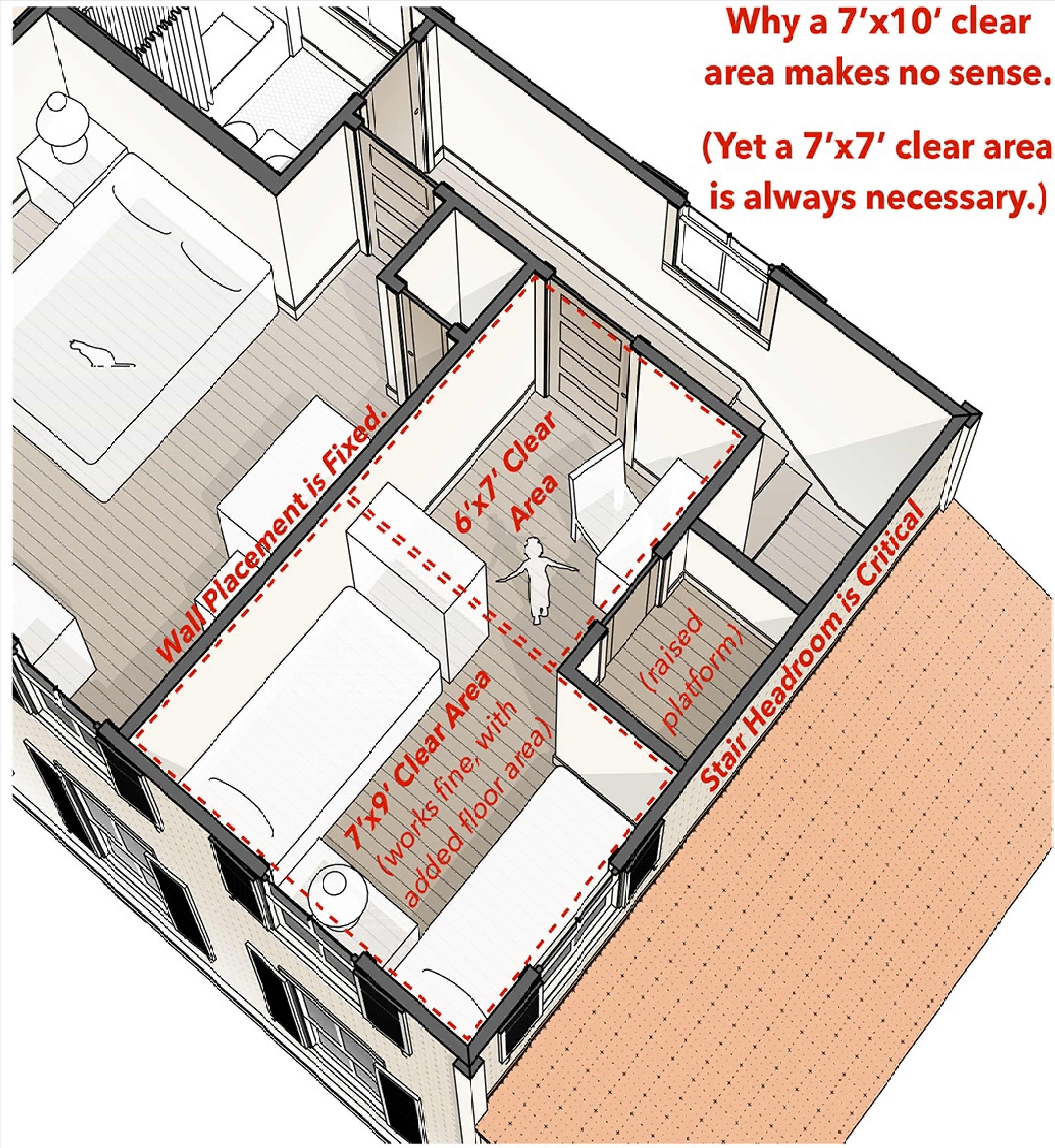
Bibliography:

A 7'x7' minimum clear area goes well with the 70 square foot requirement.

Here I show a couple of my projects. Notice that a 7'x10' requirement is ridiculous, but 7'x7' (with the added floor area requirement) is undeniably necessary. Small homes are highly functional and desirable, but they become impractical (and financially impossible to build) if requirements disallow their ability to have small rooms. The remaining 21 square feet would be designed based on the practical needs, not arbitrary conventions.



Bay windows, alcoves, and angled forms can be necessary and functional -- especially in houses that are constrained in space. They should be allowed even in the smallest rooms.



If a 7'x10' room is mandated as a minimum, that would make tens of millions of US bedrooms non-compliant. Yet 7'x7' is absolutely necessary, based on fundamental ergonomics.

I design small houses based on the successes of the past.

Visiting old homes, I always carry a laser measurer. I learn how they grew over time. And where they failed. I believe the best houses are those that have proven worth preserving. So my architectural designs embody time-tested folk wisdom.

And -- this is incredibly rare-- I create designs that are open source. All kinds of people are building them, all across the world. They're made to be adapted to local needs. Also, anybody can critique or learn from the blueprints. You can download some (for free and without permission) at FreeFarmhouse.com.

Here are some of my projects (evidence that I might know what I'm talking about):

If you want more diagrams or photos which help prove the claims I make, just let me know. We need to support the development of small, low-cost housing.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This will make small houses easier to build. Exact numbers are meaningless. But by allowing more flexibility in the design of small homes, they will obviously be more economical to build.

Starter homes are an endangered species in the US. That's partly because it's so hard to get them approved. The clarity of this proposed code change will make it more obvious if a room is large enough to meet code. It doesn't depend so much on interpretation.I hope you understand that the design and permitting of small houses is prohibitively expensive.

I think it's obvious that this proposal can save thousands of dollars in a small house project-- if only in design fees. It takes time and ingenuity to figure out how rooms fit in a small house. In projects where clearances are tight, it's common to spend a large chunk of the design process making sure there's enough space in the tightest parts. In normal scenarios, that means about 10-50 hours at $100-200 per hour (so $1,000-$10,000 in design fees alone). So it's fair to say this proposal can save thousands of dollars in the design fees for a small house. And probably a lot more in the construction-- because making it clear that a flexible room configuration is permissible (within the 70-square-foot minimum floor area) will let houses have a smaller footprint.

The dollar amount isn't precise -- it's order of magnitude. I don't want to spark debates about pennies. This primarily serves small or urban houses (and renovations), and is mostly irrelevant to the design of McMansions. It's absolutely crucial to recognize that this proposal will undoubtedly reduce costs for building small homes.

Estimated Immediate Cost Impact Justification (methodology and variables):

The difficulty of dealing with harsh or unclear regulations has a major impact on the economic feasibility of small homes. I hate to state the obvious, but there it is.
Less obvious: Small, functional houses are harder to design than sprawling McMansions. They have to follow most of the same requirements, and also need to be smart with space and budget.

Most architects are too expensive to be involved in the design of small homes, so the regulations need to be simple and straightforward. And they shouldn't be written based on the preferences of mansion owners. Small rooms aren't a luxury. They're a necessity, and should be regulated based on the needs, not fashionable desires.

Also, by allowing more flexibility in the design of rooms, this code amendment will undeniably make it easier to build small homes.

RB103-25

RB104-25

IRC: SECTION 202, R313.1, R313.1.1, 313.1.2 (New), 313.1.3 (New), R313.1.2, R312.3

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

[RB] CEILING HEIGHT. The clear vertical distance from the final ~~finished~~ floor surface to the ~~finished ceiling.~~ final ceiling or soffit surface or to the bottom of beams or girders.

SECTION R313
CEILING HEIGHT

R313.1 Minimum height. Minimum *ceiling height* shall be in accordance with Sections R313.1.1 through R313.1.3. Smoke and carbon monoxide alarms, fire sprinklers, luminaires, louvers, registers, and similar items shall be permitted to project below the minimum required *ceiling height*. ~~*Habitable space*, hallways and portions of *basements* containing these spaces shall have a *ceiling height* of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a *ceiling height* of not less than 6 feet 8 inches (2032 mm).~~

~~**Exceptions:**~~

1. ~~For rooms with sloped ceilings, the required floor area of the room shall have a *ceiling height* of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a *ceiling height* of not less than 7 feet (2134 mm).~~
2. ~~The *ceiling height* above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a *ceiling height* of not less than 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.~~
3. ~~Beams, girders, ducts or other obstructions in *basements* containing *habitable space* shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.~~
4. ~~Beams and girders spaced apart not less than 36 inches (914 mm) in clear finished width shall project not more than 78 inches (1981 mm) from the finished floor.~~

Delete and substitute as follows:

~~**R313.1.1 Basements.** Portions of *basements* that do not contain *habitable space* or hallways shall have a *ceiling height* of not less than 6 feet 8 inches (2032 mm).~~

~~**Exception:** At beams, girders, ducts or other obstructions, the *ceiling height* shall be not less than 6 feet 4 inches (1931 mm) from the finished floor.~~

R313.1.1 Habitable rooms. *Habitable rooms*, *habitable* attics, hallways, and basements within the *building thermal envelope* shall have a *ceiling height* of not less than 7 feet (2134 mm). *Habitable space* and hallways created in the basement or *attic* of an existing *building* shall have a *ceiling height* of not less than 6 feet 8 inches (2032 mm).

Exceptions:

1. *Ceiling height* not less than 6 feet 4 inches (1931 mm) shall be permitted under beams, girders, ducts or other obstructions in basements.
2. *Ceiling height* not less than 6 feet 6 inches (1981 mm) shall be permitted under beams and girders spaced apart not less than 36 inches (914 mm) in clear finished width.

3. For *habitable rooms* with sloped ceilings, the minimum required floor area in Section R312.1 shall have a *ceiling height* of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a *ceiling height* not less than 7 feet (2134) or not less than 6 feet 8 inches (2032 mm) in *habitable space* created in an existing *building*. The *ceiling height* shall be permitted less than 5 feet (1524 mm) over floor areas in excess of the minimum area required by section R312.1.

Add new text as follows:

313.1.2 Sanitation rooms. Bathrooms, toilet rooms, laundry rooms, and similar rooms used for sanitation and washing purposes shall have a *ceiling height* of not less than 6 feet 8 inches (2032 mm). Where created in the basement or *attic* of an existing *building*, the *ceiling height* shall be not less than 6 feet 4 inches (1931 mm).

Exception: The *ceiling height* above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a *ceiling height* of not less 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.

313.1.3 Storage and utility. *Closets*, laundry *closets*, pantries, storage rooms, crawlspaces, and mechanical and utility rooms, whether finished or unfinished, shall not have a minimum required *ceiling height*.

Delete without substitution:

~~**R313.1.2 Habitable attics and basements in existing buildings.** Where a *habitable attic* or habitable space in a *basement* is created in an *existing building*, *ceiling height* shall not be less than 6 feet 8 inches (2032 mm). Bathrooms, toilet rooms and laundry rooms shall have a *ceiling height* of not less than 6 feet 4 inches (1930 mm).~~

~~**Exceptions:**~~

1. ~~For rooms with sloped ceilings, the required floor area of the room shall have a *ceiling height* of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a *ceiling height* of not less than 6 feet 8 inches (2032 mm).~~
2. ~~At beams, girders, ducts or other obstructions, the *ceiling height* shall be not less than 6 feet 4 inches (1930 mm) from the finished floor.~~

~~**R312.3 Height effect on room area.** Portions of a room with a sloping ceiling measuring less than 5 feet (1524 mm) or a furred ceiling measuring less than 7 feet (2134 mm) from the finished floor to the finished ceiling shall not be considered as contributing to the minimum required habitable area for that room.~~

Reason: The provisions for minimum ceiling height have been built upon a number of times since the original 2000 edition and appear to have gotten a little messy. This proposal does not intend to change the intent of this section in the way I believe it is understood. Here are a few observations that motivated this proposal.

1) As written, a large pantry off the main floor kitchen does not have a minimum ceiling height, but a pantry off a wet bar in a finished basement has a 6 foot 8 inch minimum ceiling height.

NOTE: Section R313.1.1 states "portions of basement that do not contain habitable space or hallways shall have a ceiling height of not less than 6 feet 8 inches." A pantry is not habitable space or a hallway.

2) It is confusing to have basements included in the section about habitable rooms and an exceptions for beams and ducts, and then have another section specific to basements with the identical exception.

NOTE: This proposal attempts to clarify basements a little bit and place them in one section. Basements are tricky because unfinished basements are sort of habitable space and they are sort of not. This proposal makes it clear that new basements need to have at least a

7 foot ceiling height. What you finish your basement into later will then have ceiling heights the same as if on the main floor.

3) Typically codes are not written in permissive language, so I understand that the proposed section on storage and utility that specifies no requirement is out of the norm. However, I feel it might be fitting for this subject of "use of rooms" and there is a little precedence set in the definition of "habitable rooms" that does the same thing. It makes it clear which rooms are NOT habitable rooms. I think that clarification for ceiling height might be helpful.

Cost Impact: The 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 purpose of this proposal is to change how the information is presented but not change the intent or the common interpretation of the intent.

RB104-25

RB105-25

IRC: R313.1

Proponents: Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov); Bryant Arms, representing NYS DOS (bryant.arms@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Larissa DeLango, representing NYSDOS (larissa.delango@dos.ny.gov); Stephen Van Hoose, representing NYS DOS (stephen.vanhoose@dos.ny.gov); Chad Sievers, NYS, representing NYS Dept of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing NYSDOS (kevin.duerr-clark@dos.ny.gov); Bryan Toepfer, representing NY DOS (bryan.toepfer@dos.ny.gov); Daniel Carroll, New York State Department of State, representing Division of Building Standards and Codes (daniel.carroll@dos.ny.gov)

2024 International Residential Code

SECTION R313
CEILING HEIGHT

Revise as follows:

R313.1 Minimum height. *Habitable space*, hallways and portions of *basements* containing these spaces shall have a *ceiling height* of not less than 7 feet (2134 mm). Bathrooms, toilet rooms and laundry rooms shall have a *ceiling height* of not less than 6 feet 8 inches (2032 mm).

Exceptions:

1. For rooms with sloped ceilings, the required floor area of the room shall have a *ceiling height* of not less than 5 feet (1524 mm) and not less than 50 percent of the required floor area shall have a *ceiling height* of not less than 7 feet (2134 mm).
2. The *ceiling height* above bathroom and toilet room fixtures shall be such that the fixture is capable of being used for its intended purpose. A shower or tub equipped with a showerhead shall have a *ceiling height* of not less than 6 feet 8 inches (2032 mm) above an area of not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.
3. Beams, girders, ducts or other obstructions in *basements* containing *habitable space* shall be permitted to project to within 6 feet 4 inches (1931 mm) of the finished floor.
4. Beams, ~~and~~ girders , ducts or other obstructions spaced ~~apart not less than~~ 36 inches (914 mm) or more apart in clear finished width shall be permitted to project ~~not more than 78 inches~~ to within 6 feet 6 inches (1981 mm) ~~from~~ of the finished floor.

Reason: This proposal revises the language for exception #4 to match exception #3. Additionally, the distance "78 inches" was revised to "6 feet 6 inches" in order to be consistent with the distance units used throughout the section. This revision provides clarity in the application of this exception and revises the format of exception #4 to be consistent with the rest of the requirements in Section R313.1.

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

Justification for no cost impact:

This proposal does not change the code provision, just revises the wording to match that found elsewhere in the same section.

RB105-25

RB106-25

IRC: R314.2

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

SECTION R314
MEZZANINES

Revise as follows:

R314.2 Mezzanines. The clear height above and below *mezzanine* floor construction shall be not less than 7 feet (2134 mm).

<u>**Exception:** The ceiling height above the mezzanine shall be permitted to comply with Section R313.1 where the mezzanine meets the minimum room size in Section R312.</u>

SECTION R316
HABITABLE ATTICS

R316.2 Minimum dimensions. A *habitable attic* shall have a floor area in accordance with Section R312 and a *ceiling height* in accordance with Section R313.

Reason: The provisions for minimum room area (R312) and ceiling height (R313) provide criteria for with habitable rooms/spaces and basements, but neither specifically mentions mezzanines (R314) or habitable attics (R316). Habitable attics does reference R312 and R313 for minimum size and height, so you can do sloped ceilings or beams in the habitable attic. However, the current text does not address a sloped ceiling or beams in a mezzanine. While we do not believe it is the intent to require a mezzanine to be at least 70 sq.ft. or at least 7 feet in each direction the same as a room, the proposal would allow for mezzanines with sloped ceilings beams where the mezzanine was the size of a room.

This proposal is submitted by the ICC Building Code Action Committee (BCAC). BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2024 and 2025 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at https://www.iccsafe.org/products-and-services/i-codes/code-development/cs/building-code-action-committee-bcac/

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

Justification for no cost impact:

This is a clarification only for mezzanines constructed under sloped roofs. It will increase design options without increasing requirements.

RB106-25

RB107-25

IRC: R315.2

Proponents: Lisa Hartwig, representing Self (lisa.hartwig@minneapolismn.gov)

2024 International Residential Code

SECTION R315
SLEEPING LOFTS

Revise as follows:

R315.2 Sleeping loft limitations. *Sleeping lofts* shall comply with the following conditions:

1. The sleeping loft floor area shall be less than 70 square feet (6.5 m^2).
2. The sleeping loft *ceiling height* shall not exceed 7 feet (2134 mm) for more than one-half of the sleeping loft floor area.
3. <u>The sleeping loft shall be located in a habitable room within the dwelling unit or sleeping unit.</u>

Reason: Since sleeping lofts are intended for sleeping, the rooms or spaces containing sleeping lofts should meet all minimum requirements for habitable spaces including lighting, minimum room area, ventilation, ceiling height, and heating - in addition to the emergency escape and rescue opening that is currently required in rooms to which a sleeping loft is open.

These requirements would:

- ensure that sleeping lofts are not placed in non-habitable spaces, such as garages, hallways, or closets.
- ensure that occupants of sleeping lofts have the same ability to access and choose between the emergency escape and rescue opening or the primary (required) means of egress to safely exit the dwelling, just like occupants in other sleeping rooms or habitable spaces within the dwelling.

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

Justification for no cost impact:

Sleeping lofts are not required, but are a design option.

RB107-25

RB108-25

IRC: R316.3

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R316 HABITABLE ATTICS

Revise as follows:

R316.3 Story above grade plane. A *habitable attic* shall be considered a *story above grade plane.*

Exceptions: A *habitable attic* shall not be considered to be a *story above grade plane* provided that the *habitable attic* meets all the following:

1. The aggregate area of the *habitable attic* is either of the following:
   1.1. Not greater than one-third of the floor area of the *story* below.
   1.2. Not greater than one-half of the floor area of the *story* below where the *habitable attic* is located within a *dwelling unit* equipped with an automatic sprinkler system in accordance with Section P2904.
2. The occupiable space is enclosed by the *roof assembly* above, knee walls, if applicable, on the sides and the floor-ceiling assembly below.
3. The floor of the *habitable attic* does not extend beyond the exterior walls of the story below.
4. Where a *habitable attic* is located above a third ~~story~~ *story above grade plane*, an automatic sprinkler system in accordance with Section P2904 shall be installed in the *habitable attic* and remaining portion of the *townhouse unit* or *dwelling unit* or units located beneath the *habitable attic*.

Reason: The intent of this section is to require a fire sprinkler system when a habitable attic is above a third story "above grade plane". A basement is by definition a story, but not usually a story above grade plane.

Cost Impact: The 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 made under the understanding that the term "story" is not the intended application and rather "story above grade plane". Under this understanding, this proposal is only to clarify the existing intent and thus has no impact in the cost of construction.

RB108-25

RB109-25

IRC: R317.2

Proponents: Bryant Arms, representing NYS DOS (bryant.arms@dos.ny.gov); Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Chad Sievers, NYS, representing NYS Dept of State (chad.sievers@dos.ny.gov); Stephen Van Hoose, representing NYS DOS (stephen.vanhoose@dos.ny.gov); Larissa DeLango, representing NYSDOS (larissa.delango@dos.ny.gov); Bryan Toepfer, representing NY DOS (bryan.toepfer@dos.ny.gov); Daniel Carroll, New York State Department of State, representing Division of Building Standards and Codes (daniel.carroll@dos.ny.gov); Gregory Benton, NYS, representing Department of State, Division of Building Standards and Codes (gregory.benton@dos.ny.gov); Christopher Jensen, representing NYS DOS - Division of Building Standards and Codes (christopher.jensen@dos.ny.gov)

2024 International Residential Code

SECTION R317 GARAGES AND CARPORTS

Revise as follows:

R317.2 Carports. Carports shall ~~be open on~~ have not less than two ~~sides~~ openings with the bottom located at grade level, each having an open and unobstructed rectangular area equal to or greater than 60% of the total area of the wall upon which they are located. Carport floor surfaces shall be of *approved noncombustible material*. Carports ~~not open on two or more sides~~ that do not have the required open and unobstructed openings shall be considered to be a garage and shall comply with the provisions of this section for garages.

The area of floor used for parking of automobiles or other vehicles shall be sloped to facilitate the movement of liquids to a drain or toward the main vehicle entry doorway.

Exception: Asphalt surfaces shall be permitted at ground level in carports.

Reason: Section R317.2 of the 2024 IRC says that a carport must be open on at least two sides. That doesn't say completely open and for good reason: Otherwise bracing between the floor and the ceiling and mid-span columns would be prohibited within the open sides and that would block access for carports to the IRC's prescriptive structural solutions. However, Section R317.2 also doesn't limit how small those openings can be before they cause a carport to instead be a garage, and it doesn't prohibit those opening from being covered by screening such as chain-link security fencing.

The predominate difference between a garage and a carport from a safety perspective is that the occupants of a carport can much more easily escape from a carport, and the products of combustion are immediately naturally exhausted from under a carport's ceiling. A garage much more significantly limits egress, and garages concentrate the products combustion such as carbon monoxide, smoke, and heat.

This proposal refines Section R317.2 of the 2024 IRC to specify the minimum size and configuration of a carport's required openings and it specifies that those openings must be unobstructed (e.g. no doors, screens, half-walls, etc.).

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

Justification for no cost impact:

The macro-economic costs of the various enforcement scenarios are balanced, which may vary from one extreme where the code official only accepts custom designed carports that don't have any posts or bracing or gable or sloped roof or anything else within the required open "sides" and the other extreme where the code official agrees that by merely removing the doors from a garage's doorways on at least two exterior walls it can instead be a carport. Although this proposal reduces the limits of those extremes, it doesn't affect the macro economic balance of their costs.

RB109-25

RB110-25

IRC: R317.6, R317.6.1 (New), R317.6.2 (New), R317.6.3 (New), R317.6.4 (New), UL Chapter 44 (New)

Proponents: Larry Sherwood, Sustainable Energy Action Committee, representing IREC (larry@irecusa.org); Philip Oakes, representing NASFM; Joseph H. Cain, P.E., representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2024 International Residential Code

SECTION R317
GARAGES AND CARPORTS

Revise as follows:

R317.6 Electric vehicle charging systems. Where provided, electric vehicle charging ~~systems shall be installed in accordance with NFPA 70. Electric vehicle charging system equipment shall be *listed* and *labeled* in accordance with UL 2202. *Electric vehicle supply equipment* shall be *listed* and *labeled* in accordance with UL 2594.~~ shall comply with Sections R317.6.1 through R317.6.4.

Add new text as follows:

R317.6.1 Installation. Electric vehicle charging stations shall be installed in accordance with NFPA 70 , the manufacturer's installation instructions, and the listing.

R317.6.2 Equipment listings. Equipment used in electric vehicle charging stations shall be *listed* and *labeled* as applicable in accordance with the following:

1. Electric vehicle charging equipment in accordance with UL 2202.
2. Electric vehicle supply equipment in accordance with UL 2594.
3. Electric vehicle wireless power transfer equipment in accordance with UL 2750.

R317.6.3 Electric vehicle power export equipment. *Electric vehicle power export equipment* shall comply with Section 1208 of the *International Fire Code*.

R317.6.4 Protection from vehicle impact damage. Electric vehicle charging stations shall be protected from vehicle impact damage.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

2750-2023 Wireless Power Transfer Equipment for Electric Vehicles

Reason: The purpose of this proposal is to provide clarity regarding the charging of electric vehicles (EV).
The current Section R317.6 is broken down into separate subsections to address installation, listings, and vehicle impact protection.

There are four types of equipment used for charging EVs:

1. EV charging system equipment (UL 2202) – conductive charging equipment is located off board of the EV
2. EV power export equipment (UL 9741) - can be unidirectional or bidirectional. Unidirectional EVPE 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.

3. EV supply equipment (UL 2594) - provide power to a charger that is on-board the EV
4. EV wireless power transfer equipment (UL 2750) - infrastructure equipment (off board an EV) that transfers power to an EV through a magnetic resonance coupling between the off-board equipment and the EV.

The use of the term “electric vehicle charging system” does not encompass all four of the different types of equipment used.

New Section R317.6.1 – Equipment used in a EV charging station needs to be installed in accordance with NFPA 70, as well as with the manufacturer’s installation instructions and the listing.

New Section R317.6.2 – Clarifies the different equipment used, and the listing requirements. This includes the wireless power transfer equipment.

New Section R317.6.3 - EV power export equipment (EVPE) has additional requirements established by F175-24 in Group A.

New Section R317.6.4 – Suitable vehicle impact protection is needed for this equipment.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process. For more information, please visit www.sustainableenergyaction.org

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

Justification for no cost impact:

There is no increase in construction costs of buildings with this change as it is an editorial and correlation proposal. It also provides additional options for charging of electric vehicles.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
UL 2750-2023 Wireless Power Transfer Equipment for Electric Vehicles

RB110-25

RB111-25

IRC: R318.1, R318.3.1, R319.1, R319.2.4

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.1 Means of egress. *Dwelling units* shall be provided with a means of egress in accordance with this section. The means of egress shall provide a continuous and unobstructed path of vertical and horizontal egress travel from all portions of the *dwelling unit* to the required egress door without requiring travel through a garage. The required egress door shall open directly to the outdoors. Where opening under a roof, floor, or deck open to the outdoors, a *ceiling height* of no less than 7 feet (mm) shall be provided.~~into a *public way* or to a *yard* or *court* that opens to a *public way*.~~ Where the egress door exterior landing required by Section R318.3.1 is not at *grade*, access to *grade* shall be provided by means of a ramp in accordance with Section R318.8 or a *stairway* in accordance with Section R318.7. A path of egress travel not less than 36 inches wide and 7 feet in height shall be provided from the required egress door to a *public way*, without requiring travel through a *building* or garage.

Exception. Gates having a minimum clear width of 32 inches when opened at 90 degrees shall be permitted in the path to the *public way*.

R318.3.1 Floor elevations at the required egress doors. Landings or finished floors at the required egress door shall be not more than $1^{1}/_{2}$ inches (38 mm) lower than the top of the threshold.

Exception: The landing or floor on the exterior side shall be not more than $7^{3}/_{4}$ inches (196 mm) below the top of the threshold provided that the door does not swing over the landing or floor.

~~Where exterior landings or floors serving the required egress door are not at *grade*, they shall be provided with access to *grade* by means of a *ramp* in accordance with Section R318.8 or a *stairway* in accordance with Section R318.7.~~

SECTION R319
EMERGENCY ESCAPE AND RESCUE OPENINGS

R319.1 Emergency escape and rescue opening required. *Basements, habitable attics,* the room to which a sleeping loft is open, and every sleeping room shall have not less than one operable *emergency escape and rescue opening*. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room. *Emergency escape and rescue openings* shall open directly to the outdoors and be provided an unobstructed path of not less than 36 inches (914 mm) in width to a *public way*. ~~into a *public way*, or to a *yard* or *court* that opens to a *public way*.~~

Exceptions:

1. Basements used only to house mechanical *equipment* not exceeding a total floor area of 200 square feet (18.58 m^2).
2. Storm shelters constructed in accordance with ICC 500.
3. Where the dwelling *unit* or *townhouse unit* is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:

   3.1. One means of egress complying with Section R318 and one *emergency escape and rescue opening*.

   3.2. Two means of egress complying with Section R318.

4. Gates having a minimum clear width of 32 inches when opened at 90 degrees shall be permitted in the path to the *public way*. ~~A *yard* shall not be required to open directly into a *public way* where the *yard* opens to an unobstructed path from the *yard* to the *public way*. Such path shall have a width of not less than 36 inches (914 mm).~~

R319.2.4 Emergency escape and rescue openings under decks, porches and cantilevers. *Emergency escape and rescue openings* installed under decks, porches and cantilevers shall be fully openable and ~~provide~~ provided a path not less than 36 inches (914 mm) in height and 36 inches (914 mm) in width until no longer underneath. ~~to a *yard* or *court*.~~

Reason: "Yard" and "Court" are defined in the original 1971 CABO one and two family dwelling code. Only 19 terms were defined at that time. The only use of those terms in that code are for allowing glazed openings (windows) to be located under "roofed porches" provided they abutted a "yard or court". This requirement is still reflected in the IRC today in Section R325.1.1, exception 1. This is the significance of the definitions of "yard" and "court" in stating they must be "open to the sky". This is so sunlight can reach the edge of the porch roof that opens to a "yard or court". This is also why a "court" can be bound 3 ore more sides by definition, which means it could be bound on all sides. The definition of "court" was never intended to apply to egress provisions, as found in the IRC today. These two definitions were carried over into the 2000 IRC and still had no use other than for glazed openings under roofs. In the 2006 IRC, provisions for EERO's were changed to require them to open to a public way or to a "yard or court" that opens to a public way. However, by definition, that would not allow an EERO to open under a porch roof or under a deck, due to the "open to the sky" language. However, a new section was added in 2006 to provide a minimum height of 36 inches when EERO's open under decks. This seems to reveal that the intent of using the terms "yard or court" were never meant to prohibit an EERO from opening under a roof. In the 2015 IRC the language about opening to a yard or court in the EERO section was duplicated in the egress door section. By definition, this would prohibit the egress door from opening under a porch roof. It would also allow the door to open into a court bound on all sides. That would not be a very safe egress path to a public way.

This is why the terms "yard" and "court" should only be used for their original 1971 purpose, glazed openings for natural light. I believe this is a perfect example of "scope creep", where a vintage code provisions is slowly over time misused and/or adapted such that it no longer makes sense the IRC. This is very common for the IRC and requires occasional cleanup. That is the purpose of this proposal.

I also suggest moving the requirement for "access to grade" up to the primary section about means of egress. It seems like that section is about the whole path of egress to a public way and the landing elevation section is more about the relationship of the landing and the door.

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

Justification for no cost impact:

This proposal only clarifies the intended use of terms and does not have an impact on the cost of construction.

RB111-25

RB112-25

IRC: R318.2

Proponents: Stuart Foster, representing self

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.2 Egress door. Not less than one egress door shall be provided for each *dwelling unit* . The egress door shall be side-hinged, swinging, pivoted, or *balanced*, and shall provide a clear width of not less than 32 inches (813 mm) where measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The clear height of the door opening shall be not less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the *dwelling unit* without the use of a key or special knowledge or effort.

Reason: These types of doors are commonly used in residential construction already. This simply creates consistency with IBC section **1010.1.2 Egress door types**.

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

Justification for no cost impact:

Allowing multiple door types does not have any cost impact on construction, it simply allows for choices.

RB112-25

RB113-25

IRC: R318.2

Proponents: Allen Burris, Clark County Nevada, representing Southern Nevada Chapter (allen.burris@clarkcountynv.gov); Jeffrey Grove, representing Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.2 Egress door. Not less than one egress door shall be provided for each *dwelling unit* . The egress door shall be of the side-hinged, swinging door, pivoted door, or balanced door types, and shall provide a clear width of not less than 32 inches (813 mm) where measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The clear height of the door opening shall be not less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. The required egress door shall not require more than 30-pound (133 N) force to set in motion and shall move to full-open position when subject to not more than a 15-pound (67 N) force.Egress doors shall be readily openable from inside the *dwelling unit* without the use of a key or special knowledge or effort.

Reason: To correlate the language of the International Building Code requirements for egress door types, per section 1010.1.2 Egress door types, the International Residential Code should also provide provisions for “swinging door, pivoted door, and balanced door types.”

The International Residential Code as currently written, prevents the use of pivot doors, which are growing in popularity as front doors for residential buildings. The intent of this code amendment is to provide opportunities for unique door designs/systems to be used in residential construction, while preserving the intent of providing adequate egress capabilities.

The IBC Commentary states: “The maximum width for a means of egress door leaf in a swinging door is 48 inches (1219 mm) because larger doors are difficult to handle”

While we somewhat agree with this statement in the IBC Commentary, it is the width plus the height and the construction of the door (i.e. weight) which results in a door which may be difficult to open and / or close. The performance requirements in IBC Section 1010.1.3, door opening force requirements effectively result in the design and installation of appropriately-sized doors. Adding this language into the code that allows these additional door types and includes opening force requirements provides the designers with additional options without reducing the life safety of the building.

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

Justification for no cost impact:

This proposal adds options to the existing requirements. It does not prevent installations that are currently allowed by the code.

RB113-25

RB114-25

IRC: R318.2, R319.3

Proponents: Jennifer Hatfield, J. Hatfield & Associates, representing Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.2 Egress door types. Not less than one egress door shall be provided for each *dwelling unit* . The egress door shall be of the side-hinged swinging door, pivoted door or balanced door types, and shall provide a clear width of not less than 32 inches (813 mm) where measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The clear height of the door opening shall be not less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the *dwelling unit* without the use of a key or special knowledge or effort.

SECTION R319
EMERGENCY ESCAPE AND RESCUE OPENINGS

R319.3 Emergency escape and rescue doors. Where a door is provided as the required *emergency escape and rescue opening*, it shall be a side-hinged swinging door, pivoted door, balanced door, or a sliding door.

Reason: The 2021 IBC updated sections 1010.1.2 and 1010.1.2.1 to add balanced doors to the other common types of swinging doors allowed and used in the means of egress. Pivoted doors were already allowed and listed in the IBC prior to 2021, along with swinging door types. That previous proposal, E42-18, also revised the title of the section to denote it is "egress door types".

This proposal intends to update the Section R318.2 of the IRC to coordinate with the changes made in the IBC, to make it clear all common types of swinging doors are allowed and used in the means of egress.

The reasoning statement for the previous E42-18 included the fact it appears the intent was always that balanced doors were allowed as a means of egress due to the fact section 1010.1.10.2 of the 2018 IBC provided the following:

> **2018 IBC 1010.1.10.2 Balanced doors.** If balanced doors are used and panic hardware is required, the panic hardware shall be the push-pad type and the pad shall not extend more than one-half the width of the door measured from the latch side

This proposal also seeks to better align Section R319.3 EERO language with that of 1031.4 of the IBC, which allows for swinging doors or a sliding door as a type of EERO. Side-hinged, pivoted and balanced doors are all types of swinging doors. To be consistent with the listing out of all types in Section R318.2 (and Section 1010.1.2 and 1010.1.2.1 of the 2024 IBC), the list of swinging doors are provided in R319.3 as well.

Bibliography: Proposal E42-18 by John Woestman, Builders Hardware Manufacturers Association (BHMA) that was adopted AS for the 2021 IBC

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

Justification for no cost impact:

The proposal updates the code to more closely match types of doors being installed in the means of egress and to better align with current IBC language.

RB115-25

IRC: R318.2.1 (New)

Proponents: Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov); Bryant Arms, representing NYS DOS (bryant.arms@dos.ny.gov); Chad Sievers, NYS, representing NYS Dept of State (chad.sievers@dos.ny.gov); Kevin Duerr-Clark, representing NYSDOS (kevin.duerr-clark@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Larissa DeLango, representing NYSDOS (larissa.delango@dos.ny.gov); Bryan Toepfer, representing NY DOS (bryan.toepfer@dos.ny.gov); Stephen Van Hoose, representing NYS DOS (stephen.vanhoose@dos.ny.gov); Daniel Carroll, New York State Department of State, representing Division of Building Standards and Codes (daniel.carroll@dos.ny.gov); Christopher Jensen, representing NYS DOS - Division of Building Standards and Codes (christopher.jensen@dos.ny.gov)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

R318.2 Egress door. Not less than one egress door shall be provided for each *dwelling unit* . The egress door shall be side-hinged, and shall provide a clear width of not less than 32 inches (813 mm) where measured between the face of the door and the stop, with the door open 90 degrees (1.57 rad). The clear height of the door opening shall be not less than 78 inches (1981 mm) in height measured from the top of the threshold to the bottom of the stop. Other doors shall not be required to comply with these minimum dimensions. Egress doors shall be readily openable from inside the *dwelling unit* without the use of a key or special knowledge or effort.

Add new text as follows:

<u>**R318.2.1 Door Locking.** Entrance doors for dwelling units and sleeping units shall be provided with devices which tightly secure the door and are designed to provide security for the occupants and property within. Doors shall be equipped with a deadbolt lock designed to be readily openable from the side from which egress is to be made without the need for keys, special knowledge or effort and shall have a minimum lock throw of 1 inch (25 mm). Such deadbolt locks shall be installed according to the manufacturer's specifications. For the compliance with this section, a sliding bolt shall not be considered an acceptable deadbolt lock.</u>

Reason: The International Property Maintenance Code requires locks to be installed on doors leading into dwelling and sleeping units (see section text included below). Providing locks on exterior doors to residential buildings is also standard industry practice. However, there are no requirements in the International Residential Code currently requiring such security features. This proposal adds a section with language similar to that found in the IPMC.
IPMC sections:

> **304.15 Doors.** Exterior doors, door assemblies, operator systems if provided, and hardware shall be maintained in good condition. Locks at all entrances to dwelling units and sleeping units shall tightly secure the door. Locks on means of egress doors shall be in accordance with Section 702.3.
>
> **304.18 Building security.** Doors, windows or hatchways for dwelling units, room units or housekeeping units shall be provided with devices designed to provide security for the occupants and property within.
>
> **304.18.1 Doors.** Doors providing access to a dwelling unit, rooming unit or housekeeping unit that is rented, leased or let shall be equipped with a deadbolt lock designed to be readily openable from the side from which egress is to be made without the need for keys, special knowledge or effort and shall have a minimum lock throw of 1 inch (25 mm). Such deadbolt locks shall be installed according to the manufacturer's specifications and maintained in good working order. For the purpose of this section, a sliding bolt shall not be considered an acceptable deadbolt lock.

As the code books are currently written, if a jurisdiction adopts both the IRC and the IPMC, a building could be built without door locks in compliance with the IRC and issued a certificate of occupancy, then immediately cited for non-compliance with the IPMC. This proposal would solve such an issue by ensuring that buildings built to the IRC are also compliant with the IPMC.

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

Justification for no cost impact:

Using locking door hardware is standard industry practice for doors providing entrance into dwelling units in most locations. Additionally, in any location that has adopted the IPMC, such hardware is required by the IPMC. Additionally, a survey of door hardware available for purchase showed no appreciable difference in cost between locking and non-locking door hardware, so even for locations which do not adopt the IPMC, this requirement will not cause an impact on the cost of construction.

RB115-25

RB116-25

IRC: R318.7

Proponents: Joseph Summers, Mashantucket Pequot Tribal Nation, representing Self

2024 International Residential Code

SECTION R318 MEANS OF EGRESS

R318.7 Stairways. Where required by this code or provided, *stairways* shall comply with this section.

Exceptions:

1. *Stairways* not within and not ~~or~~ serving a *building*, porch or deck.
2. *Stairways* leading to nonhabitable attics.
3. *Stairways* leading to *crawl spaces*.

Reason: grammar has lead to inspectors interpreting that a stairway on the a building is not required to comply with section R318.7. This proposal is to correct this miss interpretation.

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

Justification for no cost impact:

Fix of a a grammatical error.

RB116-25

RB117-25

IRC: R318.5, R318.6, R318.6.1 (New), R318.6.1.1 (New), R318.7, R320.2 (New), R321.1.2 (New), R321.1.2, R321.1.3, R321.1.4, R507.2 (New), R507.2

Proponents: David Cooper, Stair Manufacturing and Design Consultants, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Revise as follows:

~~**R318.5 Landing, deck, balcony and stair construction and attachment.** Exterior landings, decks, balconies, *stairs* and similar facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces or shall be designed to be self-supporting. Attachment shall not be accomplished by use of toenails or nails subject to withdrawal.~~

~~**R318.6**~~ <u>**R318.5**</u> **Hallways.** The width of a hallway shall be not less than 3 feet (914 mm).

~~**R318.7**~~ <u>**R318.6**</u> **Stairways.** Where required by this code or provided, *stairways* shall comply with this section.

Exceptions:

1. *Stairways* not within or serving a *building*, porch or deck.
2. *Stairways* leading to nonhabitable attics.
3. *Stairways* leading to *crawl spaces.*

Add new text as follows:

<u>**R318.6.1 Stairway anchorage.** Landings, balconies, and stairs shall be positively anchored to the structure to resist the applicable loads in Section 301.5. Attachment shall not be accomplished by use of nails subject to withdrawal.</u>

<u>**R318.6.1.1 Exterior stair,landing, deck, and balcony anchorage.** Exterior landings, decks, balconies, stairs and similar facilities shall be positively anchored to the primary structure to resist both vertical and lateral forces or shall be designed to be self-supporting. Attachment shall not be accomplished by use of toenails or nails subject to withdrawal.</u>

SECTION R320
HANDRAILS

R320.1 General. Handrails shall comply with Section R320.

Revise as follows:

<u>**R320.2 Handrail anchorage.** Handrails shall be positively anchored to resist the applicable loads in Section 301.5. Attachment shall not be accomplished by use of nails subject to withdrawal.</u>

SECTION R321
GUARDS AND WINDOW FALL PROTECTION

R321.1 Guards. *Guards* shall be provided in accordance with Sections R321.1.1 through ~~R321.1.4~~ R321.1.5.

R321.1.1 Where required. *Guards* shall be provided for those portions of open-sided walking surfaces, including floors, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or *grade* below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a *guard*.

R321.1.2 Guard anchorage. Guards shall be positively anchored to resist the applicable loads in Section 301.5. Attachment shall not be accomplished by use nails subject to withdrawal.

~~R321.1.2~~ R321.1.3 Height. Required *guards* at open-sided walking surfaces, including *stairs*, porches, balconies or landings, shall be not less than 36 inches (914 mm) in height as measured vertically above the adjacent walking surface or the line connecting the *nosings*.

Exceptions:

1. *Guards* on the open sides of *stairs* shall have a height of not less than 34 inches (864 mm) measured vertically from a line connecting the *nosings*.
2. Where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) as measured vertically from a line connecting the *nosings*.

~~R321.1.3~~R321.1.4 Opening limitations. Required *guards* shall not have openings from the walking surface to the required *guard* height that allow passage of a sphere 4 inches (102 mm) in diameter.

Exceptions:

1. The triangular openings at the open side of *stair*, formed by the *riser*, tread and bottom rail of a *guard*, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. *Guards* on the open side of *stairs* shall not have openings that allow passage of a sphere $4^3/_8$ inches (111 mm) in diameter.

~~R321.1.4~~R321.1.5 Exterior plastic composite guards. *Plastic composite* exterior *guards* shall comply with the requirements of Section R507.2.2.

SECTION R507
EXTERIOR DECKS

R507.1 Decks. Wood-framed decks shall be in accordance with this section. Decks shall be designed for the *live load* required in Section R301.5 or the ground snow load indicated in Table R301.2, whichever is greater. For decks using materials and conditions not prescribed in this section, refer to Section R301.

R507.2 Construction and anchorage. Landings, decks, balconies, stairs and similar facilities shall be constructed and anchored in accordance with Section R318.6.1.1

~~R507.2~~R507.3 Materials. Materials used for the construction of decks shall comply with this section.

Reason: Although this change is comprehensive involving Stairway, Handrail, Guard and Deck sections of the code the premise is simple. The code currently only addresses anchorage of exterior stairs, landings, decks and balconies and fails to consider their interior counterparts and other structural elements subject to the loads specified in R301.5, namely handrails and guards.

Since all stairs, handrails and guards need to be positively anchored we have added an anchorage requirement to each of these sections and placed the current text of R318.5, verbatim, in a new section R318.6.1.1 within the stairway section renamed appropriately with the term anchorage. Since decks are included we have added a pointer to this section in R507 Exterior Decks to assure this is not missed by users of the code, offering improved understanding of the status quo.

Cost Impact: The 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 provides clarity of the existing requirements and incorporates editorial changes for anchorage of stairways with no requirements affecting a increase in material or labor that would increase or decrease the cost of construction.

RB117-25

RB118-25

IRC: R318.5.1 (New)

Proponents: Charles Anderson, City of Minneapolis, representing Self (c.scott.anderson@minneapolismn.gov)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Add new text as follows:

R318.5.1 Landing, deck, balcony and stair construction at required egress door. Frost protection shall be provided at exterior landings, decks, balconies, *stairs* and similar facilities at the required egress door.

Reason: This change is similar to the requirement in the IBC for frost protection at required egress doors. This change clarifies that the landings outside the required egress door need to be provided with frost 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:

While this change clarifies this requirement and even if this were to be a change in application the cost increase would be nominal based on the relative frost depth vs the min depth of an individual footing.

RB118-25

RB119-25

IRC: R318.7.2, R318.7.11.1

Proponents: Jay Osborne, representing FreeFarmhouse LLC (jay@freefarmhouse.com)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.7.2 Headroom. The headroom in *stairways* shall be not less than 6 feet 6 inches (1982 mm) ~~6 feet 8 inches (2032 mm)~~ measured vertically from the sloped line adjoining the tread *nosing* or from the floor surface of the landing or platform on that portion of the *stairway*.

Exceptions:

~~1.~~ Where the *nosings* of treads at the side of a *flight* extend under the edge of a floor opening through which the *stair* passes, the floor opening shall not project horizontally into the required headroom more than $4^3/_4$ inches (121 mm).

~~2. The headroom for *spiral stairways* shall be in accordance with Section R318.7.11.1.~~

R318.7.11.1 Spiral stairways. The clear width at and below the *handrails* at *spiral stairways* shall be not less than 26 inches (660 mm) and the walkline radius shall be not greater than $24^1/_2$ inches (622 mm). Each tread shall have a depth of not less than $6^3/_4$ inches (171 mm) at the walkline. Treads shall be identical, and the rise shall be not more than $9^1/_2$ inches (241 mm). ~~Headroom shall be not less than 6 feet 6 inches (1982 mm).~~

Reason:

Ceiling heights for houses should be less than for commercial buildings.

The minimum ceiling height for commercial buildings is 7'-6". For houses, it's 7'-0". It's lower for many reasons. You probably understand those reasons. But then why are staircase head clearance the same 6'-8" in both cases?

Why shouldn't it be lower for houses? For the exact same reasoning. The code seems to contradict its own logic.

Measuring ergonomic and demographic considerations.

If staircase ceilings could be as low as 6'-4", they'd still be high enough. About 99.5% of the US population is shorter than that. When you account for how people are ergonomically hunched and shorter when navigating stairs, make it 99.9% of the population. And when you understand the myriad ways that people have adapted old staircases with low clearances (simply with a cheap pad), you'd realize that 6'-4" is enough.

Remember the reasons why commercial buildings are required to be more spatially accommodating. And remember that small houses don't have to appeal to everyone.

The ceiling height is most applicable at one small point.

Also— and this is very important to remember — staircases usually have higher-than-normal head space, but the clearance is often pinched only where it approaches the floor structure. The edge of the floor structure is effectively identical to a beam.

Since beams are allowed to be as low as 6'-4" above a finished floor, it only makes sense to allow a lower ceiling at this particular part of the staircase. A 6'-4" exception may be hard to codify, but a 6'-6" height requirement would be simple, rational, and appropriate.

The 6'-8" stair headroom requirement strongly affects small houses.

As someone who has designed dozens of small houses, I've found that number to be a significant impediment. I also measure countless old houses (with my trusty laser measurer), and discovered they're still fine if the clearance is even lower than 6'-4". I'm not a professional basketball player, but if you measured them, too, you'd realize that 6'-8" is much higher than what's necessary in a small house. It's a luxury. What about the miniscule fraction of Americans who are professional basketball players? They still have plenty of other options for housing. The minimum shouldn't be the ideal. No house is "one-size-fits-all".

The challenge of designing small houses usually deals with ceiling heights-- especially at staircases. So by relaxing that height clearance, small houses become easier to build-- and no worse.

Why 6'-6" is an important difference.

So I'm proposing the minimum stair ceiling clearance to be lowered to 6'-6". That also eliminates an exception found for spiral staircases (there, 6'-6" also works perfectly fine). In Canada, staircase ceilings are allowed to be more than an inch lower (and there it also works perfectly fine). Maybe 6'-6" seems too small a change to bother, but it still will have a significant impact.

As someone who designs small houses (including 1.5-story backyard cottages), I understand very well how much they're affected by this requirement. This one little amendment will solve a lot of big problems. Even just a few saved inches can make modular construction economically feasible. That would obviously lower the cost of building small homes.

And this is just rational. Since it's smart to require commercial buildings to have higher ceilings than residences, then staircase ceiling heights should also follow the same logic. Why wouldn't they?

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This code change will immediately make it easier to build smaller houses. Especially houses like Accessory Dwelling Units (ADUs), which are a necessary solution to today's housing crisis.

Two story houses are often necessary in places with rising land values, like small towns and suburbs. One story isn't enough to be worth building. So by saving space in the design of staircases, small 2-story houses become more economically feasible.It saves little on material costs. But it can easily save a thousand dollars in design fees. Small houses are hard to design. Don't make it harder for no good reason.

When designing a small 2-story house, staircase headroom becomes a critical factor affecting room layouts. For a 2-story house under 1000 square feet in a size, an architectural designer can expect to spend at least 1 hour, and up to 5 hours, tweaking mere inches around the staircase. At $100-200 an hour, that means $100-1000 in design fees alone. Construction costs are even more significantly reduced, because it's very expensive to fix such issues on a job site. So this proposal will almost certainly save hundreds of dollars in the creation of small houses, which are desperately needed today.

This proposed change will have little effect in designing houses over 2000 square feet in size (it's easy to deal with space in larger houses). Just as a 6'-4" minimum beam clearance allows for a necessary degree of flexibility in the design of houses, staircases (with that same sort of localized head-height condition) should be easier and less expensive to design. Especially for small homes, where cost matters most. Luxury designers and "feature creep sellers" may not care, but reducing costs for building small houses has major ethical implications. "

Estimated Immediate Cost Impact Justification (methodology and variables):

Backyard cottages are finally being legalized, but they're often subjected to some extreme height limitations. As a compromise to their legalization, NIMBYs have forced ADUs to be barely large enough for a second floor (a half story, usually). The floor area limitation also make it harder to fit a staircase.

Space matters in a small house. And in a 2-story houses, the head clearance at the staircase is one of the hardest things to design for. It also tends to trigger other issues, like those related to room size minimums. And its one of those things that's hard to correct if a builder forgets to add a chamfer at the ceiling.

So most of all, this allows small houses to be buildable. And you probably know that starter homes are in desperately short supply in America.

RB119-25

RB120-25

IRC: R318.7.2

Proponents: David Cooper, Stair Manufacturing and Design Consultants, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

R318.7.2 Headroom. The headroom in *stairways* shall be not less than 6 feet 8 inches (2032 mm) measured vertically from the sloped line adjoining the tread *nosing* or from the floor surface of the landing or platform on that portion of the *stairway*.

Exceptions:

1. Where the *nosings* of treads at the side of a *flight* extend under the edge of a floor opening through which the *stair* passes, the floor opening shall not project horizontally into the required headroom more than $4^3/_4$ inches (121 mm).
2. A reduction of the headroom shall be allowed on one side of the stairway where a sloped ceiling extends not more than 12 inches (305 mm), measured horizontally into the width of the stairway and not more than 8 inches (203 mm) into the required headroom.

~~2~~ 3. The headroom for *spiral stairways* shall be in accordance with Section R318.7.11.1.

Reason: The code allows for sloped ceilings in hallways and rooms however offers no relief for minor intrusions into the required headroom of stairways. Where spatial trade offs are common in minimalistic trends of home design we are seeing more intances where passing flights pass over each other, or gable end/dormer ceilings may slope across the width of a stairway and project into the headroom. In some cases these are reasoned to comply with the intent of the code based upon the other sloped ceiling requirements. The projection into the headroom cited in the exception occurs where the slope of the ceiling intersects with the wall at the side of the stairway. See photo included with red arrow indicating the point where this exception would apply. The exception allows for a typical 8/12 sloped ceiling that would not extend beyond the clear area above the shoulder and between the head of the user and the side of the stairway.

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

Justification for no cost impact:

Although this may in some cases allow greater economy of space we do not think that this will result in any impact of consequence on the cost of construction.

RB120-25

RB121-25

IRC: R318.7.5.1, R318.7.5.2

Proponents: Jeffrey Munsterteiger, National Association of Home Builders, representing National Association of Home Builders; Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.7.5.1 Risers. The *riser* height shall be not more than 8 1/4 inches (210 mm) ~~$7^3/_4$ inches (196 mm)~~. The riser height shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any *flight* of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm). *Risers* shall be vertical or sloped from the underside of the *nosing* of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. At open *risers*, openings located more than 30 inches (762 mm), as measured vertically, to the floor or *grade* below shall not permit the passage of a 4-inch-diameter (102 mm) sphere.

Exceptions:

1. The opening between adjacent treads is not limited on *spiral stairways* .
2. The riser height of *spiral stairways* shall be in accordance with Section R318.7.11.1.

R318.7.5.2 Treads. The tread depth shall be not less than 9 inches (229 mm) ~~10 inches (254 mm)~~. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any *flight* of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm).

Reason: What will this amendment do?

This amendment restores the stair geometry requirements allowed by prior editions of model building codes. This amendment will allow the use of the 8 ¼" x 9" geometry, the dimensions still in use in Federal regulations and by many state and local jurisdictions regulations across the country.

What are the benefits?

The benefits are from a reduction in the stairway's length. In a home that has an 8' ceiling and 2 X 10 floor framing above this new geometry results in one less stair tread, and the remaining treads consume 1" less of length each. It is a reduction of 23" in the overall length of the stairway and at 36" in width a savings of 5.75 square feet overall. This saving of space applies to both levels accessed by the stairway. In smaller footprint homes, which are increasingly being built due to affordability barriers, and when renovating such homes these savings can have a big impact. The reduced length allows more flexibility in the placement of the stairway and the additional square footage becomes valuable usable space.

If the footprint of the house must be increased to accommodate the additional space needed, adequately sized living spaces are sacrificed without any demonstrated gain. This can lead to an economic hardship on first-time home buyers of smaller homes, and for construction on smaller lots, infill projects, and townhomes.

Has residential stairway geometry always been 7 ¾" X 10"?

No, earlier model code editions allowed stair geometry of 8" X 9" or 8 ¼" X 9", the latter being most common. And in fact, many states today amend their statewide codes to restore these dimensions. In recent research conducted using publicly available code adoption data, 46% of states that adopt a residential building code statewide make such amendments.

And in US manufactured homes which are designed to be used as dwelling units, US Federal regulations 24 CFR Part 3280.114 requires a stairway geometry of 8 ¼"(max) X 9" (min).

Precedent set in the IRC.

There is precedent for less restrictive stair geometry in the IRC. The International Residential Code has long permitted other stairways, such as spiral stairs having 9 ½” X 7 ½” geometry. Beginning in the 2015 version, alternating tread devices (2015 IRC R311.7.11) and ship’s ladders (2015 IRC R311.7.12) were introduced as an access to any area as a secondary means of egress. And in the 2018 edition both types were permitted to provide the only means of egress from lofts, mezzanines, and similar areas of 200 gross square feet or less. In both systems a 9 ½” X 5” geometry is required. Mezzanines are not restricted as to their use, and the equivalent space can be that of the minimum required space of 2+ bedrooms. Mezzanine areas may see frequent use in a home and are permitted to be accessed and served by much steeper stairways/means of egress.

A discussion of residential stairway safety.

In prior cycle’s IRC proposals regarding stairway geometry, several studies are often cited and said to reflect the safety of residential stairways.

In one study that looked at data from emergency room visits related to non-fatal consumer product injuries[1], only a small portion of the study’s report is dedicated to residential stairways. In its findings it lists stairways as the number one source of injury, second to floors. The overall difference between them is 1.2% of the total injuries in the study, <u>and floors have a mean cost per injury greater than stairways; a difference of $11,362 per injury.</u> One should conclude from this that the general geometry of a stairway is not a significant contributing factor because floors are flat and contribute to nearly as many injuries. Also missing is any indication of where or how these stairway injuries occurred. Missing is any explanation of whether these were commercial or residential stairways, or if they were interior or exterior to the building. Also missing are references to the age and condition of the stairway, what its built geometry was, or if adequate lighting or handrails were present. And no indications were given if the injured person was carrying something or was otherwise impaired. (i.e. wearing darkened sunglasses, not wearing prescription glasses, or wearing slippery footwear, etc.)

In discussions about stairway safety, European studies[2] are often quoted which are said to provide the overall best geometry of a stairway for safety. Its important to note that in many European countries where these studies were conducted, a more restrictive stairway geometry isn’t required.

For example, in the UK, private stairways, or “A stair intended to be used for only one dwelling”, have a maximum rise and minimum run (or “going” as it’s referred to in UK documents), both of 220 mm (8 11/16”). The maximum pitch of a private stairway in the UK is 42-degrees. Note that the pitch of a stairway built at 8 ¼” X 9” is 42.5 degrees.[3]

Similarly in Spain, “restricted stairways” which include stairways in individual dwelling units require a max 20 cm rise (7 7/8") & min 22 cm run (8 2/3").[4]

Conclusion.

The safety benefits of the 7 ¾” riser and 10" tread stair geometry are technically unsubstantiated and are not practical in many home designs. The 8 ¼” x 9” geometry adequately provide for stair safety in residential occupancies. No sound documentation or data has been presented demonstrating these proposed dimensions are any less safe or are a contributing factor in accidental residential falls than current stair geometry.

There is already precedent in the IRC to allow steeper means of egress stairways to habitable living areas in mezzanines. And US federal regulations also allow the proposed stairway geometry (8 ¼” X 9”). As outlined in Section R101.3 of the IRC, the intent of the code is to provide minimum requirements for occupant safety and health and there is adequate substantiation to show that 8 ¼” X 9” stairway geometry provides this minimum level of occupant safety.

[1] Lawrence BA, Spicer RS, Miller TR. Inj Prev 2015;21:23–29. “A fresh look at the costs of non-fatal consumer product injuries (2014)”

[2] UK at the Building Research Establishment (BRE)

[3] UK Building Regulations

[4] Spanish Safety of Use and Accessibility-Basic Document

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal will lower the costs of construction.

8 1/4" X 9"				7 3/4" X 10"			
Component	Amount	Cost	Subtotal	Component	Amount	Cost	Subtotal
14'- 2X12 stringers	4	$ 27.49	$ 109.96	16'- 2X12 stringers	4	$ 29.42	$ 117.68
Oak Stair treads	12	$ 14.59	$ 175.08	Oak Stair treads	13	$ 14.59	$ 189.67
Risers-1 x 10 x 3' Red Oak Board	13	$ 22.44	$ 291.72	Risers-1 x 10 x 3' Red Oak Board	14	$ 22.44	$ 314.16
Oak 14' Handrail	1	$ 92.12	$ 92.12	Oak 16' Handrail	1	$ 105.28	$ 105.28
1/2" x 44" Wrought Iron 1-Basket Baluster	24	$ 6.15	$ 147.60	1/2" x 44" Wrought Iron 1-Basket Baluster	39	$ 6.15	$ 239.85
Total			**$ 816.48**	**Total**			**$ 966.64**

Savings	**$ 150.16**

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal will lower the costs of construction. Costs are lowered first by a reduction in materials to construct a stairway, including materials for stringers, finish treads & risers and handrails/guardrails. (see materials estimates below) Framing structural requirements may also be reduced because the openings in the floors are smaller, resulting in shorter spans for materials and smaller loads. And lastly by increasing the amount of usable space recovered by the reduction in area used by the stairway.

An owner is paying for this space even though it's used by the stairway. At an average cost of $300/ft^2, returning that additional square footage to usable floor space can equate to an added value per floor served of $1200-$1500.

RB121-25

RB122-25

IRC: R318.7.5.2.1, R318.7.8

Proponents: David Cooper, Stair Manufacturing and Design Consultants, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.7.5.2.1 Winder treads. *Winder* treads shall have a tread depth of not less than 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. *Winder* treads shall have a tread depth of not less than 6 inches (152 mm) at any point within the clear width of the *stair*. Within any *flight* of stairs, the largest *winder* tread depth at the walkline shall not exceed the smallest *winder* tread by more than $^3/_8$ inch (9.5 mm). Consistently shaped *winders* at the walkline shall be allowed within the same *flight* of stairs as rectangular treads and shall not be required to be within $^3/_8$ inch (9.5 mm) of the rectangular tread depth. <u>Adjacent winder tread segments within a flight of stairs that reverse the rotation of travel direction shall be separated by not less than one tread adjoining parallel risers and handrails complying with Section R320 shall be required on both sides of the flight.</u>

Exception: The tread depth at *spiral stairways* shall be in accordance with Section R318.7.11.1.

R318.7.8 Handrails. *Handrails* shall be provided on not less than one side of each *flight* of stairs with four or more *risers*.

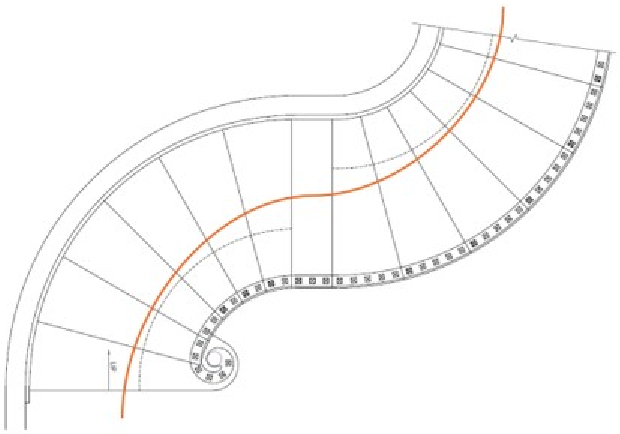
<u>**Exception:** A flight of stairs with winders that reverse the direction of rotation within a flight in accordance with Section R318.7.5.2.1, shall have handrails on both sides.</u>

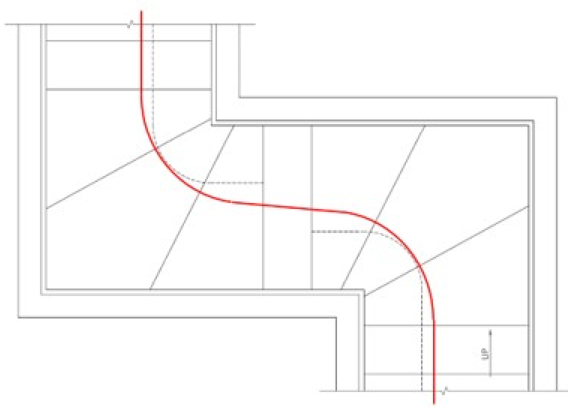
Reason: Stairways of an 'S'-shape in plan are becoming prevalent and are not being designed properly. The code currently lacks critical guidance for the designer. An 'S'-shaped stair requires the user to reverse the direction of travel and this most commonly is accompanied by a traverse to the opposite side of the stairway to take the shortest route and minimize the gait change required if they were to maintain travel on the same side of the stairway. *Please see the figure below illustrating this behavior.*

This change provides for a transition step that has a constant tread depth across the width of the stair and a handrail on both sides to assist with postural stabilization through the required gait change and transverse traverse across the flight. It is important to note that this would only be required where winder segments are reverse with in a flight. Reversing winder segments within separate flights of a stairway would have a landing between them to provide for the gait change and the single handrail could be located on the side most convenient for the user.

Properly Designed Reversing Winder or 'S'- Shaped Stairways

The black dashed line indicates the walkline per R318.7.4. The red line indicates the most common path on reversing winder stairways. Both these stairs have a single flyer (tread with parallel edges) to aid in gait transition. This transition flyer prevents walking from a narrow tread to a wide tread as the user moves to the opposite side of the stair and eliminates radical pitch changes in the handrail. A second handrail would provide additional support as the user changes gait and shifts to the opposite side.





Cost Impact: The 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 only provides clarifying guidance currently lacking in the code for the safe design of 'S'-shaped stairs and has no impact of the cost of construction.

RB122-25

RB123-25

IRC: R318.7.5.2.1

Proponents: Jay Osborne, representing FreeFarmhouse LLC (jay@freefarmhouse.com)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.7.5.2.1 Winder treads. *Winder* treads shall have a tread depth of not less than 10 inches (254 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. *Winder* treads shall have a tread depth of not less than 6 inches (152 mm) at any point within the clear width of the *stair*. Within any *flight* of stairs, the largest *winder* tread depth at the walkline shall not exceed the smallest *winder* tread by more than $^{3}/_{8}$ inch (9.5 mm). Consistently shaped *winders* at the walkline shall be allowed within the same *flight* of stairs as rectangular treads and shall not be required to be within $^{3}/_{8}$ inch (9.5 mm) of the rectangular tread depth.

~~Exception~~ Exceptions:

1. Winder treads are permitted to converge to a single point at the inside of the stair turn under the following conditions:
   1.1. The treads shall turn either 30 degrees or 45 degrees per tread, with no variation, to complete a 90-degree turn.
   1.2. No single set of winder treads shall exceed a total turning angle of 90 degrees within the stair flight.
2. The tread depth at *spiral stairways* shall be in accordance with Section R318.7.11.1.

Reason:

Modern winder regulations are always confusing people.

Over the last 10 years, I've designed 9 small houses that included winder stairs. Though code-compliant, I've seen that builders tend to change them at the last minute, often by pushing around walls and creating other problems. No matter how detailed my documentation, modern winders seem to scare builders. And regarding details, I've heard of too many code interpretations.

Current US codes make winders overly complicated and expensive to design and build. Architects (who spend countless hours working out those details) don't complain because they can just charge their clients a ton of money. Winders are typically used in challenging, spatially-constrained situations.

The design of winder stairs often costs more than the construction.

Roughly 98-99% of homes aren't custom designed by architects. Yet the vast majority of people can benefit, (or have benefited) from winder stairs. Because these people tend to live in urban areas or smaller residences, they would need winders most of all.

The winders proposed here are perfectly legal in most countries.

Winder stairs have proven their worth for millennia. And from Canada to the Netherlands, they're still allowed to go to a point. They are, of course, much more regulated than in the past. For instance, those exemplary countries allow winders to have 30-degree or 45-degree treads, for a 90-degree turn. If we learn from history, we'll see such well-developed countries are perfectly correct to allow winders to go to a point. And those countries care more about safety than the US does.

All across America, I've visited countless old buildings with winder stairs.

I always talk to tour guides about winders. They know that 99.999% of their unique visitors can safely navigate winder stairs that go to a point. Even the extremely steep ones, like those built in the 1700s.

I take note of where the treads are worn down. And the reality is that the walkline is different than what the code says. People always walk a few inches further from the inside corner. That's an ergonomic reality, easily seen in worn-out winder stairs. The stairs worth preserving are the stairs we should learn from.

Modern winders fail at their primary purpose.

Having designed so many houses with code-compliant winders, I'm still extremely frustrated that modern ones waste so much space. When you also account for head clearances, they're hard to squeeze into small houses, like backyard cottages. And that's where they're needed most.

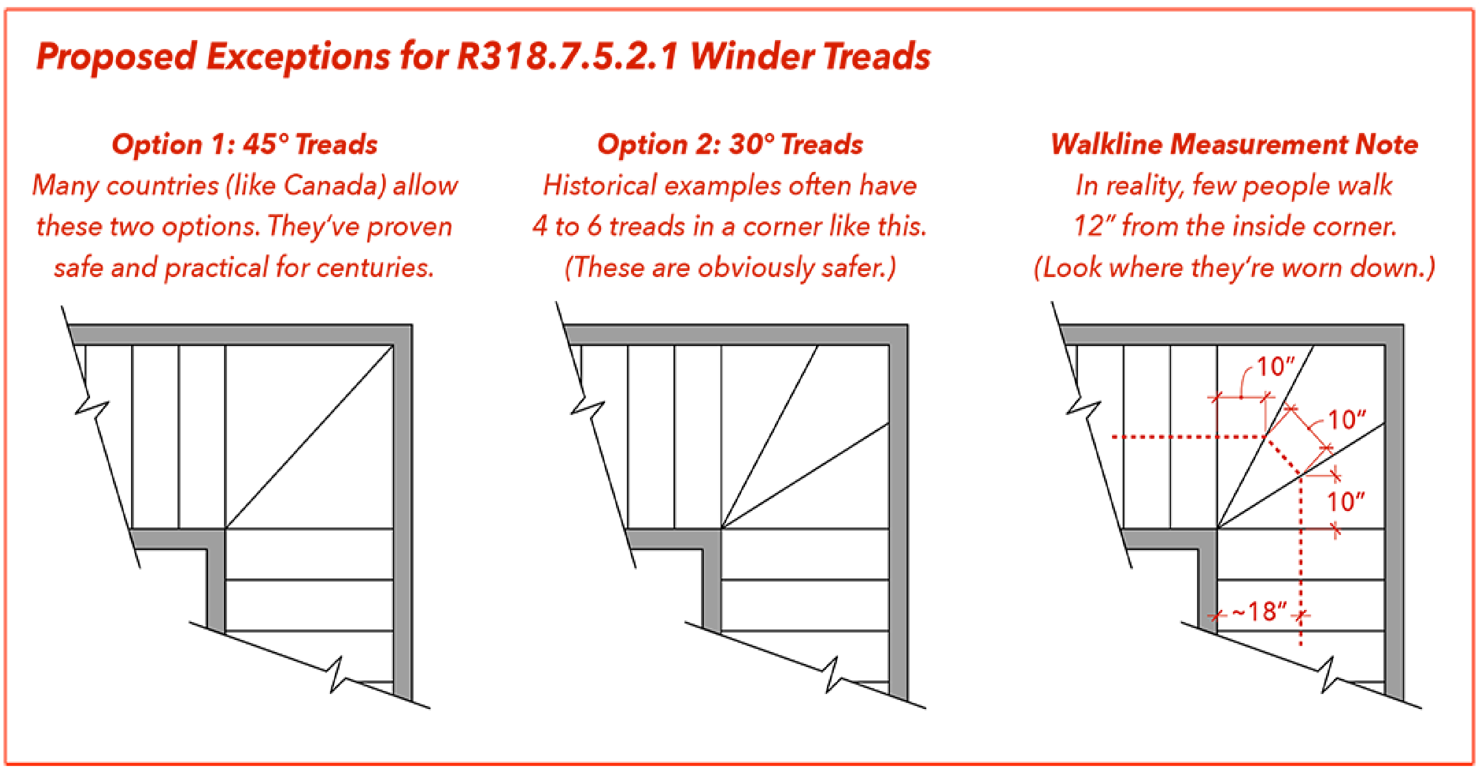
Modern US codes allow a pleasant degree of flexibility in the design of winders, but the most common and practical application is neglected. That is, they're best when making a 90-degree turn, as spatially- and cost-efficient as possible. Historically, that was their main purpose.

Current regulations are still useful, but we need a simple exception.

I'm proposing to just copy the code from other countries, to make an exception where ***— in a very limited (but common) condition —*** winders can go to a point.

Other countries have shown these to be just as safe as the current IRC requirements. They're almost necessary for buildings with narrow footprints. And since such winders are fantastic for low-cost, small houses, this amendment will show that the ICC cares about today's housing crisis.

Bibliography:



I can provide more diagrams, renderings, or photos upon request.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The most immediate costs are about design and permitting.

I'm very good at designing small houses with winder stairs, but it still takes hours to create plans for them. Their design demands hours to be crafted to a particular situation (head clearances and assembly details are the hardest parts). And it takes hours more to make sure the documentation is clear for builders. Hours more to make sure they aren't cutting corners. And hours more to make sure that code officials don't flag it for whatever reason.

Altogether, winder stairs can take 10-40 hours worth of design services, costing $100-200 per hour. In other words, the design of winder stairs adds $1000-8000 to a budget, even for projects where the design is mostly copied. And that's not even including the added construction costs.

Estimated Immediate Cost Impact Justification (methodology and variables):

Winders are best for small and economical houses.

If you're designing huge mansions, like most architects, the added cost is not a major issue. But winders make the most sense in spatially-constrained houses. They're a fallback solution (no pun intended) that's needed when there isn't enough space for a full 36"x36" landing. Yet such staircases are extremely common throughout history because they've proven safe and adequate for their purpose.

The design price tag is one thing. Then you have to wonder if the builders are going to move something by a few inches, causing all kinds of headaches and added costs. In my experience, this is almost to be expected in projects where architects aren't in full control. In other words, low-cost housing.

Simplicity saves money.

By adopting the same requirement as Canada (etc), my proposal simplifies the design and construction of the most useful application of winder stairs: A quick turn that prevents you from wasting precious space in a small house. It's easier to design. It's easier to build. And it's easier to understand its purpose.

RB123-25

RB124-25

IRC: R318.7.6

Proponents: David Cooper, Stair Manufacturing and Design Consultants, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2024 International Residential Code

SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.7.6 ~~Landings for stairways~~Stairway landings. There shall be a floor or landing at the top and bottom of each *flight* of stairs. The width perpendicular to the direction of travel shall be not less than the width of the *flight* served. For landings of shapes other than square or rectangular, the depth at the walk line and the total area shall be not less than that of a quarter circle with a radius equal to the required landing width. Where the *stairway* has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

Exceptions:

1. The top landing of an interior *stairway*, including those in an enclosed garage, shall be permitted to be on the other side of a door located at the top of the *stairway* , provided that the door does not swing over the stairs.
2. At an enclosed garage, the top landing at the *stair* shall be permitted to be not more than $7^{3}/_{4}$ inches (197 mm) below the top of the threshold.
3. Where there are not more than two risers at ~~At~~ an exterior door ~~s,~~ and the door does not swing over the tread a top landing is not required ~~for an exterior stairway of not more than two risers, provided that the door does not swing over the *stairway*~~.
4. An exterior *flight of stairs* ~~Exterior *stairways*~~ to grade with three or fewer *risers* serving a deck, porch or patio shall have a bottom landing width of not less than 36 inches (914 mm), provided that the stairway is not the required access to grade serving the required egress door.

Reason: The changes to exceptions 3 and 4 are intended to more clearly state the intent of the code.

- In exception 3 a stair with two risers and no landing is not a stairway but rather a single tread. Substitution of tread for stairway eliminates a confusing misuse of the defined term. Changes to the syntax eliminates verbiage and clarifies.
- In exception 4 the defined term "stairway" is incorrect. Substitution of "flight of stairs" for "stairway" allows application of the exception for a flight of stairs that is part of a stairway of more than 3 risers but includes an intermediate landing and a bottom flight of 3 or fewer risers.

Cost Impact: The 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 provides editorial substitutions using defined terms for stairways correctly to clarify the intent of the code with no changes impacting the cost of construction.

RB124-25

RB125-25

IRC: R318.7.7

Proponents: David Cooper, Stair Manufacturing and Design Consultants, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2024 International Residential Code

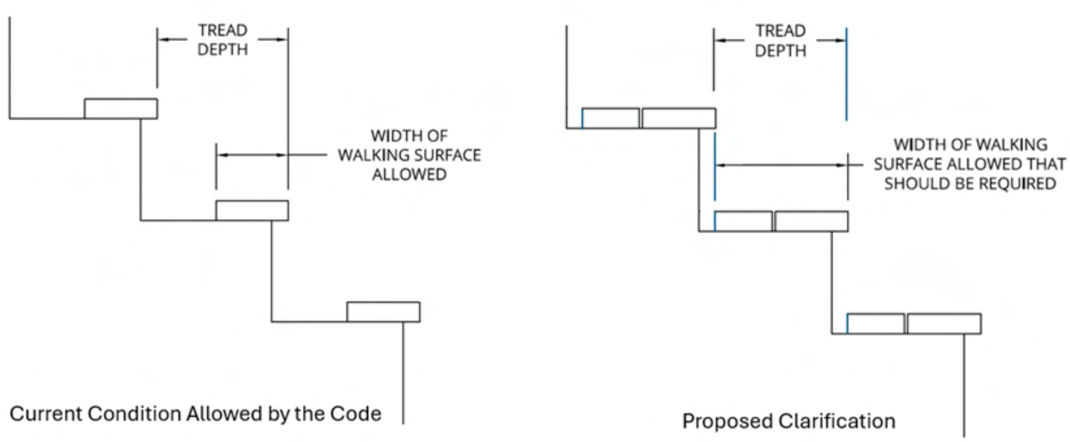
SECTION R318
MEANS OF EGRESS

Revise as follows:

R318.7.7 Stairway walking ~~surface~~ <u>surfaces</u>. <u>The width of stairway walking surfaces in the direction of travel shall be not less than the required tread or landing depth and the length perpendicular to the direction of travel shall extend to a point not more than 2 inches (51 mm) measured horizontally from the wall, face of the guard infill or other surface limiting the opening at the end of the walking surface.</u> The walking surface of treads and landings of *stairways* shall be sloped not steeper than 1 unit vertical in 48 units horizontal (2-percent slope).

> **Exception:** Where the surface of a landing is required elsewhere in the code to drain surface water, the walking surface of the landing shall be sloped not steeper than 1 unit vertical in 20 units horizontal (5-percent slope) in the direction of travel.

Reason: The code currently only requires a distance measured from <sic> "nosing to nosing" described as tread depth but fails to describe the width or length of the actual walking surface. This proposal adds appropriate requirements to the existing section **Walking surface** to provide an adequate surface for placement and support of the users feet in ascent and descent of the stairway providing width and depth requirements in addition to the current slope limit. The drawings and pictures below illustrate the need for this 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:

The change offers clarification by further describing the walking surface and has no impact on the cost of construction.

RB126-25

IRC: R319.1

Proponents: Jenifer Gilliland, Seattle Department of Construction and Inspections, representing Washington Association of Building Officials Technical Code Development Committee (jenifer.gilliland@seattle.gov); Micah Chappell, Seattle Dept. of Construction and Inspections (SDCI), representing Washington Association of Building Officials Technical Code Development Committee (WABO TCD) (micah.chappell@seattle.gov)

2024 International Residential Code

SECTION R319 EMERGENCY ESCAPE AND RESCUE OPENINGS

Revise as follows:

R319.1 Emergency escape and rescue opening required. *Basements, habitable attics,* ~~the room to which a sleeping loft is open,~~ and every sleeping room shall have not less than one operable *emergency escape and rescue opening*. Where *basements* contain one or more sleeping rooms, an *emergency escape and rescue opening* shall be required in each sleeping room. *Emergency escape and rescue openings* shall open directly into a *public way*, or to a *yard* or *court* that opens to a *public way*.

Exceptions:

1. Basements used only to house mechanical *equipment* not exceeding a total floor area of 200 square feet (18.58 m^2).
2. Storm shelters constructed in accordance with ICC 500.
3. Where the dwelling *unit* or *townhouse unit* is equipped with an automatic sprinkler system installed in accordance with Section P2904, sleeping rooms in *basements* shall not be required to have *emergency escape and rescue openings* provided that the *basement* has one of the following:
   3.1. One means of egress complying with Section R318 and one *emergency escape and rescue opening*.
   3.2. Two means of egress complying with Section R318.
4. A *yard* shall not be required to open directly into a *public way* where the *yard* opens to an unobstructed path from the *yard* to the *public way*. Such path shall have a width of not less than 36 inches (914 mm).
5. <u>Sleeping lofts shall be permitted to be served by an *emergency escape and rescue opening* in the room to which the sleeping loft is open.</u>

Reason: This proposal coordinates the 2027 IRC with proposed changes for the 2027 IBC Appendix P Sleeping Lofts being heard in the IBC General Committee. A new exception 5 permits a sleeping loft to be served by an EERO in the room it opens into (a sleeping room or another room, like a family room, den, etc.) **OR** by an EERO in the sleeping loft itself. An EERO does not have to be located in the sleeping loft to provide adequate safety. It can be impractical to locate the EERO in the loft in many dwelling unit configurations because the loft would either have to abut an exterior wall or be located just below a roof. Given the presence of good early warnings for sleeping loft occupants (the sleeping loft must be open to the space with a smoke alarm in close proximity), having an EERO in the room where the sleeping loft is located should provide adequate safety.

These changes are not intended to override the requirement for an EERO in a sleeping room or to allow a single EERO located in a sleeping loft to be the only EERO serving the sleeping room that the loft opens into. If the loft is located within a bedroom, a person sleeping on the bedroom level should not have to climb up into the sleeping loft to get to an EERO. In cases where a sleeping loft opens into a space like a family room, the family room itself wouldn't be required to have an EERO, but the sleeping loft would, and the EERO could be located in the loft or the family room.

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

Justification for no cost impact:

There is no cost impact. The proposed changes would clarify that the placement of the EERO can be either in the sleeping loft itself or in the space that the sleeping loft opens into.

RB126-25

RB127-25

IRC: SECTION R202 (New), R319.1.1

Proponents: Mike Fischer, Fischer Advocacy, representing Mighton Products (mdfischer@outlook.com)

2024 International Residential Code

Add new definition as follows:

<u>**WINDOW OPENING CONTROL DEVICE.** A window hardware device that controls the window sash opening and includes a release mechanism that allows the window to serve as an *emergency escape and rescue opening*.</u>

SECTION R319
EMERGENCY ESCAPE AND RESCUE OPENINGS

R319.1.1 Operational constraints and opening control devices. *Emergency escape and rescue openings* shall be operational from the inside of the room without the use of keys, tools or special knowledge. <u>The use of window stops, night latches or other devices that restrict the window from opening to the *emergency escape and rescue opening* dimensions required by this section shall not be permitted.</u> Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as a required *emergency escape and rescue opening* and shall be not more than 70 inches (178 cm) above the finished floor.

Reason: There is confusion among child safety advocates regarding the use of devices to help reduce child window fall incidents. As an example, some public health groups recommend the use of window locks, window stops, or night latches to reduce the clear window opening. While well-intentioned, this safety messaging almost universally ignores the potential impact of window locks on the emergency escape and rescue provisions of the code.

This proposal adds a definition of window opening control device to help establish the dual role of the devices- child fall safety and home fire safety. The additional provision regarding window locks and other devices makes it clear that such devices are not permitted on windows used as emergency escape and rescue openings. With the definition, this provision will aid in code enforcement by making it crystal clear that only ASTM F20290 compliant devices can be used on windows that serve as emergency escape and rescue openings.

WDMA and FGIA released a technical bulletin in 2024 (AAMA/WDMA TB-24-01) that includes the following information about window hardware:

"Vent stops and night latches are devices that may be installed on windows (typically single or double-hung windows or sliding or gliding windows) as a means of providing natural ventilation while attempting to discourage unwanted entry of an intruder. It can be confusing, as these devices can look similar to or even partially function similar to WOCDs, but do not meet the requirements of the ASTM F2090 standard and should not be mistaken as a window fall prevention device. Caution should be taken before using vent stops or night latches on any window designated or intended for emergency escape and rescue. Vent stops and night latches which cannot be released, and which restrict the sash from being fully opened should not be used on windows designated or intended for emergency escape and rescue."

And:

"Vent limiters, night latches and other limiting devices Other types of devices that limit the window sash opening include vent limiters, night latches or vent stops — none of which fall under the scope of ASTM F2090. These devices can be installed on all operable window types (hung, sliding or gliding, or casement/awning styles) to limit the sash opening to let air in or out for ventilation. Vent limiters are devices that restrict the sash opening and typically require a tool or removal of a fastener to open the sash fully. As such, these devices should not be installed on windows required for emergency escape and rescue. If a vent limiter restricts a sash to a less than a four-inch opening, it is possible that a building code official will accept it as an option to the minimum sill height code requirement provided that the vent limiter is not installed on a required emergency escape and rescue (egress) opening. Vent limiters may also be used in applications where windows are installed greater than 75 feet above grade. Vent stops or night latches are devices that may limit the sash opening but do not meet the criteria for a WOCD per ASTM F2090. Therefore, they would not be allowed as an option to the minimum sill height code requirement but may be of interest to occupants as a way of restricting the sash opening. Night latches allow the sash to open a limited distance for ventilation, while limiting the amount a window sash is open, which can help support home security. Caution should be taken before using vent stops or night latches on any window designated or intended for emergency escape and rescue. Vent stops and night latches which cannot be released, and which restrict the sash from being fully opened should not be used on windows designated or intended for emergency escape and rescue."

To download the Technical Bulletin visit:
https://wdma.memberclicks.net/assets/docs/TechnicalCenter/AAMA-WDMA_TB-24-01_UL.pdf

This proposal will assist code officials with interpretation and enforcement of the window fall and emergency escape and rescue opening provisions of the code, while also providing an opportunity to improve child safety and home fire safety advocacy programs. It is critical that both fall and fire safety issues are considered when enforcing the code and educating the public.

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

Justification for no cost impact:

The proposal adds no mandatory requirements.

RB127-25

RB128-25

IRC: R319.4.1, FIGURE R319.4.1 (New)

Proponents: David Hoagland, representing Rockwell Window Wells (dave@rockwellinc.com); Rodney Slade, representing Rockwell Window Wells (rodney@rockwellinc.com); Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R319
EMERGENCY ESCAPE AND RESCUE OPENINGS

Revise as follows:

R319.4.1 Minimum size. The minimum horizontal projection of the area well shall be 36 inches (914mm) at the center of the emergency opening and the minimum horizontal width shall be 36 inches (914mm) in the plane of the opening along the wall, in accordance with Figure 319.4.1. The minimum horizontal area of the area well shall be ~~not less than~~ 9 square feet (0.9 m^2)~~, with a horizontal projection and width of not less than 36 inches (914 mm). The size of the area well~~ and shall allow the *emergency escape and rescue opening* to be fully opened.

Exception: The ladder or steps required by Section R319.4.2 shall be permitted to encroach not more than 6 inches (152 mm) into the required dimensions of the area well.

Add new text as follows:

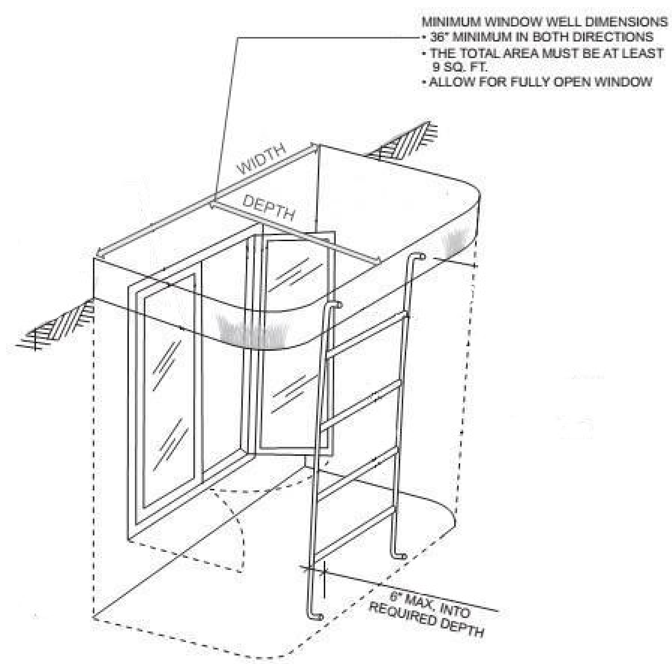
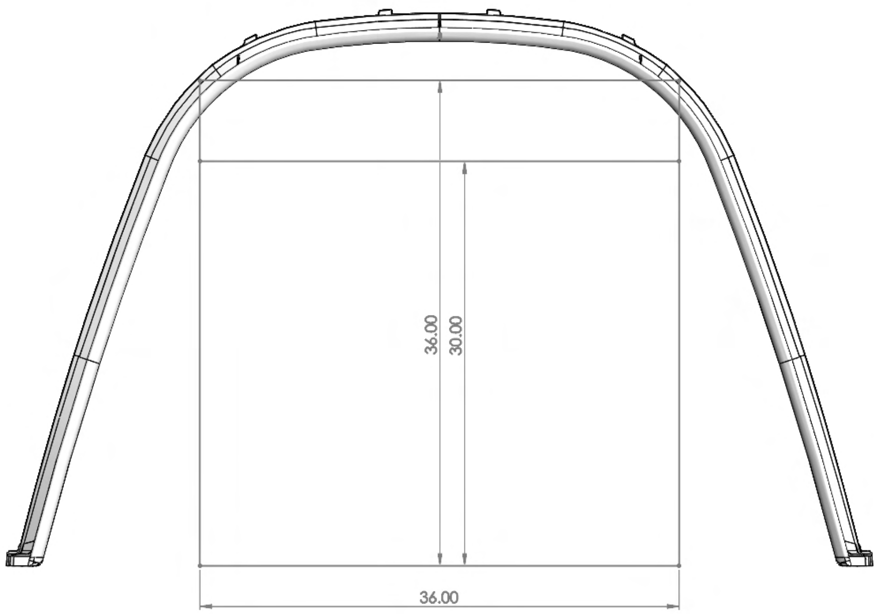


FIGURE R319.4.1 MINIMUM HORIZONTAL PROJECTION FOR AREA WELLS

Reason: Window wells are not manufactured in square shapes with sharp corners, and this is due to the need to resist lateral soil loads. Window wells, like windows, come in all different shapes, and the location of the window within the well is not always the same. For this reason, when window well minimum requirements were originally added to the 1994 Uniform Building Code, both a minimum dimension and a minimum area was included. In the same way an emergency opening can have different minimum dimensions, yet also must meet a minimum area, so must a window well.

However, as written, the IRC is often interpreted as requiring a 36-inch by 36-inch square outside the window opening. If this were the intent, there would have never been a reason to state that 9 square feet is also required. A 36-inch x 36-inch square is always 9 square feet. It is for this reason we believe the 36-inch dimensions should be clarified, and they should be so clarified with relation to the window location. Due to the structural necessity of window well design, the outside corners are typically curved, and the sides are angled as they return to the foundation wall. These designs provide for a 36-inch dimension at the window opening against the wall and a 36-inch dimension away from the wall at the center of the well. Though the outside corners of the well are less than 36 inches from the foundation wall, due to the non-square shape, 9 square feet of area is still achieved, but not as a 3'x3' square. The exception of allowing a ladder or steps to encroach up to 6 inches further demonstrates that a theoretical 3'x3' square is not intended to be the interpretation of the dimensional requirements.



We do not believe these shapes present a hazard to escape and rescue. Utilizing clear minimum dimensions with relation to the window and separately requiring a minimum area, will allow for a greater variety of strong and inexpensive design options for consumers of window wells. Currently no nationally distributed window wells provide an area equal to a 36-inch by 36-inch square. Clarification supporting this proposal is currently presented in the International Fire Code Commentary to section 1030.5.1, stating that the critical width dimension is “in the plane of the window along the wall”.

1030.5.1 Minimum size.

The minimum horizontal area of the window well shall be 9 square feet (0.84 m^2), with a minimum dimension of 36 inches (914 mm). The area of the window well shall allow the *emergency escape and rescue opening* to be fully opened.

C ❖ This section specifies the size of the window well that is needed for a rescue person in full protective clothing and breathing apparatus to use the rescue opening. The required 9 square feet (0.84 m^2) is the size of the window well. Thus, the window well must project away from the plane of the window at least 3 feet (914 mm), and the required dimension in the plane of the window along the wall is also 3 feet (914 mm) (see Commentary Figure 1030.5).

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:

The change proposal seeks to further clarify where to measure the required dimensions and has no impact on the cost of construction.

RB129-25

IRC: R319.4.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com); MICHAEL ENDERLIN, The Bilco Company, representing Residential Products Sales Manager (michael.enderlin@bilco.com)

2024 International Residential Code

SECTION R319
EMERGENCY ESCAPE AND RESCUE OPENINGS

Revise as follows:

R319.4.1 Minimum size. The horizontal area of the area well shall be not less than 9 square feet (0.9 m^2), with a horizontal projection and width of not less than 36 inches (914 mm). The size of the area well shall allow the *emergency escape and rescue opening* to be fully opened.

~~Exception~~: Exceptions:

1. The ladder or steps required by Section R319.4.2 shall be permitted to encroach not more than 6 inches (152 mm) into the required dimensions of the area well.
2. Where bulkhead enclosure stairways are in accordance with Section R318.7.11.2 and Section R319, the 36 inch (914 mm) horizontal projection shall not be required at the bottom of the stairway.

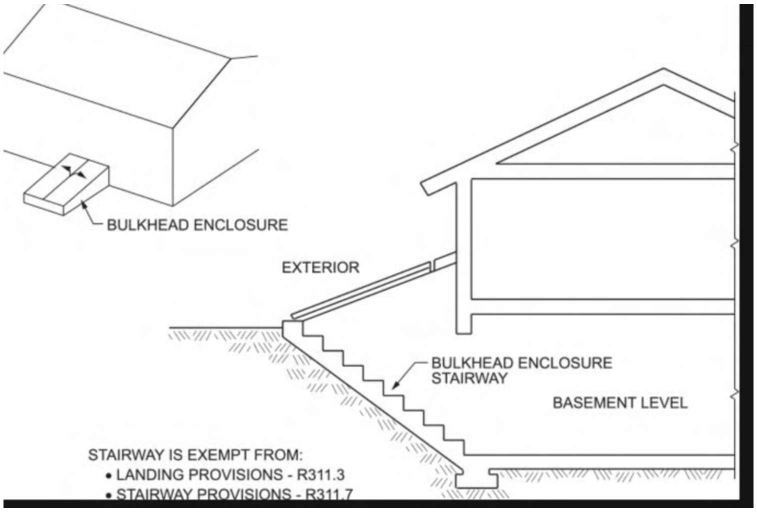
Reason: The current language in the 2024 IR would not allow a typical bulkhead enclosure to function as an emergency escape and rescue opening where the stairs end at a door at a foundation opening. This is due to there being no 36 inch clearance from the door to the first step.From the last few cycles of changes it looks like this was an unintended consequence.

In the 2015 IRC, R310.3.2 does not provide clearances outside of doors for EERO at bulkheads, as the "window well" sizes were in R310.3.3. The illustration provided with this proposal was allowed as an EERO.

In the 2018 IRC proposal RB96-16 argued that there should be no difference between doors and windows for EERO, however, R310.3.2 was changed to only include the 36 inch width for door, but nothing for 36 inches from the door. Typical bulkhead doors were still acceptable.

In the 2021 IRC, proposal RB100-19 changed these section to create an "area well" section for both EERO windows and doors. This effectively ended the use of the typical bulkhead stairs that terminate at the door from being an EERO. However, there is no mention of that as an intent in the reason statement of the proposal. In the testimony for this change during the hearing it was twice stated that "there is no technical change". I testified to this proposal for a different reason, and I didn't notice either that there actually was a change in application.

I am making this proposal to be sure this elimination of bulkhead stairs for EERO is the intended goal of the IRC. It seems like a door to a stairway not more than 8 feet tall and in a bulkhead enclosure would be a pretty good EERO, considering you could also be on the other side of a third story window screaming for rescue and that is an acceptable EERO.



Cost Impact: The 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 many different ways to design an emergency escape and rescue opening. This proposal allows for a method that was previously permitted. It's a new choice, so it has no affect on the cost of construction. It just provides more freedom of design.

RB129-25

RB130-25

IRC: R319.4.2.2, R319.4.2.3 (New)

Proponents: David Hoagland, representing Rockwell Window Wells (dave@rockwellinc.com); Rodney Slade, representing Rockwell Window Wells (rodney@rockwellinc.com); Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R319
EMERGENCY ESCAPE AND RESCUE OPENINGS

Revise as follows:

R319.4.2.2 Steps in area wells around doors. Steps in an area well around doors shall have an inside width of not less than 12 inches (305 mm), a minimum tread depth of 5 inches (127 mm) and a maximum riser height of 18 inches (457 mm) for the full height of the area well.

Add new text as follows:

R319.4.2.3 Steps in area wells around windows. Steps in areas wells around window shall have an inside width of not less than 12 inches (305 mm), a minimum tread depth of 3 inches (127 mm) and a maximum riser height of 18 inches (457 mm) for the full height of the area well.

Reason: Proposal RB101-19 in the creation of the 2021 IRC changed the requirements for steps leading from an EERO by clearly stating a minimum required 5-inch horizontal depth for area wells. Prior to this approved change, and since the original 2000 edition of the IRC, steps in a window well were most commonly interpreted as requiring the same 3-inch depth required for ladders. Many window well manufacturers have been manufacturing wells with steps built in that meet the previous 3 inch distance. There has been no evidence presented during this time or during the code development hearings that the previous dimension presented a hazard, created injury, or prohibited escape or rescue.

It is understandable that since there was no clear definition of step dimensions, one was needed. In an effort to align with IBC code, the term "area well" was used to define the feature/space. Area well has a broad meaning and can include space outside a door, window, or even utilities, such as HVAC systems. Area wells, giving access to doors and utilities, have the potential for being used far more often than just for emergency escape and rescue (see Images 1 and 2). Window wells are a specific subset of area wells that are intended solely for emergency escape and rescue (see Image 3), and as such, warrant its own code requirement within a residential application.

Key Differences

Feature	Window Well	Area Well
Size	Smaller, fits around windows	Larger, fits around doors or utility spaces
Purpose	Light, ventilation, egress for windows	Access, protection, maintenance
Shape	Semicircular or rectangular	Typically rectangular
Use	Residential and light-duty	Utility, maintenance, heavy-duty

Image 1- Area Well

Image 2- Area Well

Image 3- Window Well

Additionally, the code was added during a time of challenging communication and input when both COVID 19 and divergent code affected the process. Because of this, due diligence and communication was difficult. The code change increases the cost of egress on the window well as well as options that are available to the consumer. Furthermore, the code change has a significant impact on the safety of side yards which are trending to be smaller and more restrictive due to home affordability. Contrary to the previous proposal, most of the current window wells on the market do not meet the current R319.4.2.2 code, including the example of an acceptable window well in the orginal 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:

Although Proposal RB101-19 in the creation of the 2021 IRC stated that it had no cost impact, the result required a larger product which increases materials to produce, requires additional excavation, and consumes more space on the property. All of these impacts increase the cost to the manufacturer, builder, and homeowner.

This change proposal seeks to allow the current code for area wells to remain unchanged, while allowing current window well products to remain as an affordable option that does not increase these costs.

RB130-25

RB131-25

IRC: R319.4.4.1 (New)

Proponents: Thomas Zuzik Jr, Railingcodes.com, representing National Ornamental and Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2024 International Residential Code

SECTION R319
EMERGENCY ESCAPE AND RESCUE OPENINGS

R319.4.4 Bars, grilles, covers and screens. Where bars, grilles, covers, screens or similar devices are placed over *emergency escape and rescue openings*, bulkhead enclosures or area wells that serve such openings, the minimum net clear opening size shall comply with Sections R319.2 through R319.2.2 and R319.4.1. Such devices shall be releasable or removable from the inside without the use of a key or tool or force greater than that required for the normal operation of the escape and rescue opening.

Add new text as follows:

R319.4.4.1 Opening assist devices. Where provided, non-powered actuators shall be permitted to assist the opening and lifting of a cover, hatch or grill and shall comply with each of the following:

1. A minimum of 2 actuators shall be installed for safety redundancy.
2. A single actuator shall operate the opening and lifting assist upon failure of the other actuator.

Reason: When grates, grills or other coverings are installed over an area well of an EERO. These units are sometimes installed with non powered assist devices to off set the weight of opening the grill, grate, hatch or cover with minimum effort.

Members of NOMMA have had these types of coverings over EERO area wells questioned and held up on acceptance by authorities having jurisdiction (AHJ) for not providing fail safe or backup.

This proposal is being submitted to provide a simplified solution with a safety redundancy that an AHJ can inspect simply in the field.

The following weblink is provide for watching a short video of an installation with a set of assist actuators installed. https://railingcodes.com/eeror319/

As to the requirement, this code proposal is not requiring that assist devices be installed, just clarifying they are allowed to be installed, and if installed that the grill, grate, hatch or cover be able to be opened with the use of one assist device and that a second unit is also installed as redundancy for if the other fails.

Bibliography: Website: https://railingcodes.com/eeror319/

Cost Impact: Increase

Estimated Immediate Cost Impact:

Estimated to be less than $60.00

Estimated Immediate Cost Impact Justification (methodology and variables):

If this non required assist device is elected to be installed to offset the weight of the grill, hatch or cover, the additional cost is for the 2nd unit only as redundancy safety for if one fails and is no longer simple to open.

Estimated Life Cycle Cost Impact:

The life cycle of these assist devices are similar to those used in the auto industry for lifting hoods, and range in life cycles based on the unit used.

These devices should be checked when the home's EERO exits are inspected.

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

The cost for these items are under $100.00 and could be changed, every 10 years or less, when the homes smoke detectors are swapped out.

RB131-25

RB132-25

IRC: SECTION R321, R321.1, R321.1.1, R321.1.2, R321.1.3, R321.1.4, SECTION R322 (New), R321.2, R321.2.1, R321.2.2

Proponents: Thomas Zuzik Jr, Railingcodes.com, representing National Ornamental and Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

2024 International Residential Code

Revise as follows:

SECTION R321
GUARDS ~~AND WINDOW FALL PROTECTION~~

R321.1 ~~Guards~~ General. *Guards* shall be provided in accordance with Sections R321.2 through R321.5 ~~R321.1.1 through R321.1.4.~~

R321.2 ~~R321.1.1~~ Where required. *Guards* shall be provided for those portions of open-sided walking surfaces, including floors, *stairs*, *ramps* and landings that are located more than 30 inches (762 mm) measured vertically to the floor or *grade* below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a *guard*.

R321.3 ~~R321.1.2~~ Height. Required *guards* at open-sided walking surfaces, including *stairs*, porches, balconies or landings, shall be not less than 36 inches (914 mm) in height as measured vertically above the adjacent walking surface or the line connecting the *nosings*.

Exceptions:

1. *Guards* on the open sides of *stairs* shall have a height of not less than 34 inches (864 mm) measured vertically from a line connecting the *nosings*.
2. Where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) as measured vertically from a line connecting the *nosings*.

R321.4 ~~R321.1.3~~ Opening limitations. Required *guards* shall not have openings from the walking surface to the required *guard* height that allow passage of a sphere 4 inches (102 mm) in diameter.

Exceptions:

1. The triangular openings at the open side of *stair*, formed by the *riser*, tread and bottom rail of a *guard*, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. *Guards* on the open side of *stairs* shall not have openings that allow passage of a sphere $4^{3}/_{8}$ inches (111 mm) in diameter.

R321.5 ~~R321.1.4~~ Exterior plastic composite guards. *Plastic composite* exterior *guards* shall comply with the requirements of Section R507.2.2.

Add new text as follows:

SECTION R322
WINDOW FALL PROTECTION

Revise as follows:

~~R321.2~~ R322.1 General ~~Window fall protection.~~ Window fall protection shall be provided in accordance with Sections ~~R321.2.1 and R321.2.2~~ R322.2 and R322.3.

~~R321.2.1~~ R322.2 Window opening height. In *dwelling units*, where the bottom of the clear opening of an operable window opening is located less than 24 inches (610 mm) above the finished floor and greater than 72 inches (1829 mm) above the finished *grade* or other surface below on the exterior of the *building*, the operable window shall comply with one of the following:

1. Operable window openings will not allow a 4-inch-diameter (102 mm) sphere to pass through where the openings are in their largest opened position.
2. Operable windows are provided with window opening control devices or fall prevention devices that comply with ASTM F2090.

~~R321.2.2~~ R322.3 **Emergency escape and rescue openings.** Where an operable window serves as an *emergency escape and rescue opening*, a window opening control device or fall prevention device, after operation to release the control device or fall prevention device allowing the window to fully open, shall not reduce the net clear opening area of the window unit to less than the area required by Sections R319.2.1 and R319.2.2.

Reason: Guards and Window fall protection are two different products and industries and 2 different forms of minimum protection.

By separating the two into their own Sections, it removes all questions of them working in conjunction.

Furthermore with each subject now in their own section, citing of the code is also simplified with the reduction of run on decimal places being removed from the equation.

As to the additional wording added in newly number section R321.5 exterior plastic composite guards, this is an editorial change that clarifies that these specific types of guards are also required to meet R507.2.2, in addition to R321.

We believe this code change proposal is editorial in nature and only helps clarify the code for the common user, in addition to the code enforcement community.

With the separation of the two, Window Fall Protection is moved to the next Section number, and the sections that follow after are to be renumbered in current order by staff.

Cost Impact: The 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 renumbering of a shared Section number by Guards & Window Fall Protection and splitting them into their own Section Numbers and clarifying plastic composite guards. The proponent of this proposal submits that there is no increase or decrease in costs as it is editorial.

RB132-25

RB133-25

IRC: R321.1.2

Proponents: David Cooper, Stair Manufacturing and Design Consultants, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2024 International Residential Code

SECTION R321
GUARDS AND WINDOW FALL PROTECTION

Revise as follows:

R321.1.2 Height. Required *guards* at open-sided walking surfaces, including *stairs*, porches, balconies or landings, shall be not less than 36 inches (914 mm) in height as measured vertically above the adjacent walking surface or the line connecting the *nosings*.

Exceptions:

1. *Guards* on the open sides of *stairs* shall have a height of not less than 34 inches (864 mm) measured vertically from a line connecting the *nosings*.
2. Where the top of the *guard* serves as a *handrail* on the open sides of *stairs*, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) as measured vertically from a line connecting the *nosings*.
3. At the transition of the handrail to the guard at the top of a flight the required guard height shall be not less than the handrail height for a distance not greater than 12 inches (305 mm) as measured horizontally from the landing nosing.

Reason: This proposed exception adds the language as approved by the IBC MOE committee in CAH2.

This is a needed change for two critical reasons:

1. Most consumers feel it advantageous to have the handrail at the lower end of the required height range, especially in homes with children and older persons unable to maintain erect posture or with shrinking stature that is inherent with aging.

2. The code measures stair guard and handrail height from a line connecting the nosings however guards at landings and floors are measured from the walking surface. Handrails must be continuous to a point directly above the riser however the landing extends beyond the riser as much as 1 ¼ inches. Currently the stair guard would have to be the exact same height as the level guard with a "sharp" and precise transition or a considerably higher stair guard to allow for a smooth transition by an over easing or a wreathed fitting, i.e. curved stair handrails. (A wreathed handrail "twists" to conform to the angle of incidence of the users grip as they ambulate through the raked turn of the stair).

The ability to make a smooth rounded transition from stair guard to the level guard at the landing allows a safe and continuous grasp of the handrail. This proposal offers a superior alternative to the use of a gooseneck (vertical type transition) or post at the transition from the stair guard/handrail (allowed in the code) providing a greater level of safety. The minimal decrease from the required landing guard height is only allowed at the top of a flight and occurs for a negligible distance. This type of transition has been common throughout the built environment for hundreds of years. Please review the illustrations below, Figures 1- 4, of common transitions.

Figure 1

Handrail to Post as permitted by code

Gooseneck from Handrail to Post as permitted by code

Gooseneck from Handrail to Guard as permitted by code

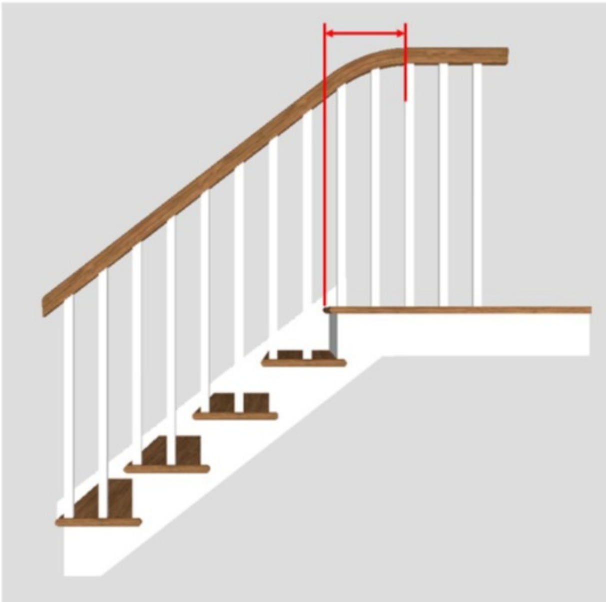
Figure 2

Simple Bisect of Handrail and Guard at Exactly Same Height
The arrow indicates area addressed by new exception

Figure 3

Wreathed transitions from Handrail to Landing Guard that provide continuous grip without interruption but require the proposed exception to the required landing guard height.

Figure 4



Preferred smooth transition of Handrail to landing Guard using over-easing at the top of a flight provides for continuous grip without interruption. Red dimension arrow indicates maximum 12 Inch distance where guard height exception would apply.

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

Justification for no cost impact:

This proposal offers needed clarification that will provide for safer handrails at the top of flights but does not require additional labor or materials affecting the cost of construction.

RB133-25

RB134-25

IRC: R321.1.3

Proponents: David Cooper, Stair Manufacturing and Design Consultants, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

2024 International Residential Code

SECTION R321
GUARDS AND WINDOW FALL PROTECTION

Revise as follows:

R321.1.3 Opening limitations. Required *guards* shall not have openings from the walking surface to the required *guard* height that allow passage of a sphere 4 inches (102 mm) in diameter.

Exceptions:

1. The triangular openings at the open side of *stair*, formed by the *riser*, tread and bottom rail of a *guard*, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. *Guards* on the open side of *stairs* <u>and at intermediate landings between flights within a stairway,</u> shall not have openings that allow passage of a sphere $4^3/_8$ inches (111 mm) in diameter.

Reason: Landings within a stairway must be accessed by a stair where the opening limitation is 4 3/8 inches yet when you get to the landing the code requires a smaller limit. The 4 3/8 inch sphere rule exception was allowed at stair guards for several reasons but of most consequence was the fact that the 95th percentile child of head and chest size susceptible to fall through at greater less than 4 3/8 inches are at the development age of just being able to sit-up and would not be unattended on a stair as might be probable at a floor area adjacent to a guard. We propose that the same reasoning should be applied at intermediate landings within a stairway.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

Although not significant increasing the opening limitation would decrease the cost of a landing guard.

Estimated Immediate Cost Impact Justification (methodology and variables):

A typical intermediate landing guard with vertically oriented balusters or wood or metal might be 42" in length and require 1 less baluster at a material and labor savings of $10 - $25 for most commodity wood or metal balustrades.

RB134-25

RB135-25

IRC: R321.1.3.1 (New), TABLE R321.1.3.1(1) (New), TABLE R321.1.3.1(2) (New)

Proponents: Ashley Goodin, Technical Services, representing Stairbuilders and Manufacturers Association (ashley.goodin@stairways.org)

2024 International Residential Code

SECTION R321
GUARDS AND WINDOW FALL PROTECTION

R321.1.3 Opening limitations. Required *guards* shall not have openings from the walking surface to the required *guard* height that allow passage of a sphere 4 inches (102 mm) in diameter.

Exceptions:

1. The triangular openings at the open side of *stair*, formed by the *riser*, tread and bottom rail of a *guard*, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. *Guards* on the open side of *stairs* shall not have openings that allow passage of a sphere 4$^{3}/_{8}$ inches (111 mm) in diameter.

Add new text as follows:

R321.1.3.1 Cable infill opening limitations. Where flexible cables of any material are components of the guard infill located between the walking surface and the required guard height, the guard infill shall comply with all of the following:

1. Each cable shall be installed with hardware designed specifically for use in guard infill systems in accordance with the manufacturers' instructions for the frame materials to be used.
2. When measured with a strain indicator, it must be in accordance with the tension values in Table R321.1.3.1(1) for the cable diameter, cable length, span, and tension used. Alternately, the distance between any two cables or a cable and another surface shall not exceed the applicable opening limitation and the values listed in Table R321.1.2.1(2) when a 4.4 pound (2.0 Kg) mass is suspended at mid span of weight is hung from any individual cable.
3. Cable infill materials used in exterior applications shall be manufactured for use in exterior applications.

Table R321.1.1.3.1(1) shall be in effect for the stated wire diameters, construction (lay), and clear span between supports. Overall cable length between terminations shall be distance between supports or greater. Measurements shall be taken with a hand-held strain gauge at the time of cable installation.

TABLE R321.1.3.1(1) CABLE TENSION BY CLEAR SPAN DISTANCE [a,b,c,d,e,f,g]

			Clear Span Between Supports (inch)							
Wire Diameter (inch)	Construction (Lay)	Wire separation spacing (inch)	24	32	36	40	48	60	72	80
			Minimum Required Tension (lbf)							
3/32	7x7	2-3/8	12.4	42.7	59.1	93.3	107.5	185.0	242.8	256.1
		3-1/8	85.9	141.6	165.1	185.2	230.4	289.6	NP	NP
3/32	1x19	2-3/8	7.9	49.0	69.7	90.4	131.5	182.1	252.9	297.9
		3-1/8	94.4	141.6	165.2	188.8	236.0	314.7	393.4	NP
1/8	7x7	2-3/8	3.4	40.0	60.7	70.6	113.8	148.4	216.9	262.6
		3-1/8	56.2	92.8	112.4	166.6	183.9	243.5	308.0	351.8
1/8	1x19	2-3/8	5.6	41.1	58.7	76.4	116.9	177.6	230.4	265.3
		3-1/8	73.1	124.8	150.6	176.5	230.4	299.0	387.8	445.1
3/16	1x19	2-3/8	1.1	1.1	2.2	3.4	4.5	33.0	133.3	200.1
		3-1/8	6.7	43.2	67.4	93.3	133.3	248.4	292.9	322.6
3/16	7x19	2-3/8	34.8	65.2	80.5	95.5	134.7	193.3	242.8	288.9
		3-1/8	88.6	147.0	176.5	205.7	257.0	333.8	418.1	473.2

For SI: 1 inch=25.6 mm.

a. Lay = number of strands by the individual wires in each strand. For example a lay of 7x19 consists of 7 strands with 19 individual wires in each strand.

b. Where a change of direction is made in a run of wire, the tensioning device is to be placed at the end of the longest span.

c. This table shall be permitted to be used for a set of non-continuous (single) vertical wires forming a barrier using the appropriate clear distance between posts as the vertical clear distance between the rails.

d. Where a 3.0 mm diameter wire is used, the tension figures for 1/8" diameter are applied.

e. Spans labeled "NP" are not allowed because the required tension would exceed the safe load of the wire.

f. Tension shall be measured with a strain indicator.

g. For wire diameters, lays, separation spacing, and spans not listed, results shall be permitted to be interpolated as necessary to meet or exceed stated values.

TABLE R321.1.3.1(2) MAXIMUM PERMISSIBLE DEFLECTION FOR CABLE INFILL BY SPAN [a,b,c,d,e]

		Clear Span Between Vertical Members (inch)					
Wire Diameter (inch)	Wire Separation Spacing (inch)	24	36	48	60	72	80
		Maximum permissible deflection of each wire when a 4.4 lb. mass is suspended at mid-span.(inch)					
3/32	2-3/8	11/16	7/16	3/8	5/16	5/16	5/16
	3-1/8	9/32	3/16	3/16	3/16	NP	NP
1/8	2-3/8	3/4	1/2	5/16	9/32	9/32	9/32
	3-1/8	5/16	1/4	1/4	3/16	3/16	3/16
3/16	2-3/8	3/4	1/2	5/16	5/16	9/32	9/32
	3-1/8	5/16	1/4	3/16	3/16	3/16	3/16

For SI: 1 inch=25.4 mm

a. Where a change of direction is made in a run of wire, the 4.4 lb mass shall be placed at the middle of the longest span.

b. Where a 3.0 mm diameter wire is used, the deflection figures for 1/8" diameter wire are applied.

c. This table shall be permitted to be used for a set of non-continuous (single) vertical wires forming a barrier using the appropriate clear distance between posts as the vertical clear distance between the rails. The deflection (offset) is measured by hooking a standard spring scale to the mid-span of each wire and pulling it horizontally until a force of 4.4 lbf is applied.

d. Spans labeled "NP" are not allowed because the required tension would exceed the safe load of the wire.

e. For wire diameters, separation spacing, and spans not listed, results shall be permitted be interpolated as necessary to meet or exceed stated values.

Attached Files

- **Part 3.9.2 Barriers and handrails _ NCC.pdf**
  https://www.cdpaccess.com/proposal/11819/35610/files/download/9379/
- **Part 2.5 Safe movement and access _ NCC.pdf**
  https://www.cdpaccess.com/proposal/11819/35610/files/download/9375/

Reason: This issue was previously considered during the 2024 cycle for IBC structural. To date, this body has not been presented with evidence of accident or number of injuries related to cable infill nor are such the subject of reports to the public. There is no doubt however that cable infill systems are highly desired by the public who by evidence of the numbers are not wary of cable systems as a life safety issue. Minimalist design, the appeal of the industrial and maritime aesthetics, not to mention visibility and sight lines are driving the demand.

Cable systems are in vogue, however, the conundrum we are here to resolve is solely a lack of guidance for users of the code and a nightmare for regulators that are left to interpret the intent of the code. This is not a life safety issue but purely an enforcement issue.

How do we measure the opening limitation when the opening is flexible? Surely applying the failure load as some have reasoned is overkill. The cable is not in failure mode. In the case of failure there would be no infill and the idea of an opening limitation would be a moot point. The measurement of the distance in question, the diameter of a sphere, is not a structural requirement, nor is this dimension a parameter of the structural properties of the guard system in question. There simply is no correlation of the failure load nor any reasoned portion thereof to the measurement of the opening limitation.

We know what works and it is clearly defined in the installation instructions of the major manufacturers of cable infill systems. When installed properly, Cable systems meet the guard requirements. This proposal provides clear, concise solutions to address conformance to code requirements for manufactureres, installers, and authorities having jurisdiction for enforcement.

This proposal seeks to incorporate elements from the Australian National Construction Code, Volume Two, Amendment 1 – 2019. This model building code allows for two different yet effective assessments for determining the ability of a flexible cable infill system to retain its ability to prevent the maximum allowable opening of 4” to be exceeded. By incorporating either a prescriptive cable installation tension or a measured deflection using a mass suspended at the mid-point of a given span, both the installer and code official have a common, objective assessment methodology for ensuring that a given installation conforms to the opening limitation requirement(s) as applicable.

The 4.4 lb suspended mass utilized in the proposed table can be derived from the 50 lbs. per square foot guard infill load.

12" x 12" = 144 square inches

50 lbs. / 144 square inches = .347 lbs. per square inch

Area of a 4" diameter sphere = 12.57 square inches x .347 lbs/square inch = 4.36 lbs.

Further, if the load were uniformly applied to a 4" x 4" area = 16 square inches x .347 lbs/square inch = 5.55 lbs.

Therefore, the proposed suspended mass of 4.4lbs. is within reason for the existing guard infill load required by the code.

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

Justification for no cost impact:

As written, this proposal is a clarification for assessment of conformance, therefore no cost impact is anticipated for code-compliant installations. Potentially, there may be a decrease in cost due to current lack of a consistent assessment tool leading to increased cost for overbuilding and/or removal of potentially compliant guard infill systems.

RB135-25

RB136-25

IRC: SECTION 202 (New), R322.1, Figure R322.1 (New)

Proponents: Steven Mickley, representing American Institute of Building Design (steve.mickley@aibd.org); Jack Butler, Butler & Butler, LLC, representing American Institute of Building Design (abutler@mpzero.com)

2024 International Residential Code

Add new definition as follows:

MULTISTORY UNIT. A *dwelling unit* or *sleeping unit* with habitable space located on more than one story.

SECTION R322
ACCESSIBILITY

Revise as follows:

R322.1 Dwelling units or sleeping units. Where there are four or more dwelling *units* or *sleeping units* in a single structure, the provisions of Chapter 11 of the *International Building Code* for Group R-3 shall apply.

~~Exception~~ Exceptions:

1. *Owner*-occupied *lodging houses* with five or fewer *guestrooms* are not required to be accessible.
2. A *multistory unit* that is not provided with elevator service, as illustrated in Figure R322.1, is not required to comply with this section.

Add new text as follows:

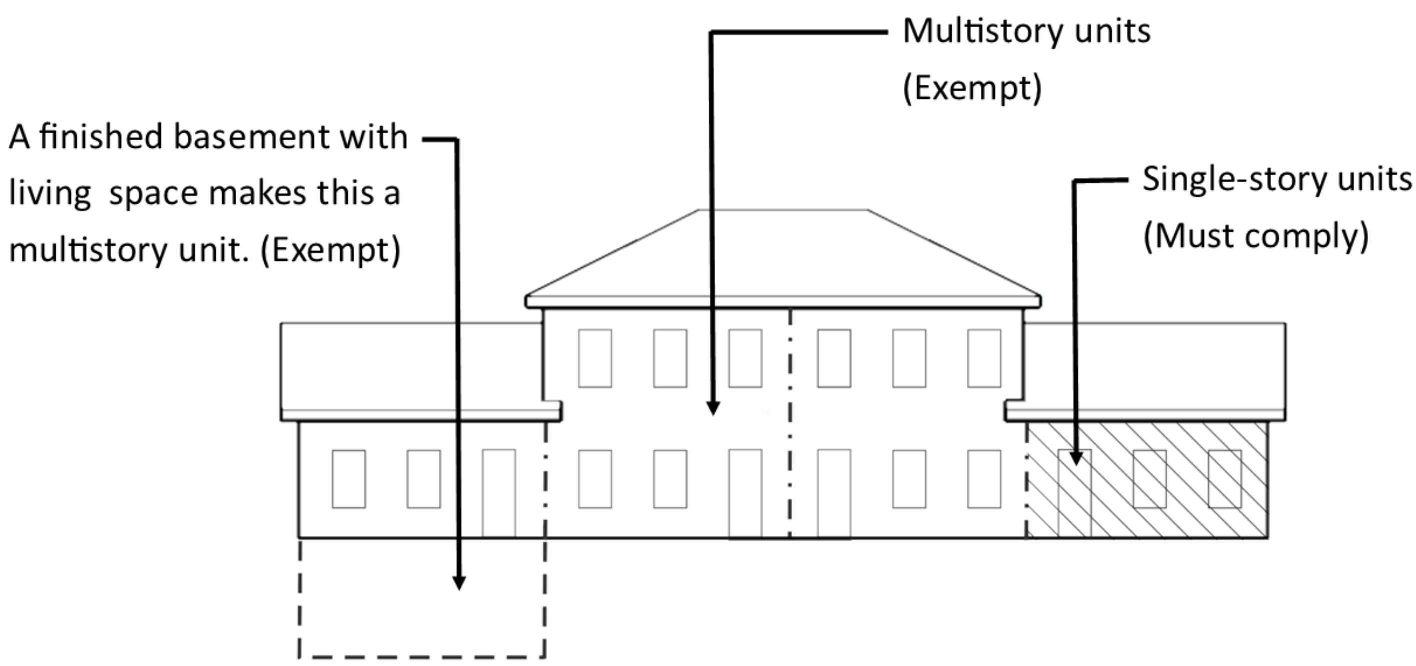


FIGURE R322.1 MULTISTORY UNIT EXCEPTION

Reason: The IRC applies to detached one- and two-family dwellings and townhouses. A townhouse consists of three or more dwelling units, which need not be identical in form. Section R322.1 of the IRC specifies that if a single structure contains four or more dwelling units (each defined as a self-contained unit with independent living facilities for one or more people) or sleeping units, the requirements of Chapter 11 in the IBC for Group R-3 are to be applied. However, Section 1108.7 of the IBC specifically excludes multistory dwelling units and sleeping units within Group R-3 buildings that lack elevator service. This means that, when four or more single-family townhouse dwelling units are grouped into one structure and those units are multistory without elevator access, then the multistory units are exempt from being designated as accessible units. To ensure alignment between the IRC and IBC, including a multistory unit definition in Section R202 and an exemption for multistory units in Section R322 will address all applicable scenarios covered in the scope of the IRC. This change will clarify the intent and improve consistency between the IRC and IBC by removing the need for IRC code users to refer to IBC Chapter 11 when it does not apply.
An accompanying illustration (attachment) is intended to visually assist building officials, building designers, and builders in identifying which units qualify for the exception. The illustration should be identified as FIGURE 322.1 and included with Exception 2.

Bibliography: International Building Code, International Code Council, published 2024, 1108.7.2.

1108.7.2 Multistory units. A multistory dwelling unit or sleeping unit that is not provided with elevator service is not required to be a Type B unit.

Fair Housing Act Design Manual, U.S. Department of Housing and Urban Development, Published August 1996, revised April 1998, page 7.

DWELLINGS COVERED BY THE DESIGN REQUIREMENTS

The design requirements apply to buildings built for first occupancy after March 13, 1991, which fall under the definition of "covered multifamily dwellings." Covered multifamily dwellings are:

1. all dwelling units in buildings containing four or more dwelling units if such buildings have one or more elevators, and

2. all ground floor dwelling units in other buildings containing four or more units.

To be a covered unit, all of the finished living space must be on the same floor, that is, be a single-story unit, such as single-story townhouses, villas, or patio apartments.

Multistory dwelling units are not covered by the Guidelines except when they are located in buildings which have one or more elevators, in which case, the primary entry level is covered.

Cost Impact: The 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 impact on the cost of construction. The proposed change aims to enhance clarity by explicitly incorporating an exemption already outlined in the International Building Code (IBC).

RB136-25

RB137-25

IRC: R324.4.3

Proponents: Gwenyth Searer, Wiss, Janney, Elstner Associates, Inc., representing myself (gsearer@wje.com)

2024 International Residential Code

SECTION R324
GLAZING

Revise as follows:

R324.4.3 Glazing in windows. Glazing in an individual fixed or operable panel that meets all of the following conditions shall be considered to be a *hazardous location*:

1. The exposed area of an individual pane is larger than 9 square feet (0.836 m^2).
2. The bottom edge of the glazing is less than 18 inches (457 mm) above the floor or adjacent walking surface.
3. The top edge of the glazing is more than 36 inches (914 mm) above the floor or adjacent walking surface.
4. One or more walking surfaces are within 36 inches (914 mm), measured horizontally and in a straight line, of the plane of the glazing.

Exceptions:

1. *Decorative glazing*.
2. Where ~~glazing is adjacent to a walking surface and~~ a horizontal rail is installed on the walking surface side of the glazing at 34 to 38 inches (864 to 965 mm) above the walking surface, the ~~. The~~ rail shall be capable of withstanding a horizontal load of 50 pounds per linear foot (730 N/m) without contacting the glass and have a cross-sectional height of not less than $1^1/_2$ inches (38 mm).
3. Outboard panes in insulating glass units ~~and~~ or multiple glazing ~~other multiple glazed panels~~ where the bottom exposed edge of the glass is 8 feet (2438 mm) ~~25 feet (7620 mm)~~ or more above any grade or walking surface adjacent to the glass exterior ~~*grade*, a roof, walking surfaces or other horizontal [within 45 degrees (0.79 rad) of horizontal] surface adjacent to the glass exterior~~.

Reason: Last code cycle, S231-22 proposed to rework a similar section (Section 2406.4.3) in the IBC. The original wording of the IBC provision (which still is present in the IRC) was very unclear with respect to intent. It is not clear why the outboard pane in IGUs would need to be safety glazing when the bottom of the glazing is as much as 25 feet above the adjacent exterior walking surface. After much discussion before the proposal was heard, consensus was reached among various industry representatives with respect to an acceptable wording that would relax the then-current wording and clarify other portions of the section. A floor modification to that effect was proposed, which was accepted by the committee unanimously, and no public comments regarding the change were submitted.

During the testimony at the Committee Action Hearings, a request was made to make the same changes to the sister section in the IRC for the 2027 code cycle, which is what this proposal does. If accepted, Section 324.4.3 of the IRC will match Section 2406.4.3 of the IBC with one minor exception: because part of the IRC wording of Exception 2 (i.e., "... and have a cross-sectional height of not less than $1^1/_2$ inches (38 mm)") is much less awkward than the IBC version (i.e., "and be not less than $1^1/_2$ inches (38 mm) in cross-sectional height."), I am proposing to leave that small portion as-is. The meaning is exactly the same, but the IRC version is better.

The rest of the IRC section is being updated to match the consensus reached in the IBC Structural Committee Action Hearings last cycle. If additional reasoning is needed, the video recording of the testimony regarding S231-22 is available on the ICCs cdpAccess website.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal will potentially reduce the cost of windows in hazardous locations that are between 8 feet and 25 feet above the grade or adjacent walking surfaces because safety glazing can be omitted from the exterior layer where it was previously required. It will also decrease the need for fully tempered glass, which can be susceptible to nickel-sulfide inclusions that result in breakage after installation, so there may be less need for heat soaking (where glass is kept at elevated temperature for several hours to accelerate the growth of the nickel-sulfide inclusions so that failures caused by that growth happen before the glass is installed) and less need for replacement of glass in the longer term.

When I asked one person who is knowledgeable about the glass industry, he thought that the cost implications would be $0, primarily because most glass is tempered or heat-strengthened anyway, so any reduction in cost would be negligible. However, because heat soaking requires an additional step in the manufacturing process, this cannot have zero-cost implications or everyone would do it for free. When I googled the cost, artificial intelligence first told me that the cost for heat soaking would be 10 to 15 percent of the total cost. But none of the links it gave me had an actual cost or percentage. So I asked again, and it said "a small premium" offered that heat soaking is "often considered a 'marginal' additional cost rather than a signficant expense on its own". But this article I found indicated that the cost is more than just marginal: https://www.pqovens.com/heat-soaked-tempered-float-glass/ The same person I had asked earlier about the cost savings, he indicated that heat soaking can cost $1.50 per square foot per lite, and an IGU is $20 per square foot.

So the short answer is that I do not know for sure how much this will save. If we assume that glass is being installed is tempered and then heat-soaked to mitigate the risk of nickel-sulfide inclusions, then the potential cost savings are roughly $1.50 per square foot wherever the current language would have required safety glass where none would be required according to this proposal. If the existing language is left as-is, then there is the possibility that the existing language may be missed or ignored due to the fact that it does not make much sense, and that may result in significant increased costs post-construction during litigation -- far more than the cost to install heat-soaked, tempered glass in the first place.

Although quantification of all of these variables is difficult, I am sure that there are no construction costs increases associated with this change.

Estimated Immediate Cost Impact Justification (methodology and variables):

The above is my best estimate of the cost implications, using my experience, the Google, and asking my peers.

RB137-25

RB138-25

IRC: R325.2

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

SECTION R325
LIGHT, VENTILATION AND HEATING

Revise as follows:

R325.2 Bathrooms. Bathrooms, toilet rooms ~~water closet compartments~~ and other similar rooms shall be provided with aggregate *glazing area* in windows of not less than 3 square feet (0.3 m^2), one-half of which shall be openable.

> **Exception:** The glazed areas shall not be required where artificial light and a *local exhaust* system are provided. The minimum *local exhaust* rates shall be determined in accordance with Section M1505. Exhaust air from the space shall be exhausted directly to the outdoors.

Reason: This is the only occurrence in the IRC of the term “water closet compartment”. There are 16 occurrences of the term “toilet room”. For consistency in interpretation, varying terms should not be used if not necessary to imply a different application.

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

Justification for no cost impact:

This proposal is only for clarification and simplification. There is no change to the intent or application.

RB138-25

RB139-25

IRC: SECTION R325, R325.9 (New)

Proponents: Clayton Trevillyan, representing City of Tucson (clayton.trevillyan@tucsonaz.gov); Jane Gilbert, Miami Dade County, representing Miami-Dade County (jane.gilbert@miamidade.gov); Mary Wright, Office of Heat Response and Mitigation, City of Phoenix, representing self (mary.wright@phoenix.gov); Ali Frazzini, representing Los Angeles County Chief Sustainability Office (afrazzini@cso.lacounty.gov); Stefano Schiavon, representing Self (schiavon@berkeley.edu); Pedro Quintela, Miami Dade County, representing RER (pq2@miamidade.gov)

2024 International Residential Code

Revise as follows:

SECTION R325 LIGHT, VENTILATION AND ~~HEATING~~ TEMPERATURE CONTROL

Add new text as follows:

R325.9 Required cooling. In Climate Zones 0, 1, 2, 3, 4, 5A, and 5B, where the outdoor summer design dry-bulb temperature in Table R301.2 is above 85°F (29.4°C), every dwelling unit shall be provided with one or more systems capable of maintaining an indoor temperature at or below 80°F (26.7°C) in the habitable rooms. Where permanently installed fans are capable of generating 120 fpm (0.6 m/s) air speed inside the habitable rooms, the systems shall be capable of maintaining the indoor temperature at or below 85°F (29.4°C). The installation of one or more portable systems shall not be used to achieve compliance with this section.

Exception: Where site-specific climate conditions warrant, as *approved* by the *building official.*

Reason: The codes require minimum heating of habitable space for the safety of the occupants. The code is silent on requirements for cooling, despite the negative impacts of elevated exterior thermal conditions on humans. The built environment is a safe haven from the effects of weather and climatic conditions, heat not being an exception for people to seek shelter from the elements. Media attention to heat-related health emergencies on the elderly and people in underserved communities demonstrates the need for improvements in the built environment[1]. As a result of increased summer temperatures, nearly half of heat-related deaths happen inside a person's home[2] and some jurisdictions have already mandated cooling be provided in new buildings while many others are considering extreme heat related ordinances. A coordinated application of the codes that can be consistently applied to new construction is warranted due to the trend in local agencies with differing requirements throughout the country. The first change includes modifying the section title for consistency with IBC 1203.

This proposal is a performance specification to ensure life safety in the built environment due to higher expected summer thermal conditions. The solution can either be active or passive systems, or a combination of these systems to provide relief from elevated thermal conditions. The active systems may include traditional central mechanical air conditioning systems that are provided in most modern homes and do not represent a significant change to how most buildings are constructed. Passive cooling systems utilize unique design features of the building that prevent heat from entering the building and/or removing heat from the building. Passive design applications include building orientation, insulation, solar control (shading and landscaping), ventilation, cool roofs, and other methods that naturally, and without input energy, would provide and maintain thermal comfort. Passive systems could be more cost effective in both the short term and the long term as compared to active mechanical systems for circumstances where a few design changes could comply with specified interior temperature. The interior temperature of 80°F was selected as the maximum temperature for the thermal comfort of the interior environment based on ANSI/ASHRAE Standard 55-2023[3] and generally at, or above the temperature in most local ordinances.

The second sentence recognizes that air movement provides a cooling effect as experienced by the occupants of the building. ASHRAE Standard 55-2023[3] states that air movement of only 120 feet per minute results in a 5°F cooling effect on the occupants within this temperature range. Where permanent fans are installed, the resulting interior maximum temperature can be increased 5°F above the baseline temperature of 80°F that would be required for either the active or passive systems installed in accordance with the first sentence of the code change proposal. This is an additional energy-efficient and cost-effective method to provide the minimum cooling effect on human bodies where thermal comfort and safety is provided in the built environment. Permanently installed fans can include ceiling fans, wall-mounted fans, bladeless ceiling fans, or any other permanently installed fan that can be verified at the time of final inspection that the equipment is installed.

The third sentence is a carry-over from the heating requirement in R325.8, where the expectation for compliance is permanently installed equipment that can be utilized by the occupant as needed for thermal comfort and life-saving opportunities from dangerous heat related health considerations.

Bibliography:

1. Kenny, Glen P., Jane Yardley, Candice Brown, Ronald J. Sigal, and Ollie Jay. (July 13, 2010). "Heat Stress in Older Individuals and Patients with Common Chronic Diseases." CMAJ 182, no. 10: 1053–60. https://doi.org/10.1503/cmaj.081050
2. Kim, Elizabeth B. (June 19, 2024). Heat waves in the US kill more people in their homes than anywhere else. Cincinnati Enquirer. https://www.cincinnati.com/story/news/2024/06/19/heat-advisory-risk-dying-at-home-or-in-cars/74130082007/
3. ANSI/ASHRAE 55-2023: Thermal Environmental Conditions for Human Occupancy. Atlanta, GA, US: ASHRAE, 2023

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 - $31+ per square foot of new or renovated habitable buildings.

The immediate cost impact to construction is for newly constructed or renovated buildings. There is no immediate cost to existing buildings. This value ranges greatly depending on variables that include but are not limited to:

- If the proposed construction would include cooling regardless of this code change. Zero cost impact will apply to many regions and project scopes for new permits.
- If the project includes a system that can be further supplemented at relatively low cost due to other air handling equipment that would have otherwise been included in the project scope.
- The method of proposed cooling and quality of equipment.
- Level of efficiency and sustainability of system design.
- The climate zone of project area.

Estimated Immediate Cost Impact Justification (methodology and variables):

1. Estimation from major HVAC contractor (Watsco)

"There are a lot of variables (i.e. size of the building, type of system, region, needs, installation costs). Below are some rough estimates"

- For commercial buildings the average cost can range from $15 to $30 per sq ft for a basic system but can go up to $40+ for more complex or high efficiency systems.
- For multi-family buildings the average cost can range from $2,500-$5,000 per unit for a basic system increasing in price for high efficiency units. ($40 pf @ 2 units for 4000 sf)

Comparison necessary to isolate cost of heating systems alone (e.g. furnace/boiler systems) to identify cost differential.

2. RSMeans Data (remeansonline.com)

$8-30 per sf

https://www.businesshue.com/commercial-hvac-cost-per-square-foot/

3. AC cost report (page 28)

https://www.energytrust.org/wp-content/uploads/2018/06/AC-Research_PhaseII_9MAR2018_Final.pdf

4. Report from IEA, claiming that fans are the best affordable and available active cooling technology.

https://www.iea.org/reports/sustainable-affordable-cooling-can-save-tens-of-thousands-of-lives-each-year

RB139-25

RB140-25

IRC: R329.4.2

Proponents: Larry Sherwood, Sustainable Energy Action Committee, representing IREC (larry@irecusa.org); Philip Oakes, representing NASFM; Dara Yung, representing California Solar & Storage Association (CALSSA) (dara@calssa.org); Joseph H. Cain, P.E., representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2024 International Residential Code

SECTION R329
SOLAR ENERGY SYSTEMS

Revise as follows:

R329.4.2 Fire classification. Rooftop-mounted *photovoltaic panel systems* shall have ~~the same~~ a fire classification as ~~the *roof assembly*~~ required in Section ~~R902~~ R902.4.

Reason: The requirements for fire classification for rooftop-mounted PV panel systems are specifically covered in Section R902.4.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process. For more information, please visit www.sustainableenergyaction.org

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

Justification for no cost impact:

This proposal provides the correct pointer for the fire classification requirements in Section R902.

RB140-25

RB141-25

IRC: R329.6

Proponents: Larry Sherwood, Sustainable Energy Action Committee, representing IREC (larry@irecusa.org); Philip Oakes, representing NASFM; Dara Yung, representing California Solar & Storage Association (CALSSA) (dara@calssa.org); Joseph H. Cain, P.E., representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

2024 International Residential Code

SECTION R329
SOLAR ENERGY SYSTEMS

Revise as follows:

R329.6 Roof access and pathways. Roof access, pathways and setback requirements shall be provided in accordance with Sections R329.6.1 through R329.6.2.1. Access and minimum spacing shall be required to provide emergency access to the roof, to provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof.

Exceptions:

1. Detached, nonhabitable structures, including but not limited to detached garages, parking shade structures, <u>elevated PV support structures,</u> carports, solar trellises and similar structures, shall not be required to provide roof access.
2. Roof access, pathways and setbacks need not be provided where the code official has determined that rooftop operations will not be employed.
3. These requirements shall not apply to roofs with slopes of <u>less than</u> 2 units vertical in 12 units horizontal (17-percent slope) ~~or less~~.
4. BIPV systems *listed* in accordance with UL 3741, where the removal or cutting away of portions of the *BIPV system* during firefighting operations has been determined to not expose a firefighter to electrical shock hazards.

Reason: Elevated PV support structures, where used in residential applications, are also detached nonhabitable structures, and thus should not be required to provide roof access. The reference in Exception 3 needs to be aligned with the definitions for low and steep slope. A roof slope of 2:12 is a steep slope, not a low slope.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.

All recommendations from SEAC are approved by diverse stakeholders through a consensus process. For more information, please visit www.sustainableenergyaction.org

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

Justification for no cost impact:

This clarifies that elevated PV support structures are not required to provide roof access. This also corrects the reference to the slope of the roof.

RB141-25

RB142-25

IRC: R329.6, R329.6.1, R329.6.3

Proponents: Joshua Costello, representing County of Los Angeles Fire Department (joshua.costello@fire.lacounty.gov)

2024 International Residential Code

SECTION R329
SOLAR ENERGY SYSTEMS

Revise as follows:

R329.6 Roof access and pathways. Roof access, pathways and setback requirements shall be provided in accordance with Sections R329.6.1 through ~~R329.6.2.1~~R329.6.4. Access and minimum spacing shall be required to provide emergency access to the roof, to provide pathways to specific areas of the roof, provide for smoke ventilation opportunity areas, and to provide emergency egress from the roof.

Exceptions:

1. Detached, nonhabitable structures, including but not limited to detached garages, parking shade structures, carports, solar trellises and similar structures, shall not be required to provide roof access.
2. Roof access, pathways and setbacks need not be provided where the code official has determined that rooftop operations will not be employed.
3. These requirements shall not apply to roofs with slopes of 2 units vertical in 12 units horizontal (17-percent slope) or less.
4. ~~BIPV systems *listed* in accordance with UL 3741, where the removal or cutting away of portions of the *BIPV system* during firefighting operations has been determined to not expose a firefighter to electrical shock hazards.~~

R329.6.1 Pathways. Not fewer than two pathways, on separate roof planes from lowest roof edge to ridge and not less than 36 inches (914 mm) wide, shall be provided on all *buildings*. Not fewer than one pathway shall be provided on the street or driveway side of the roof. For each roof plane with a photovoltaic array, a pathway not less than 36 inches wide (914 mm) shall be provided from the lowest roof edge to ridge on the same roof plane as the photovoltaic array, on an adjacent roof plane, or straddling the same and adjacent roof planes. Pathways shall be over areas capable of supporting firefighters accessing the roof. Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment.

Exception: BIPV systems *listed* in accordance with UL 3741, where the removal or cutting away of portions of the *BIPV system* during firefighting operations has been determined to not expose a firefighter to electrical shock hazards.

R329.6.3 Emergency escape and rescue openings. Panels and modules installed on *dwellings* or *townhouses* shall not be placed on the portion of a roof that is below an *emergency escape and rescue opening*. A pathway not less than 36 inches (914 mm) wide shall be provided to the *emergency escape and rescue opening*.

~~**Exception:** BIPV systems *listed* in accordance with UL 3741, where the removal or cutting away of portions of the *BIPV system* during firefighting operations has been determined to not expose a firefighter to electrical shock hazards.~~

Reason: This proposal is merely a **correction of the mis-placement of the exemption for UL-3741 certified/listed BIPV**. UL 3741 only evaluates the level of hazard to *fire fighters in full intact structural firefighting PPE*, not to occupants, nor to *any* person not in such PPE. **To use that listing/certification as a basis for exempting occupant escape or rescue pathways is simply unfounded; it was a simple error needing correction**. UL 3741 can, however, be legitimately used to exempt BIPV systems from *firefighter-only* pathways, because UL 3741 does [and only does] evaluate the hazard to firefighters in their structural-firefighting gear (which by design provides electrical insulation).

After the actuation of a UL-3741 Hazard Control / "Rapid Shutdown" function of the PV/ BIPV system, an electrocution shock hazard can remain, because the Hazard Control function only attenuates (i.e., partially reduces) the electricity flowing in *and* outside of the array. Also, when fire fighters cross a roof plane to make a rescue or assist an occupant off the roof, they must *always* "sound" their entire path across that portion of the roof (i.e., continually and *forcefully* strike the roof with a blunt object out ahead of where they will next step in order to confirm the roof is structurally sound enough to support their weight and prevent them, and any victims they assist, from falling through the roof); and during that "roof sounding" action, BIPV tiles are broken and wires can easily be exposed.

Without this correction, the UL-3741-based exemption **will be misapplied to pathways for occupant escape and rescue (totally outside the scope of the UL-3741 evaluation) instead of** only to pathways only for **fire fighters in full intact structural-firefighting PPE (which is the actual scope of UL 3741)**.

And if all those reasons are not reasons enough, during such an emergent rescue of an occupant through an upper-story door or window, it will be almost *guaranteed* that fire fighters will not have the time to even locate and activate the hazard control actuation device.

UL 3741 (*Photovoltaic Hazard Control*) is a recent product-listing safety standard for evaluating the electrical hazards posed by photovoltaic (PV) systems to fire fighters performing operations (e.g., roof-cutting operations). "While this standard accounts for fire fighters (FF) wearing new or serviceable used PPE, it does not include consideration for any damage to PPE that occurred prior to fire fighter (FF) interaction with the PV array" (2020 edition, §1.3.2). **UL 3741 is strictly scoped to *only* be "considering potential fire fighter (FF) interactions while performing duties during an emergency" where "personal protective equipment (PPE) [is] in serviceable condition worn by fire fighters (FF) during structural fire fighting operations"** (2020 edition, §1.2.1 and §1.2.2). In other words, **it does *not* pertain to anyone other than fire fighters in full, intact structural firefighting PPE**. The UL-3741 listing can be attained by both PV and building-integrated PV (BIPV) installations.

For "BIPV systems *listed* in accordance with UL 3741, where the removal or cutting away of portions of the *BIPV system* during firefighting operations has been determined to not expose a firefighter to electrical shock hazards", *Item 4 of Section R329.6* allows the BIPV systems to be exempted from the need to provide rooftop pathways *for fire fighters* conducting structure firefighting in full, intact PPE. Unfortunately, however, **the code-development community made a mistake and accidentally placed this exemption in such a way that the IFC mistakenly extended this exemption to pathways on the roof for *occupant* emergency escape and rescue, persons for whom neither the standard nor the exemption was ever meant to have any application, as they are not fire fighters in full, intact structural-firefighting PPE.**

Pathways over which occupants can traverse the roof (by either self-rescue or by being assisted by fire fighters) from an egress opening to the eave are mandated by the code to be free from unnecessary obstructions and electrocution hazards. The presence of *traditional* rooftop PV systems, and the locations of their electrical conductors above the roof deck, are readily identifiable by the untrained eye and can be avoided, but *BIPV* systems usually eliminate the physical obstructions and thereby present what seems to be a safe and unobstructed path directly over them, but **the energized electrical wires are hidden immediately under or within the BIPV tiles themselves and become exposed by essential FF "roof-sounding" operations (i.e., *forcefully* striking the roof with a blunt object in front of each step in order to confirm the roof is structurally sound to support their weight and prevent them, and any victims they assist, from falling through the roof), which shatters or damages the BIPV tiles**. Many a fire fighter have fallen through the roof, even directly into the fire below, and injuries therefrom are real, and sometimes lethal, even in a one- or two-family dwelling. "Sounding the roof" is standard practice and absolutely essential; roofs often appear intact during a fire eating away at their structural members below the surface.

The intent of the requirements (in IRC Section R329.6) are that rooftop occupant pathways to and from emergency escape and rescue openings be preserved from being negatively impacted by the presence of PV/BIPV installations; **it has never been the intent to direct unknowing occupants into an electrocution shock hazard nor to set fire fighters up to unknowingly assist them directly through one.** Hazard Control (previously termed "Rapid Shutdown") do not required nor usually use a full disconnection of the circuitry upon actuation; rather, they merely require the attenuation (i.e., partial reduction) of electricity in the conductors in and leaving the PV array. In other words, **after the actuation of the Hazard Control / "Rapid Shutdown" function of the PV/ BIPV system, an electrocution shock hazard can remain.**

And if all those reasons are not reasons enough, during such an emergent rescue of an occupant through an upper-story door

or window, it will be almost *guaranteed* that fire fighters will not have the time to locate and activate the hazard control actuation device. It is true than some hazard-control systems may self-actuate in certain scenarios, but as noted above, they only need to *partially reduce* the electrical flow in and from the BIPV array, and not even below the electrocution shock-hazard threshold.

Occupants do not wear structural-firefighting PPE, yet that is the clearly stated [very limited] scope of the UL-3741 standard, and further confirmed by the technical committee thereof. **The only justifiable rooftop-pathways application of the UL-3741 certification is to *firefighting* pathways, and that is what this proposal corrects and retains.**

Bibliography: **UL 3741 (*Photovoltaic Hazard Control*)**

https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=38258

Cost Impact: The 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 merely a **correction** in placement of an exemption. It is clearly based on the***actual scope clearly stated in the UL-3741 standard*.** See https://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=38258.

RB142-25

RB143-25

IRC: IRC: R329.6.4 (New)

Proponents: Ali Fattah, representing Self (afattah@sandiego.gov)

2024 International Residential Code

SECTION R329
SOLAR ENERGY SYSTEMS

2024 International Residential Code

Add new text as follows:

R329.6.4 Pathways adjacent to chimneys. Where a roof-mounted photovoltaic panel system is located adjacent to a chimney that is constructed to comply with Sections R1003 or Section M1805, a pathway not less then 36-inch-wide (914 mm) shall be provided between the chimney and any panels or modules. The pathway adjacent to a chimney shall connect to a roof access point.

Attached Files

- **F168-24-FATTAH-C1 Part I Installation photos.pdf**
  https://www.cdpaccess.com/proposal/10744/35269/files/download/8950/
- **F168-24-FATTAH-C1 Part I How to Clean Your Chimney.pdf**
  https://www.cdpaccess.com/proposal/10744/35269/files/download/8949/

Reason:
The proposed code change addresses 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 code change also addresses a lack of standards addressing service and firefighting access to chimneys where solar pv systems are present on the roof. chimney sweeps required clearances to be able to repair and clean chimneys exhausting solid fuel burning appliances and fireplaces. If a chimney fire occurs during daylight solar systems will be energized and will have to be obscured through spray foam or blankets by firefighting personnel to allow for safe removal of arrays to access a chimney fire. Maintenance personal during non-fire conditions will require an electrician to remove one or more PV modules to allow chimney access.
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 at the time 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.
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. The code change to the IRC is not dependent to the approval of the other code changes processed in GRoup A.
A similar code change was heard by the Fire Code Committee and the International Mechanical Code Committee. F168-24 Part I and II were not approved, proponent was not able to attend both committee hearings. Recordings of the hearing stated that justification or data

was not provided and that representative from the chimney industry were not in attendance. A comment submitted for the Group A CAH# 2 included photos taken in a California community showing what is being proposed for the pathway is being implemented. Fire loss data do not specifically capture this issue

This code change addresses a problem identified during the CAH in 2024: 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 functionality is not available or proprietary.

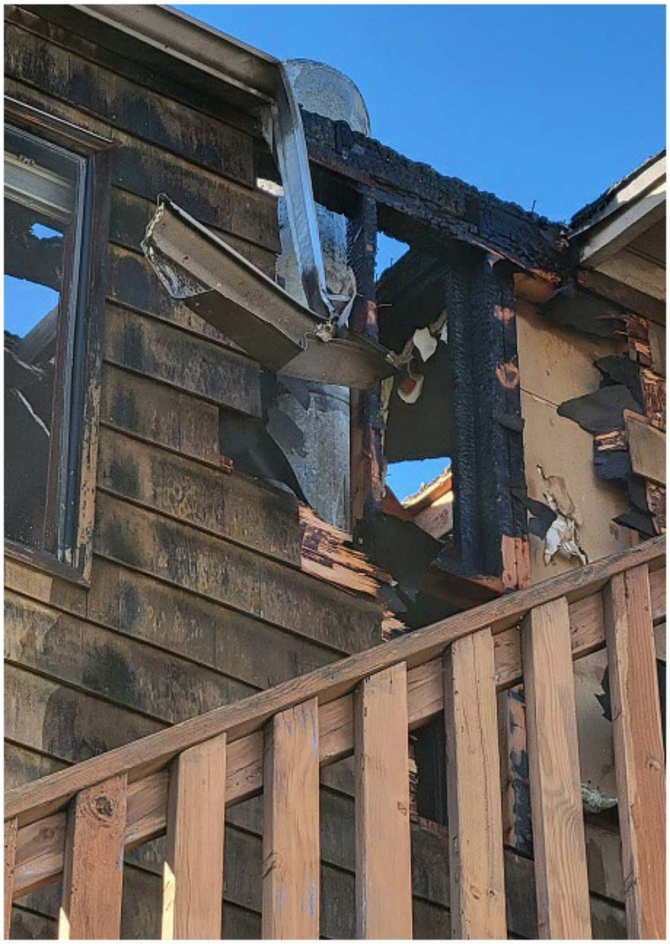
The proposal includes photos showing three cases (photos 3 to 5 spark arrestors would be required as well as 3 ft pathways) of what could happen when solar PV installations adjacent to the chimney are not regulated. Two photos (1 and 2) of a chimney fire to highlight why roof clearance should be required.

The message that has come across from the testimony past hearings in that the solar industry does not view this as their responsibility but rather for chimney sweeps and they do not appear to be concerned that the homeowner will incur costs to remove and replace the roof top solar modules to allow for any chimney maintenance. The fire service does not view the pathway issues as a concern since they can remove the solar modules out of their way. So, it is left up to the local building official to advocate for the property owner and for fire safety. Hopefully proponent will be able to testify at the Grup B CAH1 hearing coming up in the spring of 2025. The committee is requested to weigh common sense and accept that not all code changes can be technically justified, a good example is fire access requirements for roofs with solar where data was not provided on cases where firefighting was impeded, however common sense ruled the day.

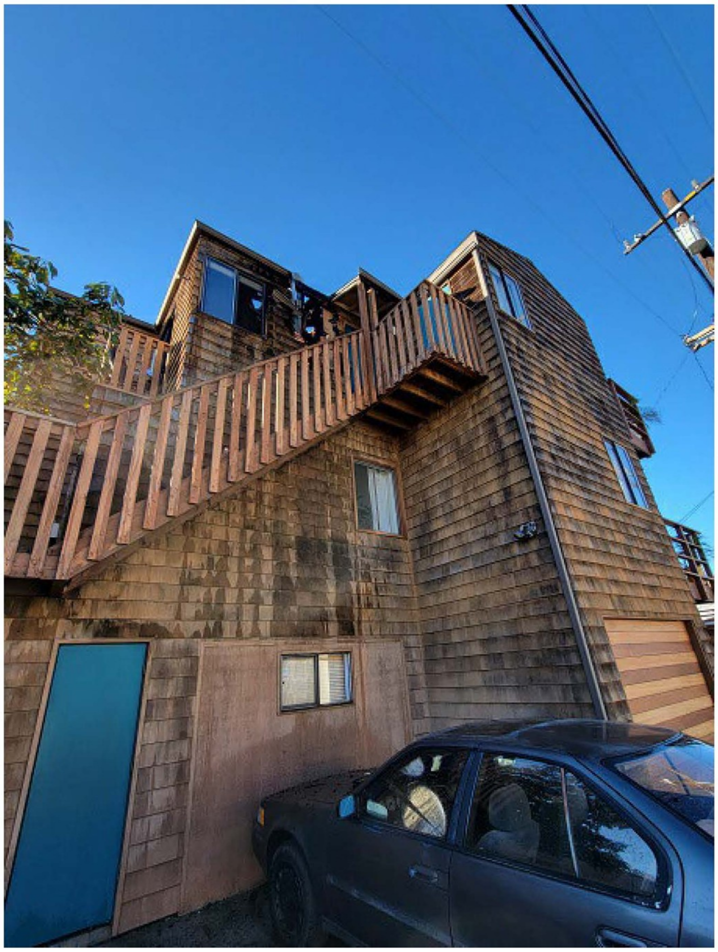
The committee will hear testimony that it is difficult to make solar projects pencil out and that every inch of the roof counts however it is never mentioned that solar technology has improved with more efficient panels resulting in fewer pv panels or that realistically there will always be a pathway to the ridge and the layout can adjust the location to also accommodate the chimney access needs. Opponents swill also state that there is no data to support the code change from fire loss history. While some code changes are reactionary to solve an issue that occurred previous to the code change, many code changes over the past two decades were preventative trying to solve an issue before it manifests itself.

Attachment 1 and 2 show photos of extremes that chimney sweeps take to service chimneys and examples of installations that resemble what is proposed. This is mainly an existing building issue ad not new construction so solar follows chimney. The committee is requested to approve as submitted.

Chimney Fire



Chimney Fire



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

Justification for no cost impact:

The proposed code change may result in a rearrangement of some solar installations and opponents in the last code cycle did not quantify cost increases since the code change does not prohibit an uninstallation and merely requires a pathway that can be coincident with pathways alrteady required.

RB143-25

RB144-25

IRC: R330.1, R330.1.1 (New), R330.2, R330.3, R330.3.1, R330.4, R330.5, R330.6, R330.7, R330.6.1 (New), R330.8, R330.8.1, FIGURE R330.8.1, R330.8.2, R330.8.3, R330.9, R330.10, R330.11, NFPA Chapter 44 (New)

Proponents: Robert Davidson, Davidson Code Concepts LLC, representing Self (rjd@davidsoncodeconcepts.com); Robert Marshall, representing FCAC (fcac@iccsafe.org); Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

SECTION R330 ENERGY STORAGE SYSTEMS

Revise as follows:

R330.1 General. *Energy storage systems (ESS)* with an aggregate capacity of 1 kWh (3.6 megajoules) or greater shall comply with ~~the provisions of~~ this section and Chapter 15 of NFPA 855.

~~**Exceptions:**~~

~~1. *ESS listed* and *labeled* for use in habitable spaces, in accordance with UL 9540 and where installed in accordance with the listing, the manufacturer's instructions and NFPA 70.~~

~~2. *ESS* less than 1 kWh (3.6 megajoules).~~

Add new text as follows:

R330.1.1 Compliance with NFPA 855 only. The following ESS systems shall only be required to comply NFPA 855:

1. ESS systems that comply with all of the requirements of Section 15.1.3 of NFPA 855.
2. Flywheel energy storage systems (FESS) that are installed in accordance with Chapter 13 of NFPA 855

Revise as follows:

R330.2 Equipment listings. *Energy storage systems (ESS)* shall be *listed* and *labeled* in accordance with UL 9540.

Exception: ~~Where *approved*, repurposed unlisted battery systems from electric vehicles are allowed to be installed outdoors or in detached sheds located not less than 5 feet (1524 mm) from exterior walls, property lines and *public ways*.~~ All types of lead-acid, aqueous nickel based, and aqueous metal-air batteries that comply with Section 15.2.2 of NFPA 855.

R330.3 Manufacturer's Installation instructions. *ESS* shall be installed in accordance with the manufacturer's installation instructions and their *listing*.

R330.3.1 Spacing. Individual units shall be separated from each other by not less than 3 feet (914 mm) , and when installed outdoors or on the exterior side of exterior walls shall be located not less than 3 feet (914 mm) from doors and windows directly entering the dwelling unit, except where other separation distances are specified by the ESS listing and the manufacturer's installation instructions.

R330.4 Locations. *ESS* shall be installed only in the following locations:

1. Detached garages and detached *accessory structures*.
2. Attached garages separated from the *dwelling unit living space* in accordance with Section R302.6.

3. Outdoors or on the exterior side of exterior walls ~~located not less than 3 feet (914 mm) from doors and windows directly entering the *dwelling unit*, except where smaller separation distances are permitted by the UL 9540 listing and manufacturer's installation instructions.~~
4. Enclosed utility *closets*, *basements*, storage or utility spaces within *dwelling units* with finished or noncombustible walls and ceilings. Walls and ceilings of unfinished wood-framed construction shall be provided with not less than $^5/_8$-inch (15.9 mm) *Type X gypsum wallboard*. Openings into the dwelling shall be equipped with solid wood doors not less than $1^3/_8$ inches (35 mm) in thickness, solid or honeycomb-core steel doors not less than $1^3/_8$ inches (35 mm) in thickness, or doors with a 20-minute fire protection rating. Doors shall be self-latching and equipped with a self-closing or an automatic-closing device. Penetrations through the required *gypsum wallboard* into the dwelling shall be protected as required by Section R302.11, Item 4.

ESS shall not be installed in sleeping rooms, or *closets* or spaces opening directly into sleeping rooms.

R330.5 Energy ratings. Individual *ESS* units shall have a maximum rating of 20 kWh. The aggregate rating of the *ESS* <u>in each location</u> shall not exceed <u>the capacities in Section 15.5 of NFPA 855. Where the maximum rating for individual ESS or the maximum aggregate rating is exceeded the installation shall comply with the *International Fire Code*.</u>~~:~~

1. ~~40 kWh within utility *closets*, *basements* and storage or utility spaces.~~
2. ~~80 kWh in attached or detached garages and detached *accessory structures*.~~
3. ~~80 kWh on exterior walls.~~
4. ~~80 kWh outdoors on the ground.~~

~~*ESS* installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Section 1207 of the *International Fire Code*.~~

Delete without substitution:

~~**R330.6 Electrical installation.** *ESS* shall be installed in accordance with NFPA 70. Inverters shall be *listed* and *labeled* in accordance with UL 1741 or provided as part of the UL 9540 listing. Systems connected to the utility grid shall use inverters *listed* for utility interaction.~~

~~R330.7~~ <u>R330.6</u> Fire detection. Rooms and areas within *dwelling units*, *basements* and attached garages in which *ESS* are installed shall be protected by smoke alarms in accordance with Section R310. A heat detector, *listed* and interconnected to the smoke alarms, shall be installed in locations within *dwelling units* and attached garages where smoke alarms cannot be installed based on their listing.

Add new text as follows:

<u>**R330.6.1 Feasibilty or practical problem.** Where compliance with Section R330.6 addressing interconnection presents a feasibility or practicality problem a fire alarm system complying with R310.7 shall per permitted.</u>

Revise as follows:

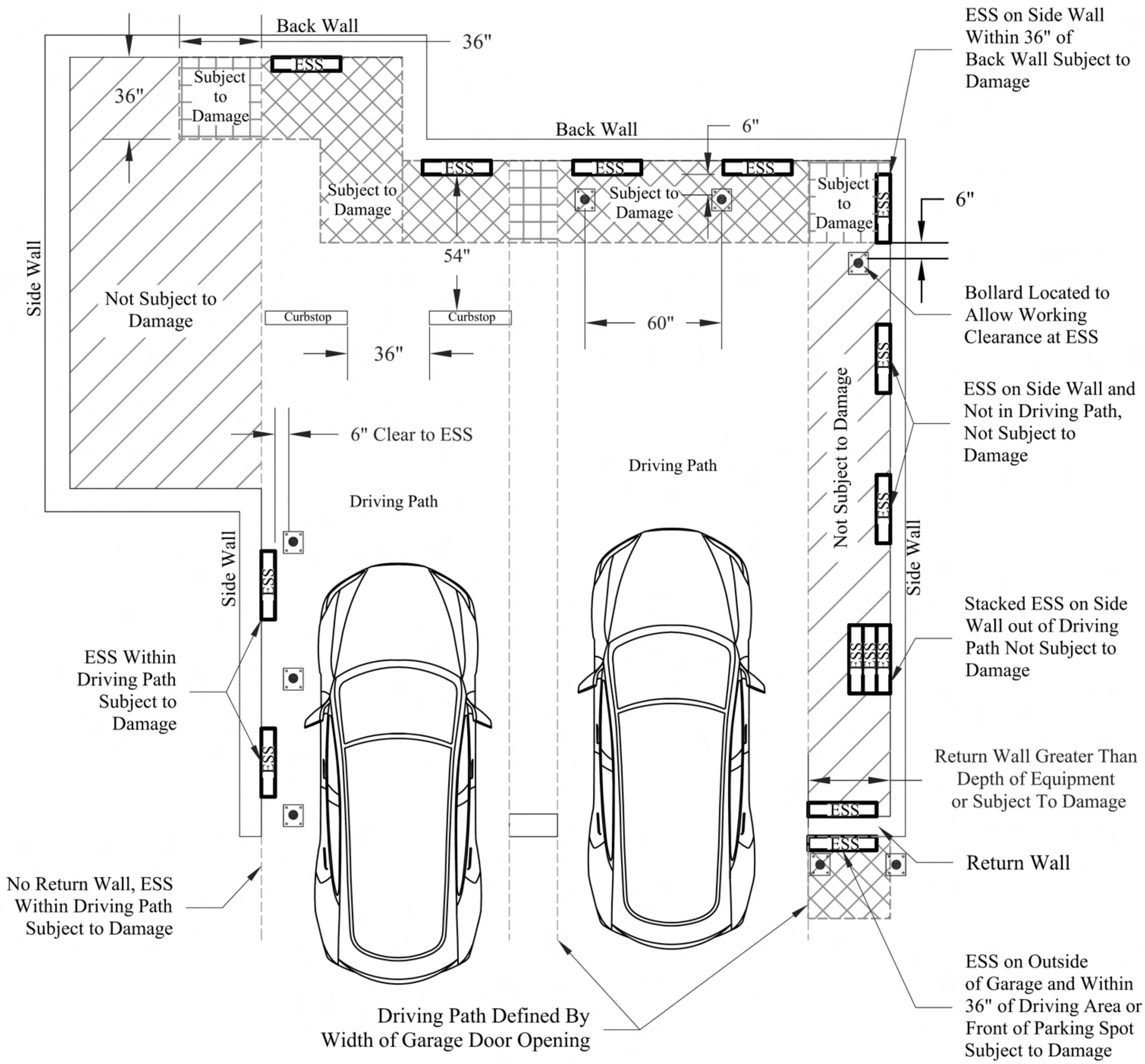
~~R330.8~~ <u>R330.7</u> Protection from impact. *ESS* installed in a location subject to vehicle damage shall be protected in accordance with Section ~~R330.8.1~~ <u>R330.7.1</u> or ~~R330.8.2~~ <u>R330.7.2</u>.

~~R330.8.1~~ <u>R330.7.1</u> Garages. Where an ESS is installed in the normal driving path of vehicle travel within a garage, impact protection complying with Section ~~R330.8.3~~ <u>R330.7.3</u> 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 ~~R330.8.1~~ <u>R330.7.1</u>):

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) from 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 installed not less than 36 inches (914 mm) above finished floor are not subject to vehicle impact protection requirements.



For SI: 1 inch = 25.4 mm.

FIGURE ~~R330.8.1~~ R330.7.1 ESS VEHICLE IMPACT PROTECTION

~~R330.8.2~~ R330.7.2 Other locations subject to vehicle impact. Where an ESS is installed in a location other than as defined in Section ~~R330.8.1~~ R330.7.1 and is subject to vehicle damage, impact protection shall be provided in accordance with Section ~~R330.8.3~~ R330.7.3.

~~R330.8.3~~ R330.7.3 Impact protection options. ESS 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 (305 mm) deep and 6 inches (152 mm) in diameter, with not less than 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.
   1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter Schedule 80 steel pipe fully welded to a steel plate not less than 8 inches (203 mm) in length by $^1/_4$ inch (6.4 mm) in thickness and bolted to a concrete floor by means of $4^1/_2$-inch (114 mm) concrete anchors imbedded not less than 3 inches (76 mm). 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.
   1.3. Premanufactured steel pipe bollards 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.
2. Wheel barriers constructed in accordance with one of the following:
   2.1. Concrete or polymer 4 inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length, 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. Concrete anchors not less than $3^1/_2$ inches (89 mm) in diameter 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. An *approved* method designed to resist an impact of 2,000 pounds per square foot (95 760 N/m^2) in the direction of travel at 24 inches (610 mm) above *grade*.

~~R330.9~~ R330.8 Ventilation. Indoor installations of *ESS* that produce hydrogen or other flammable gases during charging shall be provided with mechanical *ventilation* in accordance with Section M1307.4.

~~R330.10~~ R330.9 Electric vehicle use. The temporary use of an *owner* or occupant's electric-powered vehicle to power a *dwelling unit* while parked in an attached or detached garage or outdoors shall comply with the vehicle manufacturer's instructions ~~and~~ , NFPA 70 and Section 15.11 of NFPA 855.

Delete without substitution:

~~**R330.11 Documentation and labeling.** The following information shall be provided:~~

1. ~~A copy of the manufacturer's installation, operation, maintenance and decommissioning instructions shall be provided to the *owner* or placed in a conspicuous location near the *ESS* equipment.~~
2. ~~A label on the installed system containing the contact information for the qualified maintenance and service providers.~~

CHAPTER 44
REFERENCED STANDARDS

Add new standard(s) as follows:

NFPA

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

855-2026 Standard for the Installation of Stationary Energy Storage Systems

Reason: This proposal updates the requirements for the installation of energy storage systems. A primary purpose is to eliminate some problematic language and refer directly to NFPA 855 "Standard for the Installation of Stationary Energy Storage Systems" as has been done with the International Fire Code. The edition of NFPA 855 that is being finalized at this time has been greatly improved relative to ESS installed with one- and two-family homes and townhouses.

Section R330.1 has been modified by pulling the language referring to the energy trigger into the scoping language and adding a reference to Chapter 15 of NFPA 855.

The "exceptions" were deleted and replaced with Section R330.1.1 which identifies two types of systems that are specifically provided for in NFPA 855.

R330.2 has been modified to delete the current exception and replace it with an exception for lead-acid, aqueous nickel based, and aqueous metal-air batteries with a pointer to the specific NFPA 855 language covering the carve out.

R330.3 was provided with an editorial modification clarifying it is installation instructions that are applied.

R330.3.1 and R330.4 have been modified to pull the spacing and reduction requirements into one section.

R330.5 has been modified by deleting some of the language and point directly to the section of NFPA 855 that provides for the locations of installations and improved aggregate energy ratings.

R330.6 has been deleted; these requirements are addressed by the language in NFPA 855 and Section R330.2.

R330.7 was renumbered and a new R330.6.1 has been added to address a feasibility and practicality problem with some projects, it points the user to a solution in R310.7.R330.8 thru R330.8 have simply been renumbered.R330.10 has been renumbered a a reference has been provided to a section in NFPA 855 that addresses the use of vehicle export equipment for powering the home or vehicle to grid use.

This proposal is submitted jointly by the ***ICC Building Code Action Committee (BCAC)*** and the ***ICC Fire Code Action Committee (FCAC)***.

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

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 does not address the construction of the dwelling, so it does not address the construction costs. The installation of ESS must follow these provisions now, with this cycle the language was improved in NFPA 855 and this section recognizing new technologies, removing unnecessary restrictions and proving solutions for practical problems the current langauge crates.

Staff Analysis: The proposed referenced standard, NFPA 855-2026 Standard for the Installation of Stationary Energy Storage Systems, is currently referenced in the International Fire Code.

RB144-25

RB145-25

IRC: SECTION 202 (New), R330.3.1, R330.5

Proponents: Joshua Costello, representing County of Los Angeles Fire Department (joshua.costello@fire.lacounty.gov)

2024 International Residential Code

Revise as follows:

[RB] ENERGY STORAGE ~~SYSTEMS~~ SYSTEM(ESS). One device or multiple devices, assembled together, capable of storing ~~electrical~~ energy ~~to be supplied~~ in order to supply electrical energy at a future time.

Add new text as follows:

ENERGY STORAGE SYSTEM CABINET. An enclosure containing an *energy storage system* and meeting the applicable requirements of the listing for the system. Personnel are not able to enter the enclosure other than reaching in to access components for maintenance purposes.

SECTION R330
ENERGY STORAGE SYSTEMS

Revise as follows:

R330.3.1 Spacing. Individual *ESS* units shall be separated from each other by not less than 3 feet (914 mm) except where other separation distances are specified by the *ESS* listing and the manufacturer's installation instructions that were approved by the nationally recognized testing laboratory (NRTL) granting the listing.

R330.5 Energy ratings. ~~Individual *ESS* units~~ Each individual *ESS* unit, or individual grouping of *ESS* units, shall ~~have a maximum~~ not exceed a nominal capacity rating of 20 kWh. Where one or more groupings of *ESS* units are used, each grouping shall be in accordance with the following:

1. An individual grouping of *ESS* units is the installation of two or more *ESS* units at separation distances from each other of less than the minimum separation distance specified in Section R330.3.1.
2. Grouping of ESS units shall only be permitted where expressly allowed by the manufacturer's nationally recognized testing laboratory (NRTL) approved installation instructions, per the UL-9540 listing, to be separated at the alternative distances being used.
3. Where one or more UL-9540-listed *ESS* units are installed within an *energy storage system cabinet*, the cabinet shall be purpose-manufactured, be in accordance with the manufacturer's installation instructions for the specific UL-9540-listed *ESS* units being placed within, and minimize the amount of void space within, after the installation of the *ESS* units within, in which flammable/explosive gases can accumulate during a failure event.

The aggregate nominal-capacity rating of the *ESS* installations shall not exceed:

1. 40 kWh within utility *closets*, *basements* and storage or utility spaces.
2. 80 kWh in attached or detached garages and detached *accessory structures*.
3. 80 kWh on exterior walls.
4. 80 kWh outdoors on the ground.

ESS installations exceeding the permitted individual or aggregate ratings shall be installed in accordance with Section 1207 of the *International Fire Code*.

Reason: This proposal affects the following aspects of the code:

"Nominal" Capacity Rating:

As already established via IFC Table 1207.1 (ENERGY STORAGE SYSTEM (ESS) THRESHOLD QUANTITIES) , Footnote a.:

"Energy capacity is the total energy capable of being stored (nameplate rating), not the usable energy rating."

However, "nameplate rating" is not a good term, because **often the only capacity rating listed on the nameplate is the usable portion of the capacity rather than the nominal rating**, yet it is the nominal rating that represents the actual energy amount/density in the unit that corresponds to the degree of hazard potential. It is **the actual full capacity (i.e., what has come to be known as the "*nominal*" capacity**, so as not to be confused with the "full" or "total" *usable* capacity) that can fuel the thermal-runaway and/or fire during failure; **the thermal runaway or fire does not care what percentage of that capacity is allowed by the battery management system (BMS) to be used/discharged.**

"Grouping of ESS Units":

#1.) There is still no clear definition of what constitutes an individual ESS "unit".

When these code sections were written, the term ESS "unit" identified an assembly of battery cells and other essential components for composing a single functional energy storage system (ESS), where said assembly was listed to UL 9540 as a single functional ESS "unit". ESS "unit" remains defined *only* in UL 9540A (not even in UL 9540, nor in the I-Codes), and attempts are still being made *often* to try to make that definition clear.

#2.) Manufacturers now often create residential ESS units much smaller than 20 kWh each, with the intent of grouping them closely together, especially when connected via DC cabling.

As technology and market demand has evolved, battery manufacturers began making smaller individual ESS units, with the intent of scaling installations of units to the demand of the applicable use, and possibly to enable the replacement of *portions* of the ESS installation as necessary throughout the life of the installation to maintain efficiency, rather than necessitating the replacement of the whole ESS installation to do so. However, the Fire and Residential Codes does not allow by default for closer groupings of such smaller ESS units.

#3.) Despite the **continuing lack of a true large-scale fire test (LSFT) for ESS**, let alone for residential ESS, it is **recognized (and confirmed with original NFPA-855 TC members) that the 20-kWh maximum for residential ESS was intended to limit the amount of fire and/or hazardous-materials load amassed in any singular spot** (i.e., grouping).

Thus, after extensive research, and extensive experience with reviewing and inspecting residential BESS within their very large jurisdiction, in March of 2024, the Los Angeles County Fire Department (LACoFD, a fire protection district consisting of **60 of the cities in Los Angeles County, as well as all the unincorporated areas**) issued an "interim interpretation" of the term ESS "unit" as it pertains specifically to the sections being amended by this proposal (and their counterparts in the IFC). As explained, the interpretation is consistent with the *intent* of the codified requirements in both the I-Codes and NFPA 855, despite their language.

This interpretation has been met with great appreciation from the ESS industry, installers, *and* other AHJ's. In fact, other agencies (or at least the city of San Jose, CA) have followed suit (https://www.sanjoseca.gov/home/showpublisheddocument/113109/638562093507530000). This policy has been tried and proven effective since March of 2024, in multiple jurisdictions.

Definition of ENERGY STORAGE SYSTEM~~S~~ (ESS):

The changes being made to this existing definition in the IRC are basically editorial and are to align it with that of the definition of the exact same term in the IFC. The term is being made singular, as it is in the IFC, because when plural it further muddies the concept of what is an individual unit.

Definition of ENERGY STORAGE SYSTEM CABINET:

This change is merely to **bring this exact *existing* definition from the IFC into the IRC**, because there are many ESS manufacturers who wish to offer residential ESS for installation within a cabinet, and, especially while introducing a prescriptive path to allowing ESS groupings, it is necessary to provide parameters by which these groupings can be safely accomplished using

a cabinet. Regarding the requirement for minimizing the void space within the cabinet, this is in essence a reference to a requirement in UL 9540 that is not very clearly stated. Nonetheless, efforts need to be made to minimize this void space within the populated cabinet into which
flammable/explosive gases can accumulate during an ESS battery-failure event, as explosion hazards are real. Some installers might conceivably achieve a listing that specifies that cabinets can be built to spec on site.

NRTL-approved manufacturer's installatiuon instructions:

It has been the **experience of many AHJ's and responsible installers** that **ESS manufacturers, especially those of residential ESS, will revise and promulgate their manufacturer installation instructions *very* often, usually issuing them online.**

Also,**manufacturers' installation instructions in this industry vary extremely widely in terms of their quality, on many factors thereof.** While attempts in the UL-9540 technical committee are ongoing, even by the installers and reputable manufacturers, to standardize portions of installation-instructions format, **there remains a real need to inform the code user of the need to use the official manufacturer's installation instructions that were actually approved by the NRTL, especially when dealing with such a critical aspect as hazard separation distances that are specifically supposed to be designed to prevent a failure inside the battery or cabinet from burning down the entire structure.**

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This code change will decrease the cost of installation of ESS at IRC-regulated properties.

There is a very large variety of sizes and capacities of Residential ESS on the market today (imagination is their designers' limit). Currently, as the default code requirements are written:
Regardless of the nominal capacity of each ESS unit, each ESS unit would need to be spaced out by 3 feet from the next ESS unit.

If this proposal is approved:
Up to 20 kWh of nominal capacity of ESS units, regardless of the number of units comprising that capacity, could, by default (i.e., without need for evaluation of the UL-9540A test results), be located with less than 3 feet separation distance between those units if their manufacturer's installation instructions allow for that. This proposal reduces the necessary footprint of the installation, reduces the need to purchase more kWh capacity than necessary (i.e., increases scalability options, thereby reducing cost), and may reduce the cost to repair an ESS installation by allowing for repair of smaller portions of the installation.

Thus, if a project has limited space, or limited funds, for installing an ESS, then, to reach the same aggregate kWh storage capacity:

1. Multiple smaller-capacity ESS units can be tightly grouped in the same location rather than:

a. Having to purchase 1 larger-capacity ESS unit (assuming the added capacity that larger-capacity unit offers is unnecessary).

b. Having to spend/devote more project-site space on/for the permanent designation of working space around these units.

2. For unit designs that require interconnection using DC wiring, installation is made much easier (i.e., less costly in parts and labor) because the wiring linking each unit to the next in groups of more than 2 needs to be exactly the same length.

Estimated Immediate Cost Impact Justification (methodology and variables):

#1.) This proposal will decrease cost because it **introduces a previously non-existent codified path by which ESS models of smaller individual capacities can be spaced much more closely together**.

#2.) Besides the change discussed in #1, above, this proposal merely adds details that are already in place by law, into the text in order **to clarify ambiguity**. This added clarification **will facilitate compliant installations, which are so very critical to AHJs and residents alike when dealing with** a technology that can have a very detrimental effect if installed incorrectly or haphazardly, and also since so **many jurisdictions now offer automated permitting via an affidavit-type application; it's not until the inspection that the AHJ really gets to review the installation, and by then correcting installation mistakes are costly**.

Because the ICC requires actual cost estimates in dollar amounts, the following examples are being provided:EXAMPLE RESIDENTIAL ESS UNITS SHOWING:
COST PER ESS UNIT, &

MAXIMUM NUMBER OF SCALABLE ESS UNITS THAT CAN FIT INTO ONE 20-kWh GROUPING

EXAMPLE RESIDENTIAL ESS UNITS SHOWING:
COST PER ESS UNIT, &
MAXIMUM NUMBER OF SCALABLE ESS UNITS THAT CAN FIT INTO ONE 20-kWh GROUPING

Example* Residential ESS Unit	kWh** Capacity per ESS Unit	# of Units that can fit in one 20-kWh Grouping	Cost per ESS Unit	Information Sources*** (accessed 01-2025)
Tesla Powerwall 3 Battery	13.5 kWh	1	$9,999	https://cleanpowerstore.com/products/tesla-powerwall-3?variant=42137724256345&country=US&currency=USD&utm_medium=product_sync&utm_source=google&utm_content=sag_organic&utm_campaign=sag_organic&srsltid=AfmBOooeJ9lA57qlo4k5u8FJGJFlDKIOjHdWLN2Uu1VAqKn_XWOv55fdr4w https://energylibrary.tesla.com/docs/Public/EnergyStorage/Powerwall/3/Datasheet/en-us/Powerwall-3-Datasheet.pdf
SolarEdge Home Battery 400V	9.7 kWh	2	$6,285	https://ressupply.com/batteries-and-enclosures/solaredge-bat-10k1ps0b-02-energy-bank-battery?srsltid=AfmBOoqdcFWJb20tp98bfK3D1NJeUHh3OjUFfoeGiYWKGmmXY8T3C734D_Y&gQT=2 https://knowledge-center.solaredge.com/sites/kc/files/se-solaredge-home-battery-datasheet-nam.pdf
FortressPower eFlex MAX 5.4 kWh	5.4 kWh	3	$2,036	https://ussolarsupplier.com/products/fortress-eflex-max-5-4kwh-51-2v-battery?variant=49571488563498&country=US&currency=USD&utm_medium=product_sync&utm_source=google&utm_content=sag_organic&utm_campaign=sag_organic&gad_source=4&gclid=Cj0KCQiA4-y8BhC3ARIsAHmjC_G3ZrEblqqIkTYlnuVDuMkHLfzhm9Q7HRlw3PgTzK0NMjX1Hxevl2YaAv37EALw_wcB https://www.fortresspower.com/wp-content/uploads/2024/05/eFlex-MAX-Datasheet-V7.pdf
Enphase IQ Battery 5P	5.0 kWh	4	$3,216	https://solartekcorp.com/products/enphase-iq-5p-battery-w-cover-kit?currency=USD&variant=49902471479611&utm_source=google&utm_medium=cpc&utm_campaign=Google+Shopping&stkn=b25ed62d5566&srsltid=AfmBOoppMtkerQRizZwup_Bl5QVikqqgUJ4sY98wY9cqUoal2vYKjkJmGek&com_cvv=8fb3d522dc163aeadb66e08cd7450cbbdddc64c6cf2e8891f6d48747c6d56d2c https://enphase.com/download/iq-battery-5p-data-sheet
Enphase IQ Battery 3T	3.5 kWh	5	$2,576	https://www.portlandiaelectric.supply/enphase-en-b03-t01-us00-1-3/?srsltid=AfmBOooPz9a3TIYZ-yg8OqGhYlvS-IOQKP8A02G6QAKGieEuYQqqPlgCGjc https://enphase.com/download/iq-battery-3t-data-sheet

*Example products and services were not chosen with, nor are being presented in order to imply ,any preference for nor against them.

**kWh capacities are according to the product-specification sources cited.

***This table is not meant to validate the claims made by these sources, including regarding whether or not these are actual nominal capacities, or merely usable portions thereof, nor is it meant to endorse the products, services, nor sources.

Estimated Life Cycle Cost Impact:

Better allowing the installation of ESS models that use smaller individual units will facilitate replacing more affordable smaller portions of an installation, rather than the entire installation, in order to maintain system efficiency throughout the system life.

RB145-25

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IRC: R330.8, R330.8.1, R330.8.1.1 (New), FIGURE R330.8.1.1, R330.8.2, FIGURE R330.8.2 (New), R330.8.3 (New), R330.8.3

Proponents: Joshua Costello, representing County of Los Angeles Fire Department (joshua.costello@fire.lacounty.gov)

2024 International Residential Code

SECTION R330
ENERGY STORAGE SYSTEMS

Revise as follows:

R330.8 Protection from impact. ~~ESS installed in a location subject to vehicle damage shall be protected in accordance with Section R330.8.1 or R330.8.2.~~The need for impact protection for *ESS*units shall be deterimined in accordance with Sections R330.8.1 through R330.8.3. Where impact protection is determined to be necessary, it shall be designed in accordance with Section R330.8.4.

Delete and substitute as follows:

~~**R330.8.1 Garages.** Where an ESS is installed in the normal driving path of vehicle travel within a garage, impact protection complying with Section R330.8.3 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 R330.8.1):~~

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) from 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 installed not less than 36 inches (914 mm) above finished floor are not subject to vehicle impact protection requirements.~~

R330.8.1 Garage-interior installed ESS. Impact protection shall be provided for an ESS unit installed inside a garage or similar structure.

Exceptions:

1. Where an ESS unit is protected by the return wall in accordance with Section R330.8.1.1, no other impact protection is required for that ESS unit.
2. Where the code official approves that an ESS unit is sufficiently protected by other permanent structural elements of the garage, no other impact protection shall be required for that ESS unit.
3. Where no portion of an ESS unit is less than 36 inches (914 mm) above the adjacent finished driving surface, impact protection is not required for that ESS unit.

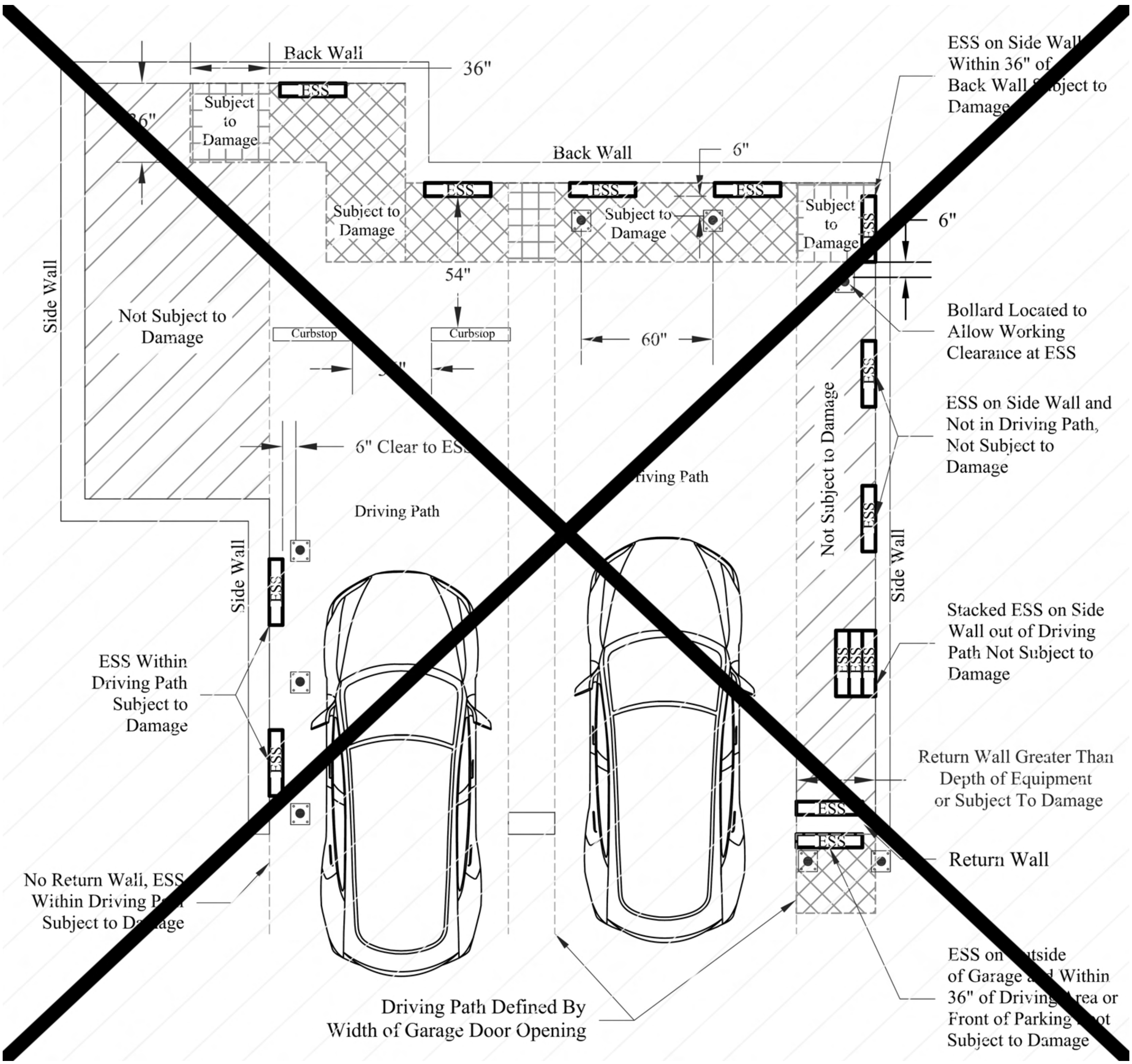
Add new text as follows:

R330.8.1.1 Return-wall protection. Where no portion of an ESS unit is installed outside of a triangle created by connecting a point measured along the side wall that is two times the return-wall measurement (2L) to a second point where the return wall terminates at the vehicle-entrance opening, in accordance with Figure R330.8.1.1, the return wall shall be considered to serve as the required impact protection for that ESS unit.where:L = The length of the vehicle-entrance return wall, measured from the inside corner where the return wall meets the adjacent side wall that runs roughly parallel to the driving path, in accordance with Figure R330.8.1.1.

Exceptions:

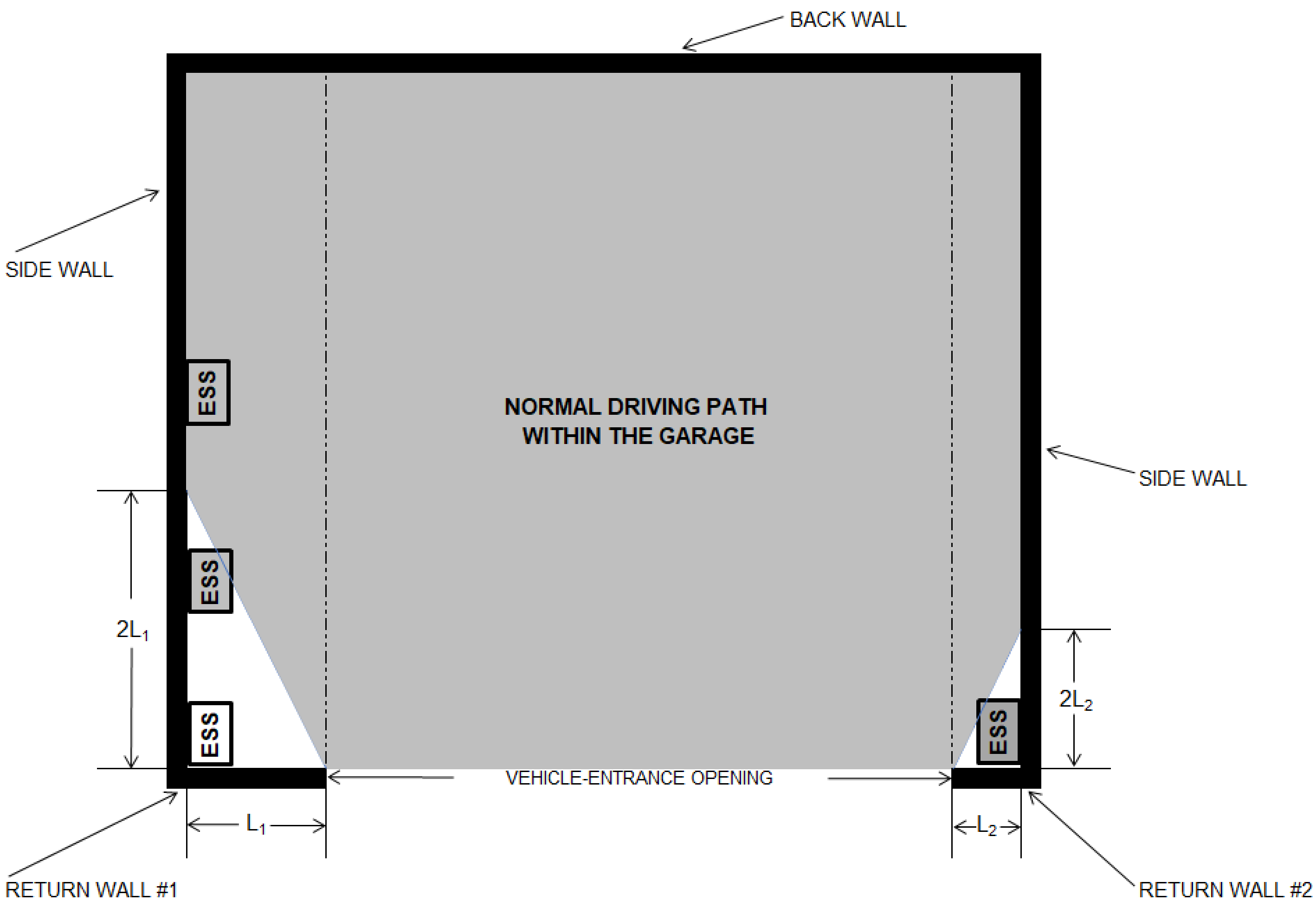
1. Where the interior length of the vehicle-entrance return wall (L) is greater than 6 feet (1829 mm), an ESS unit located entirely within the triangle formed using that return wall shall be subject to case-by-case review by the code official for the need for additional impact protection.
2. Where the driving path within the garage is deeper than 25 feet (7620 mm), an ESS unit located entirely within the triangles formed using either return wall shall be subject to case-by-case review by the code official for the need for additional impact protection.

Delete and substitute as follows:



~~For SI: 1 inch = 25.4 mm.~~

~~**FIGURE R330.8.1 ESS VEHICLE IMPACT PROTECTION**~~



L = Interior length of the vehicle-entrance return wall.

ESS = ESS unit NOT protected by the return wall from impact.

ESS = ESS unit protected by the return wall from impact[a,b].

= Area NOT protected by the return wall from impact [a,b].

a. Where the interior length of the vehicle-entrance return wall (L) is greater than 6 feet (1829 mm), an ESS unit located entirely within the triangle formed using that return wall shall be subject to case-by-case review by the code official for the need for additional impact protection.

b. Where the driving path within the garage is deeper than 25 feet (7620 mm), an ESS unit located entirely within the triangles formed using either return wall shall be subject to case-by-case review by the code official for the need for additional impact protection.

FIGURE R330.8.1.1 GARAGE RETURN-WALL PROTECTION[a,b]

~~**R330.8.2 Other locations subject to vehicle impact.** Where an ESS is installed in a location other than as defined in Section~~

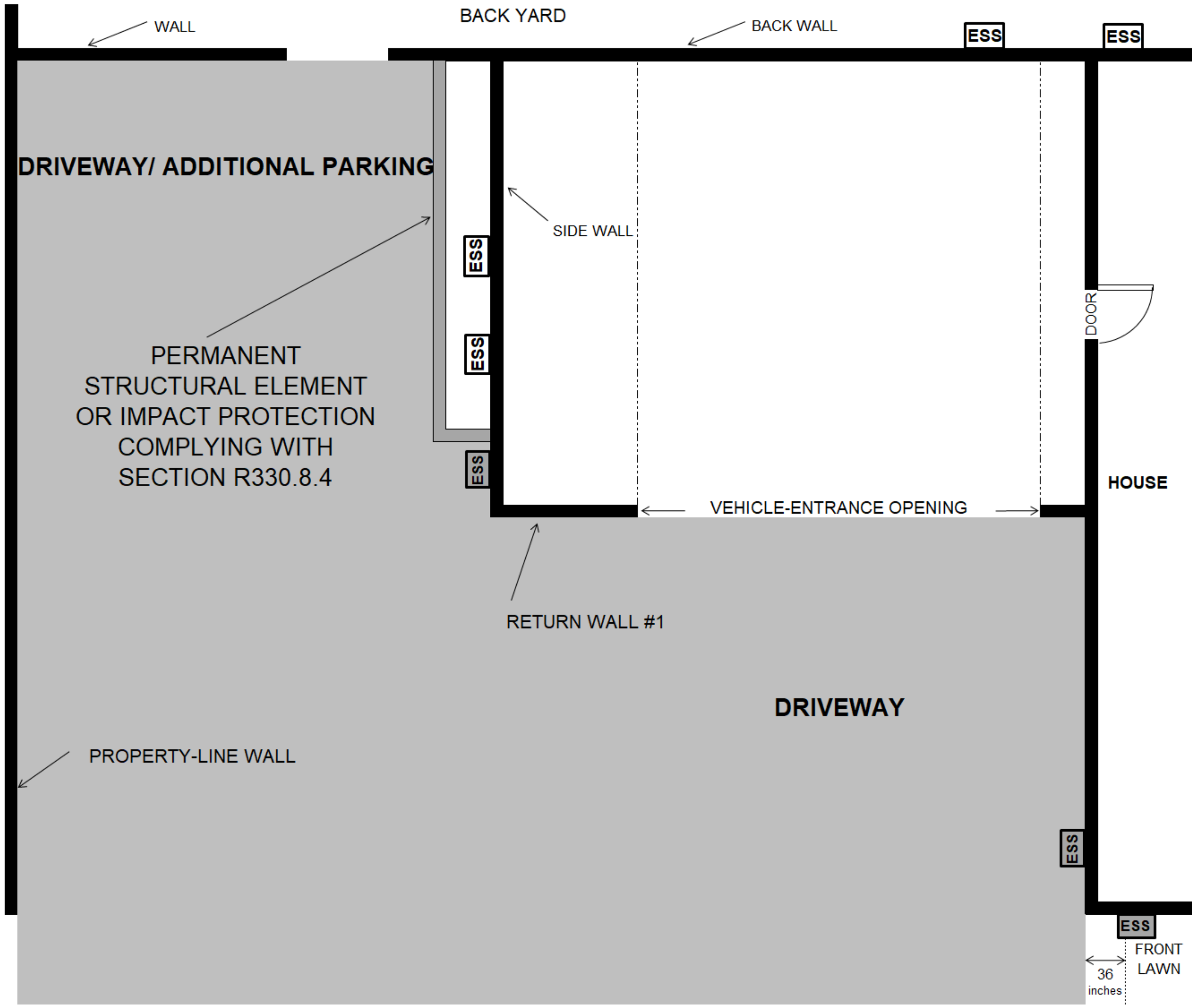
~~R330.8.1 and is subject to vehicle damage, impact protection shall be provided in accordance with Section R330.8.3.~~

R330.8.2 Exterior-installed ESS. Where an ESS unit is installed outdoors and is within 36 inches (914 mm) of a vehicular path of travel, vehicular impact protection shall be provided in accordance with Section R330.8.4. See Figure R330.8.2.

Exceptions:

1. Where the code official approves that an ESS unit is sufficiently protected by permanent structural elements on the site, no other impact protection shall be required for that ESS unit.
2. Where no portion of an ESS unit is less than 36 inches (914 mm) above the adjacent finished driving surface, no impact protection is required for that ESS unit.

Add new text as follows:



= Exterior driving surface and vehicular path of travel.

ESS = ESS unit requiring impact protection.

ESS = ESS unit *NOT* requiring impact protection, or already protected.

FIGURE R330.8.2 EXTERIOR-INSTALLED ESS

R330.8.3 Special circumstances. The need for impact protection for any ESS unit installation scenario not specifically addressed in Sections R330.8.1 and R330.8.2 and associated figures, shall require approval by the code official.

Revise as follows:

~~**R330.8.3**~~ **R330.8.4** ~~**Impact protection options**~~ **Acceptable means of impact protection.** ~~ESS~~ Impact protection for ESS shall ~~comply~~ be designed in accordance 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 (305 mm) deep and 6 inches (152 mm) in diameter, with not less than 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.

   1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter Schedule 80 steel pipe fully welded to a steel plate not less than 8 inches (203 mm) in length by $^1/_4$ inch (6.4 mm) in thickness and bolted to a concrete floor by means of $4^1/_2$-inch (114 mm) concrete anchors imbedded not less than 3 inches (76 mm). 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.

   1.3. Premanufactured steel pipe bollards 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.

2. Wheel barriers constructed in accordance with one of the following:
   2.1. Concrete or polymer 4 inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length, 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. Concrete anchors not less than $3^1/_2$ inches (89 mm) in diameter 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. An *approved* method designed to resist an impact of 2,000 pounds per square foot (95 760 N/m^2) in the direction of travel at 24 inches (610 mm) above *grade*.

Reason: Re. Determinations of When Impact Protection is Necessary for ESS:

- These basic figures and language have been <u>successfully in use in the very large Los Angeles County Fire Department (LACoFD) jurisdiction since the end of 2021 for ESS, and are codified</u>. LACoFD is a fire protection district consisting of <u>60 of the cities in Los Angeles County, as well as all the unincorporated areas</u> and has continued to successfully provide <u>non-stop permitting of residential ESS throughout the numerous fire prevention offices of the jurisdiction</u>.
  - The LACoFD figures <u>pre-date the codification of the industry-led SEAC-devised figure</u>.
  - Some <u>installers have been vocal about preferring</u> the simple, unambiguous nature of the LACoFD triggers for impact protection.
  - <u>LACoFD includes/retains the exception for ESS units mounted entirely above 36" above finished grade.</u>
- <u>The let-it-burn approach that is well established for li-ion ESS does not work for ESS at IRC properties.</u> It may not work for other hazardous chemistries that may come to this market either.
  - When these ESS are impacted, they <u>can easily enter thermal runaway at any time, **immediately or up to days (or longer) later**</u>.

    <u>Once impacted, all the cells within an ESS must be considered compromised</u> at that point and can't be trusted to be as safe as they had been before impact; damage to the cells or circuitry may not be readily apparent.

    <u>Once compromised, ESS cell</u>s of lithium-ion chemistries (e.g., lithium-iron-phosphate [LFP or LiFePO4], nickel-manganese-cobalt [NMC], or others)<u> contain all the ingredients within each affected battery cell for ignition of the large amounts of flammable and explosive gases they generate:</u> fuel, oxidizer, and potential ignition sources (e.g., heat generated by the thermal-runaway chemical reaction that is also producing the gases, and arcs and sparks from the degrading battery cell[s] themselves, not to mention other ignition sources that may be present in the vicinity).
  - <u>**Work to create an actual large-scale fire test (LSFT) for ESS, even for residential ESS, is still ongoing**</u> in NFPA 855, UL, and other technical working groups. Despite intended purpose, **it has become well recognized that UL <u>9540A has not turned out to be a LSFT by which to evaluate the ability of a fire originating in an ESS battery pack to spread to combustible construction, let alone combustibles in the vicinity of the ESS unit in question</u>**. <u>ESS permitted to date were</u>

held to UL 9540A because no LSFT standard is yet available.
  - ESS can't simply be towed out like an EV because they are bolted in place (usually to a bearing wall) and full of stranded energy (an electrocution hazard).
  - Even fully disconnecting the ESS electrical, does not stop thermal runaway nor even the threat of thermal runaway and fire.
  - The ensuing thermal runaway can't be extinguished; at best it can be actively cooled to slow the reaction and protect exposures until the fuel in the affected cells is entirely consumed, which can take a very long time, especially when the reaction is slowed by water application.
  - Fire departments can't afford to babysit the ESS for the long periods for which reignition remains a real concern, but can't remove it from the structure either for the reasons stated above.
- Restricting the trigger for impact protection to the so-called "normal driving path" may be sufficient for other hazards like plumbed natural-gas appliances, but it is extremely insufficient for this permanently-mounted ESS hazard that can't simply be rendered safe by turning it off:
  - If ESS are impacted, something has already gone wrong and the vehicle has already left the "normal driving" path.
  - ESS are **not rated for impact**, and thermal runaway should be expected thereafter; if it doesn't occur, it may at any time because the **damage to the cells or circuitry may not be readily apparent**. At the very least, compromise should be assumed until proven otherwise, a proof that is easier said than done.
  - Impact protection for **the impact-susceptible hazard of BESS necessitates an added level of consideration:**
    - **Places oxidizers, ignition sources, fuel, and high-density electrical energy all inside individual battery cells that are then closely packed together inside a BESS unit**, the combination of which **predicably, quickly, and uncontrollably generates large amounts of explosive gases without warning;** with
    - **No ducted venting;**
    - **No valid large-scale fire test (LSFT) evaluation yet in place;** and
    - Location at a **residential-associated occupancy classification** that will be the **least regulated, least maintained, and least monitored occupancy after issuance of the certificate of occupancy**.
  - Many people park at an angle in their garages, and many other driveways have a strange approach angle. These are not the "normal driving path" defined in the currently adopted verbiage and the figure.
    - Regarding the **scenario of the deep return wall (i.e., L > 6')**:
      - LACoFD is aware of occupants who turn tightly into garages of this design such that they nearly park perpendicular to the "normal driving path". Given the unique hazards inherent in BESS, that is the reason why LACoFD makes that a trigger for case-by-case evaluation.
    - Regarding the **scenario of the deep garage driving path**:
      - LACoFD-owned Toyota Priuses are 14.5 feet long, with most consumer vehicles at less than 20 feet in length. Research indicates that the average garage depth is between 18 and 24 feet. Based on this, 25 feet excludes the majority of garages but still builds into the requirement a consideration for those that are of greater lengths, as:
        a. Most accidents occur during backing, and
        b. During backing, the return wall provides no protection whatsoever.
  - Site-specific anomalies and unforeseen scenarios, especially in existing structures that may have been built long ago to little or no standards, are the reasons why case-by-case evaluation is necessary for certain scenarios; and Section R330.8.3 is included. Afterall, until this SEAC-generated figure recently came about, the final determination on both the need and ultimate means of impact protection was totally at the discretion of the code official, and that worked forever. Even current Section 312 and its commentary recognize this need for the use of common-sense case-by-case discretion by the code official. Likewise, Exception #2 of R330.8.1 and Exception #1 of R330.8.2 are included because things like irregular garage/exterior walls that create cubbies/alcoves, or the like, might make impact with a BESS unit placed within them virtually impossible, but it might be unreasonable to require those structural elements to be held to the nominal performance criteria of Item 3 of R330.8.4.
  - If there is an impact, there may also be a victim experiencing a medical emergency, who is unable to get out before an ensuing fire, and potential rescuers can't simply turn off gas service or even electrical circuits to mitigate the fire or flammable and potentially toxic gases.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal **may increase, decrease, or have no effect on the cost** of installation of an ESS unit, in accordance with the following:

There are **very many variables that may determine how many bollards or wheel barriers may be necessary in each installation scenario**, including but not limited to <u>what location option(s) is chosen for the ESS installation</u>, <u>width and number of ESS units being installed</u>, <u>height of ESS unit above adjacent driving surface</u>, <u>whether existing structural elements on site can provide full or partial impact protection</u>, and <u>direction(s) of possible impact</u>.

1. a. **<u>Parts</u>**:

i. **<u>Wheel Barrier</u>**:

1. a. i. 1. Concrete type: **$60** (https://scaffoldingrentalandsales.com/concrete-wheel-stops-parking-blocks/?srsltid=AfmBOoqF1F0O1cpa-BtqXnodIzemSAqeFILIoDXZ6_tGRZXcqmVxuW0k)

2. Polymer type: **$75** (https://www.amazon.com/dp/B0D4YQGD56/ref=sspa_dk_detail_0?pd_rd_i=B0D4YQGD56&pd_rd_w=FB5cg&content-id=amzn1.sym.7446a9d1-25fe-4460-b135-a60336bad2c9&pf_rd_p=7446a9d1-25fe-4460-b135-a60336bad2c9&pf_rd_r=XP03P3A1PPE6ZCNYD911&pd_rd_wg=q4IDo&pd_rd_r=7c6c444b-cbda-4bc7-b6cd-46a216b1875f&s=kitchen&sp_csd=d2lkZ2V0TmFtZT1zcF9kZXRhaWw&th=1)

ii. **<u>Bollards</u>:**

1. a. ii. 1. **36"** Bollard to be **Bolted in Place**: **$125 – $225 each**.

(https://www.mcmaster.com/57895T46/ and

https://www.postguard.com/bollards/bolt-down-bollards?product_id=530, respectively)

1. a. ii. 2. **48"** Bollard to be **Cemented in Place**: **$75 – $165 each**.

(https://www.amazon.com/dp/B0DSG7B7SV?ref=cm_sw_r_apan_dp_WZMP47X43KME183TSC0Y&ref_=cm_sw_r_apan_dp_WZMP47X43KME183TSC0Y&social_share
and

https://www.trafficsafetystore.com/shop/yellow-steel-bollard-powder-coated-with-round-base-48-inches/BOLPC48RND,
and

https://www.uline.com/Product/Detail/H-7686/Safety-Guards-Barriers/Pour-In-Place-Safety-Bollard-55-x-42, respectively)

iii. **Concrete (for <u>Footing</u> & <u>Fill of Bollards</u>):**

1. a. iii. 1. **Cost per Bag (yields 0.375* cu ft.):** $12.99

(https://www.acehardware.com/departments/building-supplies/concrete-cement-and-masonry/ready-mix-concrete/52376?store=03615&gad_source=1&gclid=CjwKCAiAneK8BhAVEiwAoy2HYft42_wqz27Xlg7c6pyRzx7tCDJJWQKtU8mwMhOCFjA

* https://www.quikrete.com/pdfs/data_sheet-fast%20setting%20concrete%20mix%201004-50.pdf

1. a. iii. 2. For 1 Bollard Cemented-in-Place:

0.6 cu ft. (i.e., 2 bags) = $30

1. a. iii. 3. **For 2 Bollards Cemented-in-Place:**

1.2 cu ft. (i.e., 4 bags) = **$60**

1. a. iii. 4. For 1 Bollard Bolted-in-Place:

0.3 cu ft. (i.e., 1 bag) = $15

1. a. iii. 5. **For 2 Bollards Bolted-in-Place:**

0.6 cu ft. (i.e., 2 bags) = **$30**

iv. **Fasteners:**

1. a. iv. 1. Anchors (each): $2.25 (https://www.mcmaster.com/91578A117/)

   a. 3 for **Wheel Barrier**: **$6.75**

   b. 4 for **Bolt-in-Place Bollard**: **$9**

2. **Washers**: **$15** for 25 (https://www.mcmaster.com/98023A118/)

3. **Nuts**: **$35** for 100 (https://www.mcmaster.com/products/nuts/hex-nuts-2~/hex-nuts-1~~/?s=1%2F2+-13+nuts)

1. b. **Labor Cost** this task *adds* to an ESS Project:

   i. **Hourly Rate:** $50 per hour

   ii. For **1 Wheel Stop**: 1 hour = **$50**

   iii. For 1 Bolt-in-Place Bollard: 2 hours = $100

   iv. For **2 Bolt-in-Place Bollards**: 3 hours = **$150**

   v. For 1 Cemented-In Bollard: 1.5 hours = $75

   vi. For **2 Cemented-In Bollards**: 2 hours = **$100**

1. c. **Estimated Total Cost* to Install Each of the following Means of Impact Protection:**

   i. **1 Wheel Barrier, Concrete**: **$166.75**

   ($60 + $6.75 + $15 + $35 + $50)

   ii. **1 Wheel Barrier, Polymer**: **$181.75**

   ($75 + $6.75 + $15 + $35 + $50)

   iii. **1 Bollard, Bolt-in-Place**: **$299 to $399**

   [(**$125** to **$225**) + $15 + $9 + $15 + $35 + $100)]

   iv. **2 Bollards, Bolt-in-Place**: **$489 to $689**

   [(**$250** to **$450**) + $30 + $9 + $15 + $35 + $150)]

   v. **1 Bollard, Concrete-in-Place**: **$180 to $270**

   [(**$75** to **$165**) + $30 + $75)]

   vi. **2 Bollards, Concrete-in-Place**: **$310 to $490**

   [(**$150** to **$330**) + $60 + $100)]

1. d. **Average TOTAL Costs* of Residential ESS Installation**(Per Chat GPT):

***On most sites, not all installation-location options will require impact protection to be added.** It is unclear if this total cost typically includes impact protection.

"The typical installation cost of an Energy Storage System (ESS) unit for a home can vary widely depending on several factors, such as the brand of the system, battery capacity, location, and the complexity of the installation. However, here's a general breakdown:

1. **Equipment Costs**:
   - The battery system itself (e.g., Tesla Powerwall, Enphase, LG Chem) can range from $7,000 to $15,000 for the unit, depending on capacity and brand.
2. **Installation Costs**:
   - Installation costs usually range between $2,000 and $5,000, though they can go higher depending on the complexity of the job (e.g., if you need electrical upgrades or significant changes to your home's power infrastructure).
3. **Total System Cost**:
   - A full ESS system, including both equipment and installation, can typically cost anywhere from $10,000 to $20,000 or more.

Some factors that can influence the cost include whether the installation is part of a solar panel system, any local incentives or rebates available, and the specifics of your home's electrical system.

It's always a good idea to get quotes from a few installers to get an accurate estimate for your specific situation."

Estimated Immediate Cost Impact Justification (methodology and variables):

For ESS installed **in Certain Locations Inside Garages or similar structures:**

This proposal will **increase** the cost of new installation of ESS, but **only for ESS that are installed in *certain* locations *inside* garages**or similar structures because it triggers the addition of impact protection where in some cases it is not currently prescriptively required.

For ESS installed **Outdoors:**

This proposal will either have **no effect on cost, or will decrease cost**, for the outdoor location option subject to impact protection because it simply provides direction where no direction is currently provided for this existing requirement.

Estimated Life Cycle Cost Impact:

Impact protection is required to be permanent in nature and should not require any maintenance for the life of the ESS unit.

RB146-25

RB147-25

IRC: R330.8.3

Proponents: Joshua Costello, representing County of Los Angeles Fire Department (joshua.costello@fire.lacounty.gov)

2024 International Residential Code

SECTION R330
ENERGY STORAGE SYSTEMS

Revise as follows:

R330.8.3 Impact protection options. ESS 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 (305 mm) deep and 6 inches (152 mm) in diameter, with not less than 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.

   1.2. Minimum 36 inches (914 mm) in height by 3 inches (76 mm) in diameter Schedule 80 steel pipe fully welded to a steel plate not less than 8 inches (203 mm) in length by $^1/_4$ inch (6.4 mm) in thickness and bolted to a concrete floor by means of 4$^1/_2$-inch (114 mm) concrete anchors imbedded not less than 3 inches (76 mm). 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.

   1.3. Premanufactured steel pipe bollards 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.

~~2.~~ ~~Wheel barriers constructed in accordance with one of the following:~~

~~2.1.~~ ~~Concrete or polymer 4 inches (102 mm) in height by 5 inches (127 mm) in width by 70 inches (1778 mm) in length, 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. Concrete anchors not less than 3$^1/_2$ inches (89 mm) in diameter 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.~~ 2. An *approved* method designed to resist an impact of 2,000 pounds per square foot (95 760 N/m^2) in the direction of travel at 24 inches (610 mm) above *grade*.

Reason: **Removal of wheel barriers as an option at an IRC property:**

- o Wheel stops/wheel barriers (like those found in parking lots) represent **an unacceptable trip hazard in a residential garage**, especially as occupants age, or when they are new to a property, or visiting, or fail to turn on the light; there is not visual nor physical barrier at height by which to warn them of the trip hazard.
- o **Bollards also better preserve the required:**
  - § **Working clearances in front of the ESS installation**, per the Electrical Code (and Fire Code Chapter 6).
  - § **Separation distances to combustibles.** Work to create an *actual* large-scale fire test (LSFT) for ESS, even for residential ESS, is *still ongoing* in NFPA 855, UL, and other technical working groups. Despite intended purpose, it has become well recognized that UL 9540A has *not* turned out to be a LSFT by which to evaluate the ability of a fire originating in an ESS battery pack to spread to combustible construction, let alone combustibles in the vicinity of the ESS unit in question. ESS permitted to date were held to UL 9540A because **no LSFT standard is yet available**.

- Incalculable **medical bills will far outweigh any savings** of a wheel barrier/stop over a bollard or other approved barrier.
- Los Angeles County Fire Department (a fire protection district consisting of **60 of the cities in Los Angeles County, as well as all the unincorporated areas) has *not* allowed wheel barriers for this purpose since the end of 2021**, while still successfully providing for non-stop permitting of residential ESS throughout the numerous fire prevention offices of the jurisdiction.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposal will increase the cost of construction by eliminating one option for means of impact protection for ESS.

There are **very many variables that may determine how many bollards or wheel barriers may be necessary in each installation scenario**, including but not limited to what location option(s) is chosen for the ESS installation, width and number of ESS units being installed, height of ESS unit above adjacent driving surface, whether existing structural elements on site can provide full or partial impact protection, and direction(s) of possible impact.

1. a. **Parts**:

i. **Wheel Barrier**:

1. a. i. 1. Concrete type: **$60** (https://scaffoldingrentalandsales.com/concrete-wheel-stops-parking-blocks/?srsltid=AfmBOoqF1F0O1cpa-BtqXnodIzemSAqeFILIoDXZ6_tGRZXcqmVxuW0k)

2. Polymer type: **$75** (https://www.amazon.com/dp/B0D4YQGD56/ref=sspa_dk_detail_0?pd_rd_i=B0D4YQGD56&pd_rd_w=FB5cg&content-id=amzn1.sym.7446a9d1-25fe-4460-b135-a60336bad2c9&pf_rd_p=7446a9d1-25fe-4460-b135-a60336bad2c9&pf_rd_r=XP03P3A1PPE6ZCNYD911&pd_rd_wg=q4lDo&pd_rd_r=7c6c444b-cbda-4bc7-b6cd-46a216b1875f&s=kitchen&sp_csd=d2lkZ2V0TmFtZT1zcF9kZXRhaWw&th=1)

ii. **Bollards:**

1. a. ii. 1. **36"** Bollard to be **Bolted in Place**: **$125 – $225 each**.

(https://www.mcmaster.com/57895T46/ and

https://www.postguard.com/bollards/bolt-down-bollards?product_id=530, respectively)

1. a. ii. 2. **48"** Bollard to be **Cemented in Place**: **$75 – $165 each**.

(https://www.amazon.com/dp/B0DSG7B7SV?ref=cm_sw_r_apan_dp_WZMP47X43KME183TSC0Y&ref_=cm_sw_r_apan_dp_WZMP47X43KME183TSC0Y&social_share

and

https://www.trafficsafetystore.com/shop/yellow-steel-bollard-powder-coated-with-round-base-48-inches/BOLPC48RND,

and

https://www.uline.com/Product/Detail/H-7686/Safety-Guards-Barriers/Pour-In-Place-Safety-Bollard-55-x-42, respectively)

iii. **Concrete (for Footing & Fill of Bollards):**

1. a. iii. 1. **Cost per Bag (yields 0.375* cu ft.):** $12.99

(https://www.acehardware.com/departments/building-supplies/concrete-cement-and-masonry/ready-mix-concrete/52376?store=03615&gad_source=1&gclid=CjwKCAiAneK8BhAVEiwAoy2HYft42_wqz27Xlg7c6pyRzx7tCDJJWQKtU8mwMhOCFjA

* https://www.quikrete.com/pdfs/data_sheet-fast%20setting%20concrete%20mix%201004-50.pdf

1. a. iii. 2. For 1 Bollard Cemented-in-Place:

0.6 cu ft. (i.e., 2 bags) = $30

1. a. iii. 3. **For 2 Bollards Cemented-in-Place:**

1.2 cu ft. (i.e., 4 bags) = **$60**

1. a. iii. 4. For 1 Bollard Bolted-in-Place:

0.3 cu ft. (i.e., 1 bag) = $15

1. a. iii. 5. **For 2 Bollards Bolted-in-Place:**

0.6 cu ft. (i.e., 2 bags) = **$30**

iv. **Fasteners:**

1. a. iv. 1. Anchors (each): $2.25 (https://www.mcmaster.com/91578A117/)

a. 3 for **Wheel Barrier**: **$6.75**

b. 4 for **Bolt-in-Place Bollard**: **$9**

2. **Washers**: **$15** for 25 (https://www.mcmaster.com/98023A118/)

3. **Nuts**: **$35** for 100 (https://www.mcmaster.com/products/nuts/hex-nuts-2~/hex-nuts-1~~/?s=1%2F2+-13+nuts)

1. b. **<u>Labor Cost</u>** this task *adds* to an ESS Project:

i. **Hourly Rate:** $50 per hour

ii. For **1 Wheel Stop**: 1 hour = **$50**

iii. For 1 Bolt-in-Place Bollard: 2 hours = $100

iv. For **2 Bolt-in-Place Bollards**: 3 hours = **$150**

v. For 1 Cemented-In Bollard: 1.5 hours = $75

vi. For **2 Cemented-In Bollards**: 2 hours = **$100**

1. c. **Estimated <u>Total Cost*</u> to <u>Install Each</u> of the following <u>Means of Impact Protection</u>:**

i. **1 Wheel Barrier, Concrete**: **$166.75**

($60 + $6.75 + $15 + $35 + $50)

ii. **1 Wheel Barrier, Polymer**: **$181.75**

($75 + $6.75 + $15 + $35 + $50)

iii. **1 Bollard, Bolt-in-Place**: **$299 to $399**

[(**$125** to **$225**) + $15 + $9 + $15 + $35 + $100)]

iv. **2 Bollards, Bolt-in-Place**: **$489 to $689**

[(**$250** to **$450**) + $30 + $9 + $15 + $35 + $150)]

v. **1 Bollard, Concrete-in-Place**: **$180 to $270**

[(**$75** to **$165**) + $30 + $75)]

vi. **2 Bollards, Concrete-in-Place**: **$310 to $490**

[(**$150** to **$330**) + $60 + $100)]

1. d. **Average <u>TOTAL Costs* of Residential ESS Installation</u>**(Per Chat GPT):

***On most sites, not all installation-location options will require impact protection to be added.** It is unclear if this total cost typically includes impact protection.

"The typical installation cost of an Energy Storage System (ESS) unit for a home can vary widely depending on several factors, such as the brand of the system, battery capacity, location, and the complexity of the installation. However, here's a general breakdown:

1. **Equipment Costs**:
   - The battery system itself (e.g., Tesla Powerwall, Enphase, LG Chem) can range from $7,000 to $15,000 for the unit, depending on capacity and brand.
2. **Installation Costs**:
   - Installation costs usually range between $2,000 and $5,000, though they can go higher depending on the complexity of the job (e.g., if you need electrical upgrades or significant changes to your home's power infrastructure).
3. **Total System Cost**:
   - A full ESS system, including both equipment and installation, can typically cost anywhere from $10,000 to $20,000 or more.

Some factors that can influence the cost include whether the installation is part of a solar panel system, any local incentives or rebates available, and the specifics of your home's electrical system.

It's always a good idea to get quotes from a few installers to get an accurate estimate for your specific situation."

Estimated Immediate Cost Impact Justification (methodology and variables):

<u>Cost of Impact Protection for ESS</u>:

This proposal will increase the cost of impact protection <u>by not allowing wheel barriers that may be less expensive than **the other options**</u>.

<u>Cost of Medical Bills and associated Lost Productivity</u>:

This proposal **<u>will potentially reduce the number of trip-and-fall injuries (and the associated costs)</u>** incurred by residents and visitors to these garages had they been installed with wheel barriers instead of the other options, as well as those costs to employers of those injured.

Estimated Life Cycle Cost Impact:

Impact protection is required to be permanent in nature and should not require any maintenance for the life of the ESS unit.

RB147-25

RB148-25

IRC: R401.4.1

Proponents: John-Jozef Proczka, representing City of Phoenix Planning and Development Department (john-jozef.proczka@phoenix.gov)

2024 International Residential Code

Revise as follows:

R401.4.1 Geotechnical evaluation. In lieu of a complete geotechnical evaluation, the load-bearing values in Table R401.4.1(1) ~~and the soil classifications in Table R401.4.1(2)~~ shall be assumed.

Reason: This proposal removes the ability/mandate to assume the soil classification. This soil assumption was brought in proposal RB165-22 where the reason statement indicated that Table R401.4.1(2) could be used as a guide to assign a soil classification. The reason statement to RB165-22 and the code text it brought in result in different things. Assuming a soil classification versus using a method to classify the soil that is based on the soil particle size descriptions is an important difference. Assuming a higher quality soil than is actually present can lead to foundation or structural failure.

Indicating that Table R401.4.1(2) can be used as a guide for classifying a soil seems like a prudent step. Assuming a soil classification and then presuming a load-bearing capacity is not a prudent step. Some knowledge of what soil is present at a site is necessary to be able to estimate its properties. Soil can be classified without conducting a full/entire geotechnical investigation.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Soil testing for particle size distribution alone in order to classify the soil is quite cheap when you bring a small soil sample into a laboratory, at approximately $30, however many soil testing companies that aren't just laboratories will attempt to sell the customer an entire geotechnical investigation, and that is much more expensive.

Estimated Immediate Cost Impact Justification (methodology and variables):

I obtained a soil particle size distribution test for $30 from a Phoenix local testing laboratory.

RB148-25

RB149-25

IRC: TABLE R401.4.1(2), ASTM Chapter 44 (New)

Proponents: Chad Sievers, NYS, representing NYS Dept of State (chad.sievers@dos.ny.gov); Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov); Stephen Van Hoose, representing NYS DOS (stephen.vanhoose@dos.ny.gov); Larissa DeLango, representing NYSDOS (larissa.delango@dos.ny.gov); Daniel Carroll, New York State Department of State, representing Division of Building Standards and Codes (daniel.carroll@dos.ny.gov); Christopher Jensen, representing NYS DOS - Division of Building Standards and Codes (christopher.jensen@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Bryant Arms, representing NYS DOS (bryant.arms@dos.ny.gov); Bryan Toepfer, representing NY DOS (bryan.toepfer@dos.ny.gov)

2024 International Residential Code

Revise as follows:

TABLE R401.4.1(2) PROPERTIES OF SOILS CLASSIFIED ACCORDING TO THE UNIFIED SOIL CLASSIFICATION SYSTEM

SOIL GROUP	UNIFIED SOIL CLASSIFICATION SYSTEM SYMBOL[d]	SOIL DESCRIPTION	USDA TEXTURAL SOIL CLASSIFICATION	DRAINAGE CHARACTERISTICS[a]	FROST HEAVE POTENTIAL	VOLUME CHANGE POTENTIAL EXPANSION[b]
Group I	GW	Well-graded gravels, gravel sand mixtures, little or no fines	N/A	Good	Low	Low
	GP	Poorly graded gravels or gravel sand mixtures, little or no fines	N/A	Good	Low	Low
	SW	Well-graded sands, gravelly sands, little or no fines	N/A	Good	Low	Low
	SP	Poorly graded sands or gravelly sands, little or no fines	Sand	Good	Low	Low
	GM	Silty gravels, gravel-sand-silt mixtures	N/A	Good	Medium	Low
	SM	Silty sand, sand-silt mixtures	Loamy sand, sandy loam	Good	Medium	Low
Group II	GC	Clayey gravels, gravel-sand-clay mixtures	N/A	Medium	Medium	Low
	SC	Clayey sands, sand-clay mixture	Sandy clay loam, sandy clay	Medium	Medium	Low
	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	Silt, silt loam	Medium	High	Low
	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	Loam, clay loam, silty clay loam	Medium	Medium	Medium to Low
Group III	CH	Inorganic clays of high plasticity, fat clays	Clay, silty clay	Poor [c]	Medium	High
	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts	N/A	Poor [c]	High	High
Group IV	OL	Organic silts and organic silty clays of low plasticity	N/A	Poor [c]	Medium	Medium
	OH	Organic clays of medium to high plasticity, organic silts	N/A	Unsatisfactory [c]	Medium	High
	Pt	Peat and other highly organic soils	N/A	Unsatisfactory [c]	Medium	High

For SI: 1 inch = 25.4 mm.

N/A = Not Applicable.

a. The percolation rate for good drainage is over 4 inches per hour, medium drainage is 2 inches to 4 inches per hour, and poor is less than 2 inches per hour.

b. Soils with a low potential expansion typically have a plasticity index (PI) of 0 to 15, soils with a medium potential expansion have a PI of 10 to 35 and soils with a high potential expansion have a PI greater than 20.

c. Unsuitable as backfill material.

d. Soil classifications are in accordance with ASTM D2487 and ASTM D2488.

Add new standard(s) as follows:

ASTM

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

D2487-17e1	Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
D2488-17e1	Standard Practice for Description and Identification of Soils (Visual-Manual Procedures)

Reason: The addition of this footnote clearly identifies what method and procedures are used to determine the soil classifications.

Although the table heading currently generically identifies the Unified Soil Classification System it does not identify the reference standard number and version nor does it give the appropriate credit to the standard development group.

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

Justification for no cost impact:

This change is just formally incorporating the reference standards into the code which is already identified in the table. Therefore there is no cost impact.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
ASTMD2487-17e1 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
ASTMD2488-17e1 Standard Practice for Description and Identification of Soils (Visual-Manual Procedures)

RB149-25

RB150-25

IRC: R403.1.2, TABLE R403.1.2

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

Revise as follows:

R403.1.2 Continuous footing in Seismic Design Categories D_0, D_1 and D_2. Exterior walls and ~~required~~ interior *braced wall panels* of *buildings* located in *Seismic Design Categories* D_0, D_1 and D_2 shall be supported by continuous ~~solid or fully grouted masonry or concrete~~ footings in accordance with Table R403.1.2. These footings shall be concrete or masonry that is solid or fully grouted in accordance with Section R403.1.3. Where concrete or masonry continuous footings intersect with perpendicular footings, the horizontal reinforcing shall lap between the elements to resist tension in accordance with Section R608.5.4.3. ~~Other footing~~ Footings made from other materials or systems shall be designed in accordance with accepted engineering practice.

TABLE R403.1.2 CONTINUOUS FOOTING REQUIREMENTS IN SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2[a]

BUILDING PLAN DIMENSIONS	1-STORY						2-STORY						3-STORY	
	50 feet or less			> 50 feet			50 feet or less			> 50 feet			Any	
SDC	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1	D_2	D_0	D_1
~~Continuous f~~ Footings supporting exterior walls	R													
~~Continuous f~~ Footings supporting ~~required~~ interior braced wall panels	NR			R[a]			NR		R[a]	R[a]			R	

For SI: 1 foot = 304.8 mm.
R = Continuous ~~solid or fully grouted masonry or concrete~~footings ~~in accordance with Section R403.1.3.4~~ required.
NR = Continuous footings not required.

a. ~~B~~ One- and two-story buildings shall be permitted to have interior braced wall panels supported on continuous ~~foundations~~ footings at intervals not exceeding 50 feet, provided that the following conditions are all met:

1. The height of cripple walls does not exceed 4 feet.
2. First-floor braced wall panels are supported on doubled floor joists, continuous blocking or floor beams.
3. The distance between bracing lines does not exceed twice the building width measured parallel to the braced wall line.

Reason: Table R403.1.2 was developed by APA in the last cycle as RB169 and was intended to be a code simplification by tabulating complex and possibly confusing requirements for continuous footings at interior braced wall panels that were written in the text of the IRC. While we've provided input during the prior code hearings, we believe additional changes are needed to help clarify and potentially correct the current provisions. The proposed changes provide the following clarifications and corrections:

Editorial changes to Section 403.1.2 and Table 403.1.2 are proposed that will improve readability for users by rewording existing language that may be confusing, merging cells with duplicative information, and deleting redundant words.
The referenced code section in footnote “R” has been relocated to the main text to prevent it from being overlooked by users. The original code reference to Section R403.1.3.4 is only applicable to footings supporting interior walls and we have changed the reference to R403.1.3, which includes provisions for footings supporting exterior and interior walls.
The changes provided clarify that the exception to Table R403.1.2 only applies to one- and two-story buildings and does not apply to three-story buildings.

We are also proposing a needed technical change to the provisions with the addition of reinforcement detailing requirements at footing intersections. During development of FEMA P-232, *Homebuilder’s Guide to Earthquake-Resistant Design and Construction,* it was identified that current code provisions overlook detailing of reinforcing at intersecting footings. FEMA P-232 recommended developing horizontal footing reinforcing at intersecting footings based on reinforcing detailing requirements in Section R608.5.4 and those recommendations are included in this proposal.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This change proposal primarily provides editorial clarification of existing provisions for required footing locations, resulting in no cost change. It does also include, however, a specific requirement for lapping of reinforcing at intersecting continuous foundations. While it is hoped that this is already occurring in residential construction, we have estimated a cost of approximately $81 for addition of lapping bars at intersecting footings based on a representative single-family dwelling. This is approximately 0.02% of the median new home price of $425,000 reported by NAHB in March 2023. While the specific dollar amount might be argued, we believe that the cost can definitively be categorized as negligible, and can be compared to the benefit of improved footing performance.

Estimated Immediate Cost Impact Justification (methodology and variables):

The estimated cost is based on two No. 4 bars in each continuous footing based on Figure R403.1.3, Detail 1. Based on the house plan shown in Figure R602.10.1.1, intersections between footings occur at nine locations. At each of these locations it was assumed that each of the two lapped bars at the intersections would have a length of four feet. From this the total added weight of rebar is 54 lb. Based on an RS Means cost per ton of $2725 for footing reinforcing (with materials, labor, overhead and profit included) this gives a cost of $74. With 10% added for Division 1/insurance/bonds, this gives at total cost of $81 for the example dwelling. No location adjustment has been made.

RB150-25

RB151-25

IRC: R403.1.4.1

Proponents: Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org); Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org)

2024 International Residential Code

Revise as follows:

R403.1.4.1 Frost protection. Except where otherwise protected from frost, foundation walls, piers and other permanent supports of *buildings* and structures shall be protected from frost by one or more of the following methods:

1. Extended below the frost line specified in Table R301.2.
2. Constructed in accordance with Section R403.3.
3. ~~Constructed in accordance with ASCE 32.~~

~~4~~. 3. Erected on solid rock.

Footings shall not bear on frozen soil unless the frozen condition is permanent.

Exceptions:

1. Protection of free-standing *accessory structures* with an area of 600 square feet (56 m^2) or less, of *light-frame construction*, with an eave height of 10 feet (3048 mm) or less shall not be required.
2. Protection of free-standing *accessory structures* with an area of 400 square feet (37 m^2) or less, of other than *light-frame construction*, with an eave height of 10 feet (3048 mm) or less shall not be required.

Reason: The ASCE 32 standard prescriptively limits the use of insulation materials to two types: extruded polystyrene (XPS) and expanded polystyrene (EPS). Including the standard as a compliance option for Section R403.1.4.1 creates the impression for code users that only XPS and EPS insulation are suitable for frost protection. This violates Council Policy #28 Section 4.6.2.5, which states that standards "shall not have the effect of requiring proprietary materials." In practice, the current code language unfairly restricts the use of other insulation materials that are capable of meeting the performance requirements for frost protection. For example, other insulation products like polyisocyanurate and spray foam can deliver the performance required for protecting foundations from frost damage. These products share key physical properties to XPS insulation such as being closed-cell (i.e., resistant to moisture intrusion) and like polystyrene insulation products can be manufactured in sufficient compressive strengths to resist soil pressures.

Furthermore, ASCE 32 has not been substantively reviewed or republished in more than two decades. In recent years, attempts to engage with the ASCE 32 development committee have been rebuffed and proposals that would amend the standard by adopting performance-based requirements applicable to all insulation materials have been set aside by the XPS and EPS interests that run the ASCE 32 committee. The ASCE 32 committee has not provided a technical justification to support its refusal to address the comments and proposals submitted by PIMA and others. Rather, the committee cites the amount of work required to review and amend the ASCE 32 as the rationale for maintaining the standard's prescriptive material limitations.

For these reasons, we believe that ASCE 32 should be stricken from the IRC as a compliance option for Section R403.1.4.1.

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

Justification for no cost impact:

However, this code change proposal is expected to decrease the cost of construction or have no impact on the cost of construction. This code change proposal eliminates a method of compliance that has been interpreted as restricting the types of insulation products allowed for use in the construction of frost protected shallow foundations. The proposal preserves other existing compliance paths so there is no negative impact on the cost of compliance. Typically, when the code permits the use of additional or alternative material types, this optionality can decrease the cost of construction.

RB152-25

IRC: R403.1.5.1 (New)

Proponents: Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com); Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com)

2024 International Residential Code

Add new text as follows:

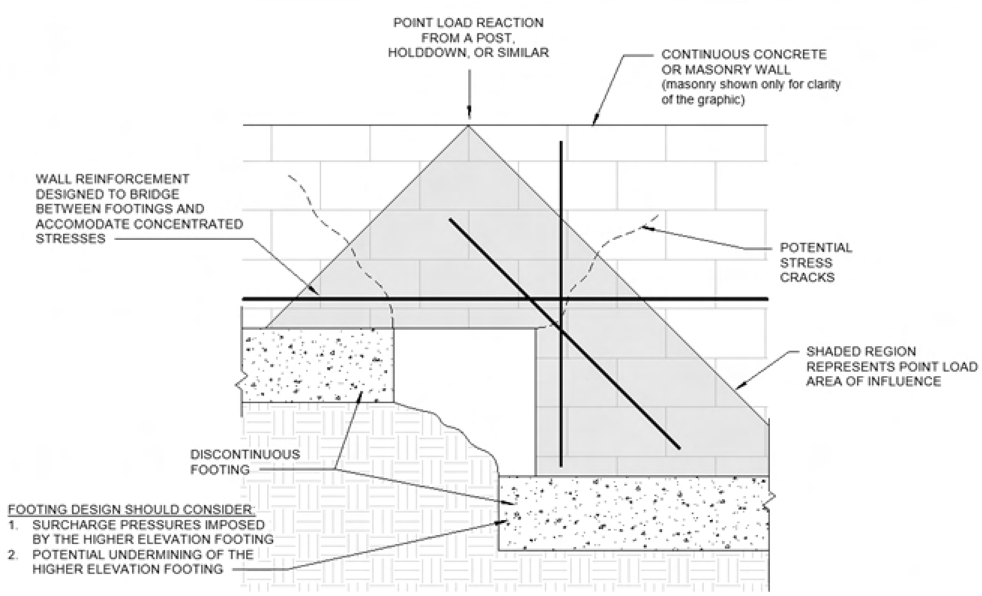
R403.1.5.1 **Discontinuous footings.** Where a continuous concrete or masonry wall is supported on discontinuous footings, the wall shall be designed and reinforced to span between footing segments, and the footings shall be designed and reinforced to support the wall in accordance with Section R301.1.3.

Reason: This proposal clarifies that IRC prescriptive provisions for continuous concrete or masonry walls are not intended for use with discontinuous footings (also called “jump footings”). The proposed language does not prohibit these footings but does recognize that the interaction between a continuous wall and supporting footing segments requires special consideration in the design and detailing to avoid damage caused by concentrated stress points in the geometry.

IRC prescriptive provisions for continuous concrete or masonry walls account for the following three conditions:

1. Bearing: vertical loads applied to the top of the wall
2. Retaining: out-of-plane loads applied to the side of the wall
3. Shear: in-plane loads applied along the length of the wall

Discontinuous footings are used to accommodate multiple conditions in the site, structure, or to facilitate construction logistics. A continuous wall supported on a discontinuous foundation effectively becomes a concrete or masonry beam that carries the structure load from above. IRC prescriptive provisions do not account for the bridging loads that occur in the wall when constructed with this geometry. As shown in the commentary figure, concentrated areas of stress are created in the wall as it attempts to flex between the footing segments, significantly increasing the potential for stress cracks to form in the wall. Given a large enough gap between footing segments and a high enough load on the wall, the stress cracks could easily increase resulting in structural failure of the wall itself.



Commentary Figure R403.1.5
Continuous Wall Supported on Discontinuous Footing

Cost Impact: The 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 editorial. Discontinuous footings are currently outside the scope of the IRC prescriptive provisions. The proposal provides clarification of the intended use of the IRC.

RB152-25

RB153-25

IRC: R403.3, TABLE R403.3(1)

Proponents: Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org); Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org)

2024 International Residential Code

Revise as follows:

R403.3 Frost-protected shallow foundations. For *buildings* where the monthly mean temperature of the *building* is maintained at not less than 64°F (18°C), footings are not required to extend below the frost line where protected from frost by insulation in accordance with Figure R403.3(1) and Table R403.3(1). Foundations protected from frost in accordance with Figure R403.3(1) and Table R403.3(1) shall not be used for unheated spaces such as porches, utility rooms, garages and carports, and shall not be attached to *basements* or *crawl spaces* that are not maintained at a minimum monthly mean temperature of 64°F (18°C).

Foam plastic insulation materials and *foam plastic insulation* components ~~Materials~~ used below *grade* for the purpose of insulating footings against frost shall be *labeled* ~~as complying with ASTM C578~~ in accordance with Section R303.2.

TABLE R403.3(1) MINIMUM FOOTING DEPTH AND INSULATION REQUIREMENTS FOR FROST-PROTECTED FOOTINGS IN HEATED BUILDINGS[a]

AIR-FREEZING INDEX (°F days)[b]	MINIMUM FOOTING DEPTH, *D* (inches)	VERTICAL INSULATION *R*-VALUE[~~c, d~~]	HORIZONTAL INSULATION *R*-VALUE[~~c, e~~]		HORIZONTAL INSULATION DIMENSIONS PER FIGURE R403.3(1) (inches)		
			Along walls	At corners	A	B	C
1,500 or less	12	4.5	Not required	Not required	Not required	Not required	Not required
2,000	14	5.6	Not required	Not required	Not required	Not required	Not required
2,500	16	6.7	1.7	4.9	12	24	40
3,000	16	7.8	6.5	8.6	12	24	40
3,500	16	9.0	8.0	11.2	24	30	60
4,000	16	10.1	10.5	13.1	24	36	60

For SI: 1 inch = 25.4 mm, °C = [(°F) – 32]/1.8.

a. Insulation requirements are for protection against frost damage in heated buildings. Greater values could be required to meet energy conservation standards.

b. See Figure R403.3(2) or Table R403.3(2) for Air-Freezing Index values.

c. Manufacturers of insulation materials used below *grade*~~Insulation materials~~ shall provide ~~the stated~~ minimum *R*-values that reflect a risk reduction factor to account for ~~under~~ long-term exposure to moist, below-ground conditions in freezing climates. Insulation materials used below *grade* shall provide the necessary compressive strengths to resist the pressures in below-ground or below-slab conditions. ~~The following *R*-values shall be used to determine insulation thicknesses required for this application: Type II expanded polystyrene (EPS) 3.2 R per inch for vertical insulation and 2.6 R per inch for horizontal insulation; Type IX expanded polystyrene (EPS) 3.4 R per inch for vertical insulation and 2.8 R per inch for horizontal insulation; Types IV, V, VI, VII, and X extruded polystyrene (XPS) 4.5 R per inch for vertical insulation and 4.0 R per inch for horizontal insulation.~~

~~d. Vertical insulation shall be expanded polystyrene insulation or extruded polystyrene insulation.~~

~~e. Horizontal insulation shall be expanded polystyrene insulation or extruded polystyrene insulation.~~

Reason: Section R403.3 unreasonably limits the use of insulation used for insulating footings and foundations against frost to only two product types: extruded polystrene (XPS) and expanded polystrene (EPS). Other insulation products like polyisocyanurate and spray foam can deliver the performance required for protecting foundations from frost damage. These products share key physical properties to XPS insulation such as being closed-cell (i.e., resistant to moisture intrusion) and like polystyrene insulation products can be manufactured in sufficient compressive strengths to resist soil pressures. The current material restrictions in Section R403.3 are not technically justified. Furthermore, these material restrictions in the absence of performance-based requirements is contrary to the ICC's material-neutral, performance-based principles for code development.

This code change proposal removes the language that suggests or explicitly requires the use of only XPS and EPS insulation. It should be noted that the current code language does not contain any performance-based requirements for insulation used below grade for frost protection. This proposal adds useful guidance and requirements on what information should be provided to the code user related to insulation used below grade for frost protection. All foam plastic insulation materials are tested for R-value, water or moisture absorption, and compressive strength. These materials can be manufactured with the performance specifications required for below grade applications. This proposal improves the existing language by requiring manufactures to provide code users with the necessary information to determine or demonstrate that a particular product is suitable for below grade applications.

In summary, this proposal removes problematic material restrictions and improves the current code language with application-specific reporting and performance requirements.

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

Justification for no cost impact:

This code change proposal is expected to decrease the cost of construction or have no impact on the cost of construction.

This code change proposal eliminates existing restrictions on the use of alternative materials that are fit for purpose for protecting foundations from frost damage. Typically, when the code permits the use of additional or alternative material types, this optionality can decrease the cost of construction through improved competition.

RB153-25

RB154-25

IRC: R403.1.5.1 (New), R403.1.5.2 (New), FIGURE R403.1.5(1) (New), FIGURE R403.1.5(2) (New)

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

Add new text as follows:

R403.1.5.1 Stepped Footings. The step height in stepped footings shall be 2 feet (610 mm) or less. The distance between footing steps, along the length of the footing, shall be at least two times the step height. The footing thickness shall comply with R403.1.1 and shall be maintained through the step as shown in Figure R403.1.5(1).

R403.1.5.2 Stepped footings in Seismic Design Categories D_0, D_1 and D_2. Stepped concrete footings in *Seismic Design Categories* D_0, D_1 and D_2 shall have minimum continuity reinforcement as shown in Figure R403.1.5(2).

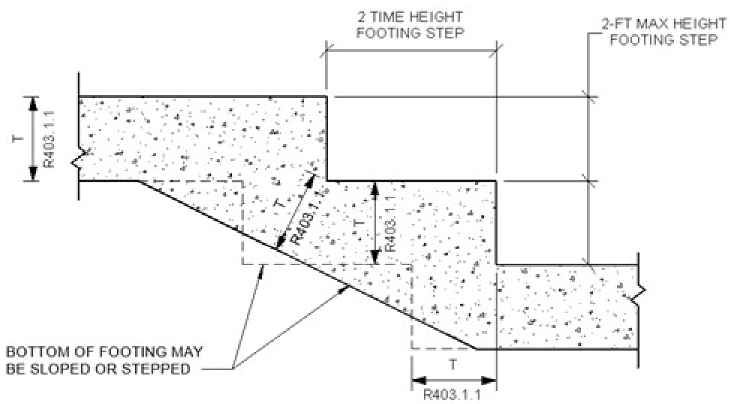


Figure R403.1.5(1)
Stepped Concrete Footings
All Wind and Seismic Design Categories

FIGURE R403.1.5(1) STEPPED CONCRETE FOOTINGS, ALL WIND AND SEISMIC DESIGN CATEGORIES

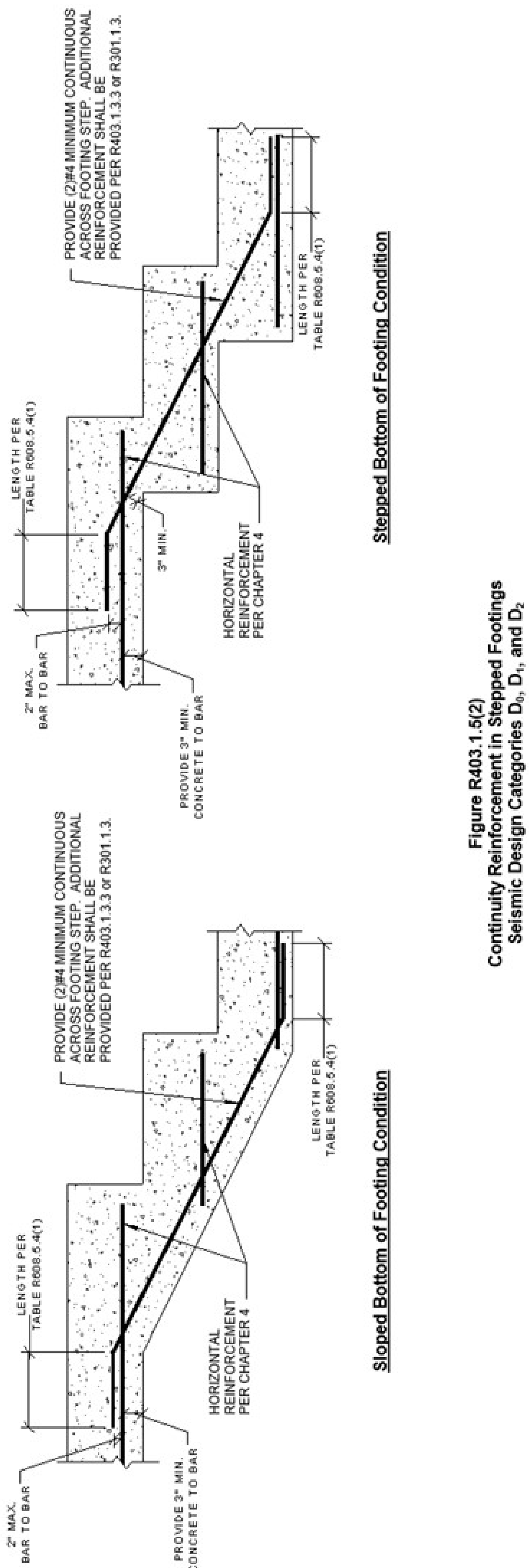


FIGURE R403.1.5(2) CONTINUITY REINFORCEMENT IN STEPPED FOOTINGS, SEISMIC DESIGN CATEGORIES D_0, D_1 AND D_2

Reason: IRC Section R403.1.5 has always noted that footings shall be stepped if the bottom surface of the footing exceeds 1 unit vertical in 10 units horizontal (10-percent slope), but it has never provided the parameters for stepped footings. This code change proposal lists the dimensional requirements for stepped footings and clarifies reinforcing requirements at these steps for projects located in Seismic Design Categories D_0, D_1 and D_2.

The dimensional requirements and reinforcing shown in proposed Figures R403.1.5(1) and R403.1.5(2) follow common engineered practice. The dimensions match what is shown in Figure 4-10 of the September 2024 version of FEMA P-232, *Homebuilders' Guide to Earthquake-Resistant Design and Construction*, and are similar to those enforced in residential construction by the City of Santa Clarita, CA, the Town of Amherst, NY and what is specified in Section 1809.3 of the California Building Code. These dimensions are appropriate for any loading that puts structural demands on the foundations, including moderate to high wind and seismic loads, loads due to differential soil movement, etc.

This proposal provides a limitation to footing steps, as is typical with prescriptive designs. While not prohibiting footings that exceed those limitations, such footings would be considered outside the prescriptive scope of the provisions and require conformance with R301.1.3.

These stepped footing provisions are specifically identified as applicable to footings and not intended to be used for stem walls. Figure R403.1.3 and Sections R403.1.3.1 and R403.1.3.2 provide clear differentiation of footings and stem walls.

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

Justification for no cost impact:

The IRC already requires stepped footings when the slope of the bottom surface of the footings exceeds one unit vertical to 10 units horizontal. This proposal simply provides clarity on the minimum requirements for stepped footing and is in line with common practice.

RB154-25

RB155-25

IRC: R301.2.2.5, R404.1.3, R404.1.3.2.1, R404.1.3.2.2, R404.1.3.4, R404.1.4.2, R608.1, R608.2, R608.5.1, R608.9.2, R608.9.3, NRMCA (New), 44 PCA, PCA Chapter 44

Proponents: Dr. Julian Mills-Beale, representing National Ready Mixed Concrete Association (jmills-beale@nrmca.org); Shamim Rashid-Sumar, representing National Ready Mixed Concrete Association (ssumar@nrmca.org); Darryl Dixon, representing National Ready Mixed Concrete Association (ddixon@nrmca.org); Robert Sculthorpe, representing Insulating Concrete Manufacturers' Association

2024 International Residential Code

Revise as follows:

R301.2.2.5 Concrete construction. *Buildings* with exterior above-*grade* concrete walls shall comply with ~~PCA~~ NRMCA 100 or shall be designed in accordance with ACI 318.

> **Exception:** Detached one- and two-family *dwellings* in *Seismic Design Category* C with exterior above-*grade* concrete walls are allowed to comply with the requirements of Section R608.

R404.1.3 Concrete foundation walls. Concrete foundation walls that support light-frame walls shall be designed and constructed in accordance with the provisions of this section, ACI 318, ACI 332 or ~~PCA~~ NRMCA 100. Concrete foundation walls that support above-grade concrete walls that are within the applicability limits of Section R608.2 shall be designed and constructed in accordance with the provisions of this section, ACI 318, ACI 332 or ~~PCA~~ NRMCA 100. Concrete foundation walls that support above-grade concrete walls that are not within the applicability limits of Section R608.2 shall be designed and constructed in accordance with the provisions of ACI 318, ACI 332 or ~~PCA~~ NRMCA 100. Where ACI 318, ACI 332, ~~PCA~~ NRMCA 100 or the provisions of this section are used to design concrete foundation walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the *jurisdiction* having authority.

R404.1.3.2.1 Concrete foundation stem walls supporting above-grade concrete walls. Foundation stem walls that support above-grade concrete walls shall be designed and constructed in accordance with this section.

1. Stem walls not laterally supported at top. Concrete stem walls that are not monolithic with slabs-on-ground or are not otherwise laterally supported by slabs-on-ground shall comply with this section. Where unbalanced backfill retained by the stem wall is less than or equal to 18 inches (457 mm), the stem wall and above-grade wall it supports shall be provided with vertical reinforcement in accordance with Section R608.6 and Table R608.6(1), R608.6(2) or R608.6(3) for above-grade walls. Where unbalanced backfill retained by the stem wall is greater than 18 inches (457 mm), the stem wall and above-grade wall it supports shall be provided with vertical reinforcement in accordance with Section R608.6 and Table R608.6(1).
2. Stem walls laterally supported at top. Concrete stem walls that are monolithic with slabs-on-ground or are otherwise laterally supported by slabs-on-ground shall be vertically reinforced in accordance with Section R608.6 and Table R608.6(1), R608.6(2) or R608.6(3) for above-grade walls. Where the unbalanced backfill retained by the stem wall is greater than 18 inches (457 mm), the connection between the stem wall and the slab-on-ground, and the portion of the slab-on-ground providing lateral support for the wall shall be designed in accordance with ~~PCA~~ NRMCA 100 or with accepted engineering practice. Where the unbalanced backfill retained by the stem wall is greater than 18 inches (457 mm), the minimum nominal thickness of the wall shall be 6 inches (152 mm).

R404.1.3.2.2 Concrete foundation stem walls supporting light-frame above-grade walls. Concrete foundation stem walls that support light-frame above-grade walls shall be designed and constructed in accordance with this section.

1. Stem walls not laterally supported at top. Concrete stem walls that are not monolithic with slabs-on-ground or are not otherwise laterally supported by slabs-on-ground and retain 48 inches (1219 mm) or less of unbalanced fill, measured from the top of the wall, shall be constructed in accordance with Section R404.1.3. Foundation stem walls that retain more than 48 inches (1219 mm) of unbalanced fill, measured from the top of the wall, shall be designed in accordance with Sections R404.1.1 and R404.4.

2. Stem walls laterally supported at top. Concrete stem walls that are monolithic with slabs-on-ground or are otherwise laterally supported by slabs-on-ground shall be constructed in accordance with Section R404.1.3. Where the unbalanced backfill retained by the stem wall is greater than 48 inches (1219 mm), the connection between the stem wall and the slab-on-ground, and the portion of the slab-on-ground providing lateral support for the wall, shall be designed in accordance with ~~PCA~~ NRMCA 100 or in accordance with accepted engineering practice.

R404.1.3.4 Requirements for Seismic Design Category C. Concrete foundation walls supporting above-grade concrete walls in *townhouses* assigned to *Seismic Design Category* C shall comply with ACI 318, ACI 332 or ~~PCA~~ NRMCA 100 (see Section R404.1.3).

R404.1.4.2 Concrete foundation walls. In *buildings* assigned to *Seismic Design Category* D_0, D_1 or D_2, as established in Table R301.2, concrete foundation walls that support light-frame walls shall comply with this section, and concrete foundation walls that support above-grade concrete walls shall comply with ACI 318, ACI 332 or ~~PCA~~ NRMCA 100 (see Section R404.1.3). In addition to the horizontal reinforcement required by Table R404.1.3.2(1), plain concrete walls supporting light-frame walls shall comply with the following:

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum thickness for plain concrete foundation walls shall be 7.5 inches (191 mm) except that 6 inches (152 mm) is permitted where the maximum wall height is 4 feet 6 inches (1372 mm).

Foundation walls less than 7.5 inches (191 mm) in thickness, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be provided with horizontal reinforcement in accordance with Table R404.1.3.2(1), and vertical reinforcement in accordance with Table R404.1.3.2(2), R404.1.3.2(3), R404.1.3.2(4), R404.1.3.2(5), R404.1.3.2(6), R404.1.3.2(7) or R404.1.3.2(8). Where Tables R404.1.3.2(2) through R404.1.3.2(8) permit plain concrete walls, not less than No. 4 (No. 13) vertical bars at a spacing not exceeding 48 inches (1219 mm) shall be provided.

R608.1 General. Exterior concrete walls shall be designed and constructed in accordance with the provisions of this section or in accordance with the provisions of ~~PCA~~ NRMCA 100, ACI 318 or ACI 332. Where ~~PCA~~ NRMCA 100, ACI 318, ACI 332 or the provisions of this section are used to design concrete walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the *jurisdiction* having authority.

R608.2 Applicability limits. The provisions of this section shall apply to the construction of exterior concrete walls for *buildings* not greater than 60 feet (18 288 mm) in plan dimensions, floors with clear spans not greater than 32 feet (9754 mm) and roofs with clear spans not greater than 40 feet (12 192 mm). *Buildings* shall not exceed 35 feet (10 668 mm) in *mean roof height* or two *stories* in height above grade. Floor/ceiling *dead loads* shall not exceed 10 pounds per square foot (479 Pa), roof/ceiling *dead loads* shall not exceed 15 pounds per square foot (718 Pa) and attic *live loads* shall not exceed 20 pounds per square foot (958 Pa). Roof overhangs shall not exceed 2 feet (610 mm) of horizontal projection beyond the exterior wall and the *dead load* of the overhangs shall not exceed 8 pounds per square foot (383 Pa).

Walls constructed in accordance with the provisions of this section shall be limited to *buildings* subjected to a maximum design wind speed of 160 mph (72 m/s) Exposure B, 136 mph (61 m/s) Exposure C and 125 mph (56 m/s) Exposure D. Walls constructed in accordance with the provisions of this section shall be limited to detached one- and two-family *dwellings* and *townhouses* assigned to *Seismic Design Category* A or B, and detached one- and two-family *dwellings* assigned to *Seismic Design Category* C.

Buildings that are not within the scope of this section shall be designed in accordance with ~~PCA~~ NRMCA 100 or ACI 318.

R608.5.1 Concrete and materials for concrete. Materials used in concrete, and the concrete itself, shall conform to requirements of this section, ~~PCA~~ NRMCA 100, ACI 318 or ACI 332.

R608.9.2 Connections between concrete walls and light-frame floor systems. Connections between concrete walls and light-frame floor systems shall be in accordance with one of the following:

1. For floor systems of wood-framed construction, the provisions of Section R608.9.1 and the prescriptive details of Figures R608.9(1) through R608.9(4), where permitted by the tables accompanying those figures. Portions of connections of wood-framed floor systems not noted in the figures shall be in accordance with Section R502, or AWC WFCM, if applicable. Wood framing members shall be of a species having a specific gravity equal to or greater than 0.42.

2. For floor systems of cold-formed steel construction, the provisions of Section R608.9.1 and the prescriptive details of Figures R608.9(5) through R608.9(8), where permitted by the tables accompanying those figures. Portions of connections of cold-formed steel-framed floor systems not noted in the figures shall be in accordance with Section R505, or AISI S230, if applicable.
3. Proprietary connectors selected to resist loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of ~~PCA~~ NRMCA 100.
4. An engineered design using loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of ~~PCA~~ NRMCA 100.
5. An engineered design using loads and material design provisions in accordance with this code, or in accordance with ASCE 7, ACI 318, and AWC NDS for wood-framed construction or AISI S100 for cold-formed steel frame construction.

R608.9.3 Connections between concrete walls and light-frame ceiling and roof systems. Connections between concrete walls and light-frame ceiling and roof systems shall be in accordance with one of the following:

1. For ceiling and roof systems of wood-framed construction, the provisions of Section R608.9.1 and the prescriptive details of Figures R608.9(9) and R608.9(10), where permitted by the tables accompanying those figures. Portions of connections of wood-framed ceiling and roof systems not noted in the figures shall be in accordance with Section R802, or AWC WFCM, if applicable. Wood framing members shall be of a species having a specific gravity equal to or greater than 0.42.
2. For ceiling and roof systems of cold-formed steel construction, the provisions of Section R608.9.1 and the prescriptive details of Figures R608.9(11) and R608.9(12), where permitted by the tables accompanying those figures. Portions of connections of cold-formed steel-framed ceiling and roof systems not noted in the figures shall be in accordance with Section R804, or AISI S230, if applicable.
3. Proprietary connectors selected to resist loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of ~~PCA~~ NRMCA 100.
4. An engineered design using loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of ~~PCA~~ NRMCA 100.
5. An engineered design using loads and material design provisions in accordance with this code, or in accordance with ASCE 7, ACI 318, and AWC NDS for wood-framed construction or AISI S100 for cold-formed steel-framed construction.

Add new standard(s) as follows:

NRMCA

National Ready Mixed Concrete Association
66 Canal Center Plaza, Suite 250
Alexandria, VA 2314

100-2023 Prescriptive Design of Exterior Concrete Walls for One and Two-Family Dwellings

Delete without substitution:

~~PCA~~

~~Portland Cement Association~~
~~5420 Old Orchard Road~~
~~Skokie, IL 60077~~

~~100—17~~ ~~Prescriptive Design of Exterior Concrete Walls for One- and Two-family Dwellings (Pub. No. PCA 100.3)~~

Reason: This proposal updates the reference for PCA 100 to NRMCA 100.

In 2022, the National Ready Mixed Concrete Association (NRMCA) assumed responsibility for the PCA 100, *Prescriptive Design of Exterior Concrete Walls for One- and Two-Family Dwellings* standard previously maintained by the Portland Cement Association (PCA). On January 4, 2024, ANSI approved NRMCA 100-2023, *Prescriptive Design of Exterior Concrete Walls for One- and Two-Family Dwellings* as a new standard. This can be referenced on page 20 of the "ANSI Standards Action" newsletter dated January 12, 2024: *https://share.ansi.org/Shared%20Documents/Standards%20Action/2024-PDFs/SAV5502.pdf*.

It should be noted that NRMCA 100-2023 is an editorial update to PCA 100 with no change in the document's scope and minor updates to the standard to align with the design criteria of ASCE/SEI 7 *Minimum Design Loads for Buildings and Other Structures* and ACI 318 *Building Code Requirements for Structural Concrete.*

Bibliography: NRMCA 100-2023 Prescriptive Design for Exterior Concrete Walls for One- and Two-Family Dwellings. View this document online: https://my.nrmca.org/ItemDetail?iProductCode=2PP100&Category=STAN&WebsiteKey=042c1042-fb9e-4355-b1e6-e5876cb04424

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

Justification for no cost impact:

NRMCA 100 simply replaces PCA 100 and does not effect any changes resulting in increased cost of construction.

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
NRMCA100-2023 Prescriptive Design of Exterior Concrete Walls for One and Two-Family Dwellings

RB155-25

RB156-25

IRC: R404.1.3.3.6, R404.1.3.3.6.1

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2024 International Residential Code

R402.2 Concrete. Concrete shall have a minimum specified compressive strength of f'_c, as shown in Table R402.2. Concrete subject to moderate or severe weathering as indicated in Table R301.2 shall be air entrained as specified in Table R402.2. The maximum weight of fly ash, other pozzolans, silica fume, slag or blended cements that is included in concrete mixtures for garage floor slabs and for exterior porches, carport slabs and steps that will be exposed to deicing chemicals shall not exceed the percentages of the total weight of cementitious materials specified in Section 19.3.3.4 of ACI 318. Materials used to produce concrete and testing thereof shall comply with the applicable standards listed in Chapters 19 and 20 of ACI 318 or ACI 332.

R402.2.1 Materials for concrete. Materials for concrete shall comply with the requirements of Section R608.5.1.

Revise as follows:

<u>R402.2.2</u> ~~R404.1.3.3.6~~ Form materials and form ties. Forms shall be made of wood, steel, aluminum, plastic, a composite of cement and foam insulation, a composite of cement and wood chips, or other *approved* material suitable for supporting and containing concrete. Forms shall be accurately positioned and secured before placing concrete and shall provide sufficient strength to contain concrete during the concrete placement operation.

Form ties shall be steel, solid plastic, foam plastic, a composite of cement and wood chips, a composite of cement and foam plastic, or other suitable material capable of resisting the forces created by fluid pressure of fresh concrete.

<u>R402.2.2.1</u> ~~R404.1.3.3.6.1~~ Stay-in-place forms. Stay-in-place concrete forms shall comply with this section.

1. Surface burning characteristics. The flame-spread index and *smoke-developed index* of forming material, other than foam plastic, left exposed on the interior shall comply with Section R302. The surface burning characteristics of foam plastic used in *insulating concrete forms* shall comply with Section R303.3.
2. Interior covering. Stay-in-place forms constructed of rigid foam plastic shall be protected on the interior of the *building* as required by Section R303. Where *gypsum board* is used to protect the foam plastic, it shall be installed with a mechanical fastening system. Use of adhesives in addition to mechanical fasteners is permitted.
3. *Exterior wall covering*. Stay-in-place forms constructed of rigid foam plastics shall be protected from sunlight and physical damage by the application of an *approved exterior wall covering* complying with this code. Exterior surfaces of other stay-in-place forming systems shall be protected in accordance with this code.
4. Termite protection. In areas where the probability of termite infestation is “very heavy” as indicated by Table R301.2 or Figure R301.2.1, *foam plastic insulation* shall be permitted below grade on foundation walls in accordance with Section R305.4.
5. Flat *ICF* wall system forms shall conform to ASTM E2634.

Reason: In the 2009 IRC, Section R404 on Foundation and Retaining Walls was significantly expanded and reorganized to combine the requirements for cast-in-place concrete foundation walls and insulated concrete form walls and incorporate material from the PCA 100 *Prescriptive Design of Exterior Concrete Walls for One- and Two-Family Dwellings*. While there was value in the reorganization and added material, it has created a situation where some information is duplicated, some information is difficult to relocate, and some key concrete material and reinforcing details are even in Chapter 6 provisions for above-grade concrete walls even though the bulk of concrete construction in houses are footings, below-grade stem walls and basement foundation walls. It is clear further work is needed to improve the usability of Chapter 4. The ICC BCAC started the process last cycle by relocating masonry foundation tables to be under the masonry foundation wall section and concrete foundation walls tables under the concrete foundation wall section. A series of code changes is proposed to continue what the BCAC started.

This change relocates materials on form materials and form ties from Section R404 to Section R402. It makes sense to have one comprehensive section on materials applicable to all the footing and foundation types covered in Chapter 4 rather than have requirements scattered throughout R403 and R404.

An attached file shows (in outline-strikeout format) how Sections R402, R403 and R404 would be collectively revised if NAHB's three Chapter 4 proposals and an additional BCAC proposal are all approved.

- **IRC Chapter 4 concrete and masonry foundation wall reorganization.pdf**
  https://www.cdpaccess.com/proposal/11571/35467/documentation/183504/attachments/download/9290/

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

Justification for no cost impact:

The code change is purely editorial, reorganizing and consolidating sections with no intended technical changes.

RB156-25

RB157-25

IRC: R404.1.3.3.7.1, R402.2.2.1 (New), R403.1.3.5.1, R404.1.3.3.7, R404.1.3.3.7.2, R404.1.3.3.7.3, R404.1.3.3.7.4, R404.1.3.3.7.5, R404.1.3.3.7.6, R404.1.3.3.7.7, R404.1.3.3.7.8

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2024 International Residential Code

R402.2 Concrete. Concrete shall have a minimum specified compressive strength of f'_c, as shown in Table R402.2. Concrete subject to moderate or severe weathering as indicated in Table R301.2 shall be air entrained as specified in Table R402.2. The maximum weight of fly ash, other pozzolans, silica fume, slag or blended cements that is included in concrete mixtures for garage floor slabs and for exterior porches, carport slabs and steps that will be exposed to deicing chemicals shall not exceed the percentages of the total weight of cementitious materials specified in Section 19.3.3.4 of ACI 318. Materials used to produce concrete and testing thereof shall comply with the applicable standards listed in Chapters 19 and 20 of ACI 318 or ACI 332.

R402.2.1 Materials for concrete. Materials for concrete shall comply with the requirements of Section R608.5.1.

Revise as follows:

R402.2.2 ~~R404.1.3.3.7.1~~ Steel reinforcement. Steel reinforcement shall comply with the requirements of ASTM A615, A706 or A996. ASTM A996 bars produced from rail steel shall be Type R. The ~~In buildings assigned to *Seismic Design Category* A, B or C,~~ the minimum yield strength of reinforcing steel shall be 40,000 psi (Grade 40) (276 MPa). ~~In *buildings* assigned to *Seismic Design Category* D_0, D_1 or D_2, the minimum yield strength shall be 60,000 psi (Grade 60) (414 MPa).~~

Add new text as follows:

R402.2.2.1 Steel reinforcement for foundation walls in Seismic Design Category D0, D1 or D2.. In buildings assigned to Seismic Design Category D0, D1 or D2, the minimum yield strength of reinforcing steel for concrete foundation walls constructed in accordance with Section R404 shall be 60,000 psi (Grade 60) (414 MPa).

Revise as follows:

R403.1.3.5.1 Steel reinforcement. Steel reinforcement shall comply with the material and minimum yield strength requirements of Section R402.2.2 ~~ASTM A615, A706M or A996M. ASTM A996M bars produced from rail steel shall be Type R. The minimum yield strength of reinforcing steel shall be 40,000 psi (Grade 40) (276 MPa)~~.

R404.1.3.3.1 ~~R404.1.3.3.7~~ Reinforcement. Reinforcement for concrete foundation walls shall comply with the requirements of Section R402.2 and this section.

R404.1.3.3.1.1 ~~R404.1.3.3.7.2~~ Location of reinforcement in wall. The center of vertical reinforcement in *basement* walls determined from Tables R404.1.3.2(2) through R404.1.3.2(7) shall be located at the centerline of the wall. Vertical reinforcement in *basement* walls determined from Table R404.1.3.2(8) shall be located to provide a maximum cover of $1^{1}/_{4}$ inches (32 mm) measured from the inside face of the wall. Regardless of the table used to determine vertical wall reinforcement, the center of the steel shall not vary from the specified location by more than the greater of 10 percent of the wall thickness and $^{3}/_{8}$ inch (10 mm). Horizontal and vertical reinforcement shall be located in foundation walls to provide the minimum cover required by Section R404.1.3.3.7.4.

R404.1.3.3.1.2 ~~R404.1.3.3.7.3~~ Wall openings. Vertical wall reinforcement required by Section R404.1.3.2 that is interrupted by wall openings shall have additional vertical reinforcement of the same size placed within 12 inches (305 mm) of each side of the opening.

R404.1.3.3.1.3 ~~R404.1.3.3.7.4~~ Support and cover. Reinforcement shall be secured in the proper location in the forms with tie wire or other bar support system to prevent displacement during the concrete placement operation. Steel reinforcement in concrete cast against the earth shall have a minimum cover of 3 inches (75 mm). Minimum cover for reinforcement in concrete cast in removable forms that will be exposed to the earth or weather shall be $1^1/_2$ inches (38 mm) for No. 5 bars and smaller, and 2 inches (50 mm) for No. 6 bars and larger. For concrete cast in removable forms that will not be exposed to the earth or weather, and for concrete cast in stay-in-place forms, minimum cover shall be $^3/_4$ inch (19 mm). The minus tolerance for cover shall not exceed the smaller of one-third the required cover or $^3/_8$ inch (10 mm).

<u>R404.1.3.3.1.4 </u>~~R404.1.3.3.7.5~~ **Lap splices.** Vertical and horizontal wall reinforcement shall be the longest lengths practical. Where splices are necessary in reinforcement, the length of lap splice shall be in accordance with Table R608.5.4(1) and Figure R608.5.4(1). The maximum gap between noncontact parallel bars at a lap splice shall not exceed the smaller of one-fifth the required lap length and 6 inches (152 mm) [see Figure R608.5.4(1)].

<u>R404.1.3.3.1.5 </u>~~R404.1.3.3.7.6~~ **Alternate grade of reinforcement and spacing.** Where tables in Section R404.1.3.2 specify vertical wall reinforcement based on minimum bar size and maximum spacing, which are based on Grade 60 (414 MPa) steel reinforcement, different size bars or bars made from a different grade of steel are permitted provided that an equivalent area of steel per linear foot of wall is provided. Use of Table R404.1.3.2(9) is permitted to determine the maximum bar spacing for different bar sizes than specified in the tables or bars made from a different grade of steel. Bars shall not be spaced less than one-half the wall thickness, or more than 48 inches (1219 mm) on center.

<u>R404.1.3.3.1.6 </u>~~R404.1.3.3.7.7~~ **Standard hooks.** Where reinforcement is required by this code to terminate with a standard hook, the hook shall comply with Section R608.5.4.5 and Figure R608.5.4(3).

<u>R404.1.3.3.1.7 </u>~~R404.1.3.3.7.8~~ **Construction joint reinforcement.** Construction joints in foundation walls shall be made and located to not impair the strength of the wall. Construction joints in plain concrete walls, including walls required to have not less than No. 4 bars at 48 inches (1219 mm) on center by Sections R404.1.3.2 and R404.1.4.2, shall be located at points of lateral support, and not fewer than one No. 4 bar shall extend across the construction joint at a spacing not to exceed 24 inches (610 mm) on center. Construction joint reinforcement shall have not less than 12 inches (305 mm) embedment on both sides of the joint. Construction joints in reinforced concrete walls shall be located in the middle third of the span between lateral supports, or located and constructed as required for joints in plain concrete walls.

> **Exception:** Use of vertical wall reinforcement required by this code is permitted in lieu of construction joint reinforcement provided that the spacing does not exceed 24 inches (610 mm), or the combination of wall reinforcement and No. 4 bars described in this section does not exceed 24 inches (610 mm).

Reason: In the 2009 IRC, Section R404 on Foundation and Retaining Walls was significantly expanded and reorganized to combine the requirements for cast-in-place concrete foundation walls and insulated concrete form walls and incorporate material from the PCA 100 *Prescriptive Design of Exterior Concrete Walls for One- and Two-Family Dwellings*. While there was value in the reorganization and added material, it has created a situation where some information is duplicated, some information is difficult to relocate, and some key concrete material and reinforcing details are even in Chapter 6 provisions for above-grade concrete walls even though the bulk of concrete construction in houses are footings, below-grade stem walls and basement foundation walls. It is clear further work is needed to improve the usability of Chapter 4. The ICC BCAC started the process last cycle by relocating masonry foundation tables to be under the masonry foundation wall section and concrete foundation walls tables under the concrete foundation wall section. A series of code changes is proposed to continue what the BCAC started.

This proposal relocates duplicative sections on reinforcing to a new subsection of R402.2. There is no reason references to the same basic set of ASTM material standards must be repeated in multiple locations within Chapter 4. Construction requirements such as bar location, cover, and splices are left in the specific requirements for footings and foundation walls.

An attached file shows (in outline-strikeout format) how Sections R402, R403 and R404 would be collectively revised if NAHB's three Chapter 4 proposals and an additional BCAC proposal are all approved.

- **IRC Chapter 4 concrete and masonry foundation wall reorganization.pdf**
  https://www.cdpaccess.com/proposal/11570/35485/documentation/183632/attachments/download/9297/

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

Justification for no cost impact:

The code change is purely editorial, reorganizing and consolidating sections with no intended technical changes.

RB157-25

RB158-25

IRC: R402.2.1, R608.5.1, R608.5.1.1, R608.5.1.2, R608.5.1.3, R608.5.1.4, R608.5.1.5, R608.5.1.6, R404.1.3.3, R404.1.3.3.1, R404.1.3.3.2, R404.1.3.3.3, R404.1.3.3.4, R404.1.3.3.5

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

R402.2.1 Concrete and materials ~~Materials~~ for concrete. Concrete and materials ~~Materials~~ for concrete shall comply with the requirements of this Section ~~R608.5.1~~.

~~R608.5.1~~ R402.2.1.1 Concrete and materials for concrete. Materials used in concrete, and the concrete itself, shall conform to requirements of this section, PCA 100, ACI 318 or ACI 332.

~~R608.5.1.1~~ R402.2.1.2 Cements. The following standards as referenced in Chapter 44 shall be permitted to be used:

1. ASTM C150.
2. ASTM C595.
3. ASTM C1157.

~~R608.5.1.2~~ R402.2.1.3 Concrete mixing and delivery. Mixing and delivery of concrete shall comply with ASTM C94 or ASTM C685.

~~R608.5.1.3~~ R402.2.1.4 Maximum aggregate size. The nominal maximum size of coarse aggregate shall not exceed one-fifth the narrowest distance between sides of forms, or three-fourths the clear spacing between reinforcing bars or between a bar and the side of the form.

Exception: When *approved*, these limitations shall not apply where removable forms are used and workability and methods of consolidation permit concrete to be placed without honeycombs or voids.

~~R608.5.1.4~~R402.2.1.5 Proportioning and slump of concrete. Proportions of materials for concrete shall be established to provide workability and consistency to permit concrete to be worked readily into forms and around reinforcement under conditions of placement to be employed, without segregation or excessive bleeding. Slump of concrete placed in removable forms shall not exceed 6 inches (152 mm).

Exception: When *approved*, the slump is permitted to exceed 6 inches (152 mm) for concrete mixtures that are resistant to segregation, and are in accordance with the form manufacturer's recommendations.

Slump of concrete placed in stay-in-place forms shall exceed 6 inches (152 mm). Slump of concrete shall be determined in accordance with ASTM C143.

~~R608.5.1.5~~ R402.2.1.6 Compressive strength. The minimum specified compressive strength of concrete, f'_C, shall comply with Section R402.2 and shall be not less than 2,500 pounds per square inch (17.2 MPa) at 28 days. For concrete foundation walls in buildings assigned to Seismic Design Category D0, D1 or D2 the minimum specified compressive strength of concrete shall not be less than 3,000 psi(21 MPa) .

~~R608.5.1.6~~ R402.2.1.7 Consolidation of concrete. Concrete shall be consolidated by suitable means during placement and shall be worked around embedded items and reinforcement and into corners of forms. Where stay-in-place forms are used, concrete shall be consolidated by internal vibration.

Exception: When *approved*, self-consolidating concrete mixtures with slumps equal to or greater than 8 inches (203 mm) that are specifically designed for placement without internal vibration need not be internally vibrated.

R404.1.3.3 Concrete, materials for concrete, and forms. Materials used in concrete foundation walls, ~~the concrete itself and forms~~

shall conform to requirements of Section R402.2.1. ~~this section or ACI 318.~~

Delete without substitution:

~~**R404.1.3.3.1 Compressive strength.** The minimum specified compressive strength of concrete, *f′c*, shall comply with Section R402.2 and shall be not less than 2,500 psi (17.2 MPa) at 28 days in *buildings* assigned to *Seismic Design Category* A, B or C and 3,000 psi (20.5 MPa) in *buildings* assigned to *Seismic Design Category* D_0, D_1 or D_2.~~

~~**R404.1.3.3.2 Concrete mixing and delivery.** Mixing and delivery of concrete shall comply with ASTM C94 or ASTM C685.~~

~~**R404.1.3.3.3 Maximum aggregate size.** The nominal maximum size of coarse aggregate shall not exceed one-fifth the narrowest distance between sides of forms, or three-fourths the clear spacing between reinforcing bars or between a bar and the side of the form.~~

~~**Exception:** Where *approved*, these limitations shall not apply where removable forms are used and workability and methods of consolidation permit concrete to be placed without honeycombs or voids.~~

~~**R404.1.3.3.4 Proportioning and slump of concrete.** Proportions of materials for concrete shall be established to provide workability and consistency to permit concrete to be worked readily into forms and around reinforcement under conditions of placement to be employed, without segregation or excessive bleeding. Slump of concrete placed in removable forms shall not exceed 6 inches (152 mm).~~

~~**Exception:** Where *approved*, the slump is permitted to exceed 6 inches (152 mm) for concrete mixtures that are resistant to segregation, and are in accordance with the form manufacturer's recommendations.~~

~~Slump of concrete placed in stay-in-place forms shall exceed 6 inches (152 mm). Slump of concrete shall be determined in accordance with ASTM C143.~~

~~**R404.1.3.3.5 Consolidation of concrete.** Concrete shall be consolidated by suitable means during placement and shall be worked around embedded items and reinforcement and into corners of forms. Where stay-in-place forms are used, concrete shall be consolidated by internal vibration.~~

~~**Exception:** Where *approved* for concrete to be placed in stay-in-place forms, self-consolidating concrete mixtures with slumps equal to or greater than 8 inches (203 mm) that are specifically designed for placement without internal vibration need not be internally vibrated.~~

Reason: This proposal is editorial in nature and relocates the sections on concrete materials from R608 to R402. A small number of all residential structures use above grade concrete walls while a high number of them have concrete foundations. This relocation puts the requirements for concrete materials into the section where it is most frequently used. A pointer is added to R608 pointing back to R402 forconcrete and materials used for concrete in above grade concrete walls.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

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

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

Justification for no cost impact:

This proposal is a relocation of code sections therefore there is no increase or decrease in the cost of construction.

RB158-25

RB159-25

IRC: R404.1, R404.1.1 (New), R404.1.1, R404.1.6, R404.1.7, R404.1.2, R404.1.2.1, R404.1.5.1, R404.1.4.1, R404.1.5.3, FIGURE R404.1.5.3, R404.1.8, R404.1.9, R404.1.9.1, R404.1.9.2, R404.1.9.3, R404.1.9.4, R404.1.9.5, R404.1.3, R404.1.3.1 (New), R404.1.5.2, R404.1.3.1, R404.1.3.2, R404.1.3.2.2, R404.1.3.2.1, R404.1.3.3.8, R404.1.3.4, R404.1.4, R404.1.4.2, R404.1.5

Proponents: Gary Ehrlich, representing NAHB (gehrlich@nahb.org)

2024 International Residential Code

Revise as follows:

R404.1 Concrete and masonry foundation walls. Foundation ~~Concrete foundation~~ walls shall be ~~selected and~~ constructed in accordance with the provisions of Sections R404.1.1 and R404.1.3 for concrete foundation walls, and~~. Masonry foundation walls shall be selected and constructed in accordance with the provisions of~~ Sections R404.1.1 and R404.1.2 for masonry foundation walls.

Add new text as follows:

R404.1.1 General requirements. Concrete and masonry foundation walls shall comply with this section.

Revise as follows:

R404.1.1.1 Design required. Concrete or masonry foundation walls shall be designed in accordance with accepted engineering practice where either of the following conditions exists:

1. Walls are subject to hydrostatic pressure from ground water.
2. Walls supporting more than 48 inches (1219 mm) of unbalanced backfill that do not have permanent lateral support at the top or bottom.

R404.1.1.2~~R404.1.6~~ Height above finished grade. Concrete and masonry foundation walls shall extend above the finished *grade* adjacent to the foundation at all points not less than 4 inches (102 mm) where *masonry veneer* is used and not less than 6 inches (152 mm) elsewhere.

R404.1.1.3~~R404.1.7~~ Backfill placement. Backfill shall not be placed against the wall until the wall has sufficient strength and has been anchored to the floor above, or has been sufficiently braced to prevent damage by the backfill.

Exception: Bracing is not required for walls supporting less than 4 feet (1219 mm) of unbalanced backfill.

R404.1.2 Masonry ~~Design of masonry~~ foundation walls. Masonry foundation walls shall be designed and constructed in accordance with the provisions of this section or in accordance with the provisions of TMS 402. Where TMS 402 or the provisions of this section are used to design masonry foundation walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the *jurisdiction* having authority.

R404.1.2.1 Plain masonry and reinforced masonry~~Masonry foundation walls~~. *Concrete masonry* and *clay masonry* foundation walls shall be constructed as set forth in Table R404.1.2.1(1), R404.1.2.1(2), R404.1.2.1(3) or R404.1.2.1(4) and shall comply with applicable provisions of Section R606. In *buildings* assigned to *Seismic Design Categories* D_0, D_1 and D_2, *concrete masonry* and *clay masonry* foundation walls shall also comply with Section R404.1.2.2~~R404.1.4.1~~. Rubble stone masonry foundation walls shall be constructed in accordance with Sections R404.1.2.5~~R404.1.8~~ and R606.4.2. Rubble stone masonry walls shall not be used in *Seismic Design Categories* D_0, D_1 and D_2, or in *townhouses* in *Seismic Design Category* C.

R404.1.2.2~~R404.1.5.1~~ Masonry wall thickness. Masonry foundation walls shall be not less than the thickness of the wall supported, except that masonry foundation walls of not less than 8-inch (203 mm) nominal thickness shall be permitted under brick veneered frame walls and under 10-inch-wide (254 mm) cavity walls where the total height of the wall supported, including gables, is not more than 20 feet (6096 mm), provided that the requirements of Section R404.1.1 are met.

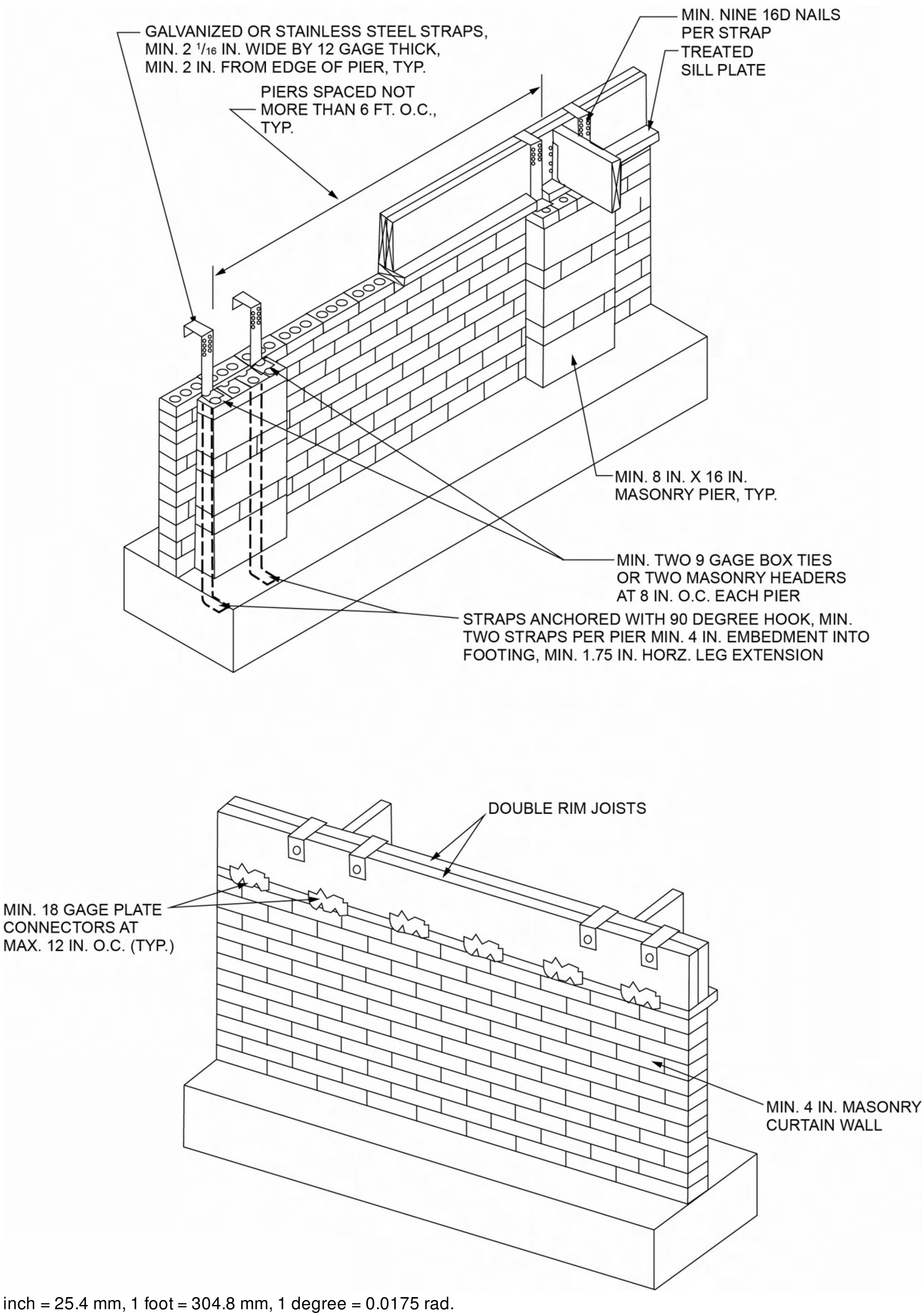
R404.1.2.3~~R404.1.4.1~~ Masonry foundation walls in Seismic Design Category D_0, D_1 or D_2. In *buildings* assigned to *Seismic Design Category* D_0, D_1 or D_2, as established in Table R301.2, masonry foundation walls shall comply with this section. In addition to the requirements of Table R404.1.2.1(1), plain masonry foundation walls shall comply with the following:

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum nominal thickness for plain masonry foundation walls shall be 8 inches (203 mm).
4. Masonry stem walls shall have a minimum vertical reinforcement of one No. 4 (No. 13) bar located not greater than 4 feet (1219 mm) on center in grouted cells. Vertical reinforcement shall be tied to the horizontal reinforcement in the footings.

Foundation walls, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be constructed in accordance with Table R404.1.2.1(2), R404.1.2.1(3) or R404.1.2.1(4). Masonry foundation walls shall have two No. 4 (No. 13) horizontal bars located in the upper 12 inches (305 mm) of the wall.

R404.1.2.4~~R404.1.5.3~~ Pier and curtain wall foundations. Use of pier and curtain wall foundations shall be permitted to support *light-frame construction* not more than two *stories* in height, provided that the following requirements are met:

1. All *load-bearing walls* shall be placed on continuous concrete footings placed integrally with the exterior wall footings.
2. The minimum actual thickness of a load-bearing masonry wall shall be not less than 4 inches (102 mm) nominal or $3^3/_8$ inches (92 mm) actual thickness, and shall be bonded integrally with piers spaced in accordance with Section R606.6.4.
3. Piers shall be constructed in accordance with Sections R606.7 and R606.7.1, and shall be bonded into the load-bearing masonry wall in accordance with Section R606.13.1 or R606.13.1.1.
4. The maximum height of a 4-inch (102 mm) load-bearing masonry foundation wall supporting wood-frame walls and floors shall be not more than 4 feet (1219 mm).
5. Anchorage shall be in accordance with Section R403.1.6, Figure R404.1.2.4 ~~R404.1.5.3~~, or as specified by engineered design accepted by the *building official*.
6. The unbalanced fill for 4-inch (102 mm) foundation walls shall not exceed 24 inches (610 mm) for *solid masonry* or 12 inches (305 mm) for *hollow masonry*.
7. In *Seismic Design Categories* D_0, D_1 and D_2, prescriptive reinforcement shall be provided in the horizontal and vertical direction. Provide minimum horizontal joint reinforcement of two No. 9 gage wires spaced not less than 6 inches (152 mm) or one $^1/_4$-inch-diameter (6.4 mm) wire at 10 inches (254 mm) on center vertically. Provide minimum vertical reinforcement of one No. 4 bar at 48 inches (1220 mm) on center horizontally grouted in place.



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.0175 rad.

FIGURE R404.1.2.4~~R404.1.5.3~~ FOUNDATION WALL CLAY MASONRY CURTAIN WALL WITH CONCRETE MASONRY PIERS

R404.1.2.5~~R404.1.8~~ **Rubble stone masonry.** Rubble stone masonry foundation walls shall have a minimum thickness of 16 inches (406 mm), shall not support an unbalanced backfill exceeding 8 feet (2438 mm) in height, shall not support a soil pressure greater than 30 pounds per square foot per foot (4.71 kPa/m), and shall not be constructed in *Seismic Design Categories* D_0, D_1, D_2 or *townhouses* in *Seismic Design Category* C, as established in Figure R301.2(2).

R404.1.2.6~~R404.1.9~~ **Isolated masonry piers.** Isolated masonry piers shall be constructed in accordance with this section and the general masonry construction requirements of Section R606. *Hollow masonry* piers shall have a minimum nominal thickness of 8 inches (203 mm), with a nominal height not exceeding four times the nominal thickness and a nominal length not exceeding three times the nominal thickness. Where *hollow masonry units* are solidly filled with concrete or grout, piers shall be permitted to have a nominal height not exceeding ten times the nominal thickness. Footings for isolated masonry piers shall be sized in accordance with Section R403.1.1.

R404.1.2.6.1~~R404.1.9.1~~ **Pier cap.** *Hollow masonry* piers shall be capped with 4 inches (102 mm) of *solid masonry* or concrete, a masonry cap block, or shall have cavities of the top course filled with concrete or grout. Where required, termite protection for the pier cap shall be provided in accordance with Section R305.

R404.1.2.6.2~~R404.1.9.2~~ **Masonry piers supporting floor girders.** Masonry piers supporting wood girders sized in accordance with Tables R602.7(1) and R602.7(2) shall be permitted in accordance with this section. Piers supporting girders for interior bearing walls shall have a minimum nominal dimension of 12 inches (305 mm) and a maximum height of 10 feet (3048 mm) from top of footing to bottom of sill plate or girder. Piers supporting girders for exterior bearing walls shall have a minimum nominal dimension of 12 inches (305 mm) and a maximum height of 4 feet (1220 mm) from top of footing to bottom of sill plate or girder. Girders and sill plates shall be anchored to the pier or footing in accordance with Section R403.1.6 or Figure R404.1.2.4~~R404.1.5.3~~. Floor girder bearing shall be in accordance with Section R502.6.

R404.1.2.6.3~~R404.1.9.3~~ **Masonry piers supporting braced wall panels.** Masonry piers supporting *braced wall panels* shall be designed in accordance with accepted engineering practice.

R404.1.2.6.4~~R404.1.9.4~~ **Seismic design of masonry piers.** Masonry piers in *dwellings* located in *Seismic Design Category* D_0, D_1 or D_2, and *townhouses* in *Seismic Design Category* C, shall be designed in accordance with accepted engineering practice.

R404.1.2.6.5~~R404.1.9.5~~ **Masonry piers in flood hazard areas.** Masonry piers for *dwellings* in flood hazard areas shall be designed in accordance with Section R306.

R404.1.3 Concrete foundation walls. Concrete foundation walls that support light-frame walls shall be designed and constructed in accordance with one of the following:

1. Concrete foundation walls supporting light-frame walls shall be designed and constructed in accordance with this section.
2. Concrete foundation walls supporting above-grade concrete walls and meeting the applicability limits of Section R608.2 shall be designed and constructed in accordance with this section.
3. Concrete foundation walls shall be designed and constructed in accordance with ACI 318, ACI 332 or PCA 100.

~~the provisions of this section, ACI 318, ACI 332 or PCA 100. Concrete foundation walls that support above-grade concrete walls that are within the applicability limits of Section R608.2 shall be designed and constructed in accordance with the provisions of this section, ACI 318, ACI 332 or PCA 100. Concrete foundation walls that support above-grade concrete walls that are not within the applicability limits of Section R608.2 shall be designed and constructed in accordance with the provisions of ACI 318, ACI 332 or PCA 100.~~ Where this section, ACI 318, ACI 332, or PCA 100 ~~or the provisions of this section~~ are used to design concrete foundation walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the *jurisdiction* having authority.

Add new text as follows:

R404.1.3.1 **Minimum dimensions for concrete foundation walls.** The minimum thickness and cross-section of concrete foundation walls shall be in accordance with this section.

Revise as follows:

<u>R404.1.3.1.1</u>~~R404.1.5.2~~ Concrete wall thickness. The thickness of concrete foundation walls shall be equal to or greater than the thickness of the wall in the *story* above. Concrete foundation walls with corbels, brackets or other projections built into the wall for support of *masonry veneer* or other purposes are not within the scope of the tables in this section.

Where a concrete foundation wall is reduced in thickness to provide a shelf for the support of *masonry veneer*, the reduced thickness shall be equal to or greater than the thickness of the wall in the *story* above. Vertical reinforcement for the foundation wall shall be based on Table R404.1.3.2(8) and located in the wall as required by Section R404.1.3.3.7.2 where that table is used. Vertical reinforcement shall be based on the thickness of the thinner portion of the wall.

Exception: Where the height of the reduced thickness portion measured to the underside of the floor assembly or sill plate above is less than or equal to 24 inches (610 mm) and the reduction in thickness does not exceed 4 inches (102 mm), the vertical reinforcement is permitted to be based on the thicker portion of the wall.

<u>R404.1.3.1.2</u>~~R404.1.3.1~~ Concrete cross section. Concrete walls ~~constructed in accordance with this code~~ shall comply with the shapes and minimum concrete cross-sectional dimensions required by Table R608.3. Other types of forming systems resulting in concrete walls not in compliance with this section and Table R608.3 shall be designed in accordance with ACI 318.

R404.1.3.2 Reinforcement for foundation walls. Concrete foundation walls shall be laterally supported at the top and bottom. Horizontal reinforcement shall be provided in accordance with Table R404.1.3.2(1). Vertical reinforcement shall be provided in accordance with Table R404.1.3.2(2), R404.1.3.2(3), R404.1.3.2(4), R404.1.3.2(5), R404.1.3.2(6), R404.1.3.2(7) or R404.1.3.2(8). Vertical reinforcement for flat basement walls retaining 4 feet (1219 mm) or more of unbalanced backfill is permitted to be determined in accordance with Table R404.1.3.2(9). For *basement* walls supporting above-grade concrete walls, vertical reinforcement shall be the greater of that required by Tables R404.1.3.2(2) through R404.1.3.2(8) or by Section R608.6 for the above-grade wall. In *buildings* assigned to *Seismic Design Category* D_0, D_1 or D_2, concrete foundation walls shall also comply with Section R404.1.4.2.

<u>R404.1.3.2.1</u>~~R404.1.3.2.2~~ Concrete foundation stem walls supporting light-frame above-grade walls. Concrete foundation stem walls that support light-frame above-grade walls shall be designed and constructed in accordance with this section.

1. Stem walls not laterally supported at top. Concrete stem walls that are not monolithic with slabs-on-ground or are not otherwise laterally supported by slabs-on-ground and retain 48 inches (1219 mm) or less of unbalanced fill, measured from the top of the wall, shall be constructed in accordance with Section R404.1.3. Foundation stem walls that retain more than 48 inches (1219 mm) of unbalanced fill, measured from the top of the wall, shall be designed in accordance with Sections R404.1.1 and R404.4.
2. Stem walls laterally supported at top. Concrete stem walls that are monolithic with slabs-on-ground or are otherwise laterally supported by slabs-on-ground shall be constructed in accordance with Section R404.1.3. Where the unbalanced backfill retained by the stem wall is greater than 48 inches (1219 mm), the connection between the stem wall and the slab-on-ground, and the portion of the slab-on-ground providing lateral support for the wall, shall be designed in accordance with PCA 100 or in accordance with accepted engineering practice.

<u>R404.1.3.2.2</u>~~R404.1.3.2.1~~ Concrete foundation stem walls supporting above-grade concrete walls. Foundation stem walls that support above-grade concrete walls shall be designed and constructed in accordance with this section.

1. Stem walls not laterally supported at top. Concrete stem walls that are not monolithic with slabs-on-ground or are not otherwise laterally supported by slabs-on-ground shall comply with this section. Where unbalanced backfill retained by the stem wall is less than or equal to 18 inches (457 mm), the stem wall and above-grade wall it supports shall be provided with vertical reinforcement in accordance with Section R608.6 and Table R608.6(1), R608.6(2) or R608.6(3) for above-grade walls. Where unbalanced backfill retained by the stem wall is greater than 18 inches (457 mm), the stem wall and above-grade wall it supports shall be provided with vertical reinforcement in accordance with Section R608.6 and Table R608.6(1).

2. Stem walls laterally supported at top. Concrete stem walls that are monolithic with slabs-on-ground or are otherwise laterally supported by slabs-on-ground shall be vertically reinforced in accordance with Section R608.6 and Table R608.6(1), R608.6(2) or R608.6(3) for above-grade walls. Where the unbalanced backfill retained by the stem wall is greater than 18 inches (457 mm), the connection between the stem wall and the slab-on-ground, and the portion of the slab-on-ground providing lateral support for the wall shall be designed in accordance with PCA 100 or with accepted engineering practice. Where the unbalanced backfill retained by the stem wall is greater than 18 inches (457 mm), the minimum nominal thickness of the wall shall be 6 inches (152 mm).

R404.1.3.3.8 Exterior wall coverings. Requirements for installation of *masonry veneer*, stucco and other wall coverings on the exterior of concrete walls and other construction details not covered in this section shall comply with the requirements of this code.

R404.1.3.4 <u>Concrete foundation walls in</u> ~~Requirements for~~ Seismic Design Category C. Concrete foundation walls supporting above-grade concrete walls in *townhouses* assigned to *Seismic Design Category* C shall comply with ACI 318, ACI 332 or PCA 100 (see Section R404.1.3).

Delete without substitution:

~~**R404.1.4 Seismic Design Category D_0, D_1 or D_2.**~~

Revise as follows:

<u>R404.1.3.5</u>~~R404.1.4.2~~ Concrete foundation walls<u> in *Seismic Design Category* D_0, D_1 or D_2</u>. In *buildings* assigned to *Seismic Design Category* D_0, D_1 or D_2, as established in Table R301.2, concrete foundation walls that support light-frame walls shall comply with this section, and concrete foundation walls that support above-grade concrete walls shall comply with ACI 318, ACI 332 or PCA 100 (see Section R404.1.3). In addition to the horizontal reinforcement required by Table R404.1.3.2(1), plain concrete walls supporting light-frame walls shall comply with the following:

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum thickness for plain concrete foundation walls shall be 7.5 inches (191 mm) except that 6 inches (152 mm) is permitted where the maximum wall height is 4 feet 6 inches (1372 mm).

Foundation walls less than 7.5 inches (191 mm) in thickness, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be provided with horizontal reinforcement in accordance with Table R404.1.3.2(1), and vertical reinforcement in accordance with Table R404.1.3.2(2), R404.1.3.2(3), R404.1.3.2(4), R404.1.3.2(5), R404.1.3.2(6), R404.1.3.2(7) or R404.1.3.2(8). Where Tables R404.1.3.2(2) through R404.1.3.2(8) permit plain concrete walls, not less than No. 4 (No. 13) vertical bars at a spacing not exceeding 48 inches (1219 mm) shall be provided.

Delete without substitution:

~~**R404.1.5 Foundation wall thickness based on walls supported.** The thickness of masonry or concrete foundation walls shall be not less than that required by Section R404.1.5.1 or R404.1.5.2, respectively.~~

Reason: In the 2009 IRC, Section R404 on Foundation and Retaining Walls was significantly expanded and reorganized to combine the requirements for cast-in-place concrete foundation walls and insulated concrete form walls and incorporate material from the PCA 100 Prescriptive Design of Exterior Concrete Walls for One- and Two-Family Dwellings. While there was value in the reorganization and added material, it has created a situation where some information is duplicated, some information is difficult to relocate, and some key concrete material and reinforcing details are even in Chapter 6 provisions for above-grade concrete walls even though the bulk of concrete construction in houses are footings, below-grade stem walls and basement foundation walls. It is clear further work is needed to improve the usability of Chapter 4. The ICC BCAC started the process last cycle by relocating masonry foundation tables to be under the masonry foundation wall section and concrete foundation walls tables under the concrete foundation wall section. A series of code changes is proposed to continue what the BCAC started.

This proposal builds on last cycle's work by further relocating masonry-related provisions under Section R404.1.2 for masonry foundation walls and concrete-related provisions under Section R404.1.3 for concrete foundation walls. This includes splitting up the combined Section R404.1.4 containing both masonry and concrete walls requirements for Seismic Design Category D0, D1 and D2 and the combined Section R404.1.5 containing both masonry and concrete wall thickness requirements. The rubble stone masonry and isolated masonry pier provisions are also relocated under the masonry foundation wall requirements. And a general requirements section is created under R404.1 to hold not only the existing set of conditions where engineered design is required but also the requirements for minimum height above finished grade and backfill placement which are currently located at the end of all the material on masonry and concrete foundation walls but really should be at the beginning.

The intent of this proposal is not to make any technical changes or delete any requirements entirely, just editorially rearrange things so all the masonry provisions are together, and all the concrete provisions are together.

An attached file shows (in outline-strikeout format) how Sections R402, R403 and R404 would be collectively revised if NAHB's three Chapter 4 proposals and an additional BCAC proposal are all approved.

- **IRC Chapter 4 concrete and masonry foundation wall reorganization.pdf**
  https://www.cdpaccess.com/proposal/11593/35493/documentation/183689/attachments/download/9302/

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

Justification for no cost impact:

The code change is purely editorial, reorganizing and consolidating sections with no intended technical changes.

RB159-25

RB160-25

IRC: TABLE R404.1.2.1(1), TABLE R404.1.2.1(2), TABLE R404.1.2.1(3), TABLE R404.1.2.1(4), R404.1.4, R404.1.4.1

Proponents: Nicholas Lang, representing Concrete Masonry & Hardscapes Association (nlang@masonryandhardscapes.org)

2024 International Residential Code

Revise as follows:

TABLE R404.1.2.1(1) PLAIN MASONRY FOUNDATION WALLS[f]

MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	MAXIMUM UNBALANCED BACKFILL HEIGHT[c] (feet)	PLAIN MASONRY[a] MINIMUM NOMINAL WALL THICKNESS (inches) Soil classes and lateral soil load [b] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, MH, ML-CL and inorganic CL soils 60
5	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
6	4	6 solid[d] or 8	6 solid[d] or 8	6 solid[d] or 8
	5	6 solid[d] or 8	8	10
	6	8	10	12
7	4	6 solid[d] or 8	8	8
	5	6 solid[d] or 8	10	10
	6	10	12	10 <u>grout</u> ~~solid~~[d]
	7	12	10 <u>grout</u> ~~solid~~[d]	12 <u>grout</u> ~~solid~~[d]
8	4	6 solid[d] or 8	6 solid[d] or 8	8
	5	6 solid[d] or 8	10	12
	6	10	12	12 <u>grout</u> ~~solid~~[d]
	7	12	12 <u>grout</u> ~~solid~~[d]	Note e
	8	10 grout[d]	12 grout[d]	Note e
9	4	6 grout[d] or 8 solid[d] or 12	6 grout[d] or 8 solid[d]	8 grout[d] or 10 <u>grout</u> ~~solid~~[d]
	5	6 grout[d] or 10 <u>grout</u> ~~solid~~[d]	8 grout[d] or 12 <u>grout</u> ~~solid~~[d]	8 grout[d]
	6	8 grout[d] or 12 <u>grout</u> ~~solid~~[d]	10 grout[d]	10 grout[d]
	7	10 grout[d]	10 grout[d]	12 grout
	8	10 grout[d]	12 grout	Note e
	9	12 grout	Note e	Note e

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond. Ungrouted hollow masonry units are permitted except where otherwise indicated.

b. Soil classes are in accordance with the Unified Soil Classification System. Refer to Table R401.4.1(2).

c. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

d. Solid indicates solid masonry unit; grout indicates grouted hollow units.

e. Wall construction shall be in accordance with Table R404.1.2.1(2), R404.1.2.1(3) or R404.1.2.1(4), or a design shall be provided.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2.1(2) 8-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 5 INCHES[a, c, f]

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (inches)[b, c] Soil classes and lateral soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
	~~4 feet (or less)~~	~~#4 at 48~~	~~#4 at 48~~	~~#4 at 48~~
	5 feet <u>(or less)</u>	#4 at 48	#4 at 48	#4 at 48
	6 feet 8 inches	#4 at 48	#5 at 48	#6 at 48

6 feet 8 inches

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL	MINIMUM VERTICAL REINFORCEMENT AND SPACING (inches) Soil classes and lateral soil load (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
7 feet 4 inches	~~4 feet (or less)~~	~~#4 at 48~~	~~#4 at 48~~	~~#4 at 48~~
	5 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	6 feet	#4 at 48	#5 at 48	#5 at 48
	7 feet 4 inches	#5 at 48	#6 at 48	#6 at 40
8 feet	~~4 feet (or less)~~	~~#4 at 48~~	~~#4 at 48~~	~~#4 at 48~~
	5 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	6 feet	#4 at 48	#5 at 48	#5 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet	#5 at 48	#6 at 48	#6 at 32
8 feet 8 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet 8 inches	#6 at 48	#6 at 32	#6 at 24
9 feet 4 inches	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 40
	8 feet	#6 at 48	#6 at 40	#6 at 24
	9 feet 4 inches	#6 at 40	#6 at 24	#6 at 16
10 feet	4 feet (or less)	#4 at 48	#4 at 48	#4 at 48
	5 feet	#4 at 48	#4 at 48	#5 at 48
	6 feet	#4 at 48	#5 at 48	#6 at 48
	7 feet	#5 at 48	#6 at 48	#6 at 32
	8 feet	#6 at 48	#6 at 32	#6 at 24
	9 feet	#6 at 40	#6 at 24	#6 at 16
	10 feet	#6 at 32	#6 at 16	#6 at 16

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 5 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R401.4.1(2).

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2.1(3) 10-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 6.75 INCHES[a, c, f]

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (inches)[b, c] Soil classes and later soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	~~4 feet (or less)~~	~~#4 at 56~~	~~#4 at 56~~	~~#4 at 56~~
	5 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	6 feet 8 inches	#4 at 56	#5 at 56	#5 at 56
7 feet 4 inches	~~4 feet (or less)~~	~~#4 at 56~~	~~#4 at 56~~	~~#4 at 56~~
	5 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#4 at 56	#5 at 56
	7 feet 4 inches	#4 at 56	#5 at 56	#6 at 56
	~~4 feet (or less)~~	~~#4 at 56~~	~~#4 at 56~~	~~#4 at 56~~
	5 feet (or less)	#4 at 56	#4 at 56	#4 at 56

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL	MINIMUM VERTICAL REINFORCEMENT AND SPACING (inches) Soil classes and later soil load (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
8 feet	6 feet	#4 at 56	#4 at 56	#5 at 56
	7 feet	#4 at 56	#5 at 56	#6 at 56
	8 feet	#5 at 56	#6 at 56	#6 at 48
8 feet 8 inches	~~4 feet (or less)~~	~~#4 at 56~~	~~#4 at 56~~	~~#4 at 56~~
	5 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#4 at 56	#5 at 56
	7 feet	#4 at 56	#5 at 56	#6 at 56
	8 feet 8 inches	#5 at 56	#6 at 48	#6 at 32
9 feet 4 inches	~~4 feet (or less)~~	~~#4 at 56~~	~~#4 at 56~~	~~#4 at 56~~
	5 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#5 at 56	#5 at 56
	7 feet	#4 at 56	#5 at 56	#6 at 56
	8 feet	#5 at 56	#6 at 56	#6 at 40
	9 feet 4 inches	#6 at 56	#6 at 40	#6 at 24
10 feet	~~4 feet (or less)~~	~~#4 at 56~~	~~#4 at 56~~	~~#4 at 56~~
	5 feet (or less)	#4 at 56	#4 at 56	#4 at 56
	6 feet	#4 at 56	#5 at 56	#5 at 56
	7 feet	#5 at 56	#6 at 56	#6 at 48
	8 feet	#5 at 56	#6 at 48	#6 at 40
	9 feet	#6 at 56	#6 at 40	#6 at 24
	10 feet	#6 at 48	#6 at 32	#6 at 24

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 6.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R401.4.1(2).

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground level. Where an interior concrete slab-on-grade is provided and is in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

TABLE R404.1.2.1(4) 12-INCH MASONRY FOUNDATION WALLS WITH REINFORCING WHERE d ≥ 8.75 INCHES[a, c, f]

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL[e]	MINIMUM VERTICAL REINFORCEMENT AND SPACING (inches)[b, c] Soil classes and lateral soil load[d] (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
6 feet 8 inches	~~4 feet (or less)~~	~~#4 at 72~~	~~#4 at 72~~	~~#4 at 72~~
	5 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	6 feet 8 inches	#4 at 72	#4 at 72	#5 at 72
7 feet 4 inches	~~4 feet (or less)~~	~~#4 at 72~~	~~#4 at 72~~	~~#4 at 72~~
	5 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#4 at 72	#5 at 72
	7 feet 4 inches	#4 at 72	#5 at 72	#6 at 72
8 feet	~~4 feet (or less)~~	~~#4 at 72~~	~~#4 at 72~~	~~#4 at 72~~
	5 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#4 at 72	#5 at 72
	7 feet	#4 at 72	#5 at 72	#6 at 72
	8 feet	#5 at 72	#6 at 72	#6 at 64
	~~4 feet (or less)~~	~~#4 at 72~~	~~#4 at 72~~	~~#4 at 72~~
	5 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#4 at 72	#5 at 72

MAXIMUM UNSUPPORTED WALL HEIGHT	HEIGHT OF UNBALANCED BACKFILL	MINIMUM VERTICAL REINFORCEMENT AND SPACING (inches) Soil classes and lateral soil load (psf per foot below grade)		
		GW, GP, SW and SP soils 30	GM, GC, SM, SM-SC and ML soils 45	SC, ML-CL and inorganic CL soils 60
8 feet 8 inches	7 feet	#4 at 72	#5 at 72	#6 at 72
	8 feet 8 inches	#5 at 72	#7 at 72	#6 at 48
9 feet 4 inches	~~4 feet (or less)~~	~~#4 at 72~~	~~#4 at 72~~	~~#4 at 72~~
	5 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#5 at 72	#5 at 72
	7 feet	#4 at 72	#5 at 72	#6 at 72
	8 feet	#5 at 72	#6 at 72	#6 at 56
	9 feet 4 inches	#6 at 72	#6 at 48	#6 at 40
10 feet	~~4 feet (or less)~~	~~#4 at 72~~	~~#4 at 72~~	~~#4 at 72~~
	5 feet (or less)	#4 at 72	#4 at 72	#4 at 72
	6 feet	#4 at 72	#5 at 72	#5 at 72
	7 feet	#4 at 72	#6 at 72	#6 at 72
	8 feet	#5 at 72	#6 at 72	#6 at 48
	9 feet	#6 at 72	#6 at 56	#6 at 40
	10 feet	#6 at 64	#6 at 40	#6 at 32

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot per foot = 0.157 kPa/mm.

a. Mortar shall be Type M or S and masonry shall be laid in running bond.

b. Alternative reinforcing bar sizes and spacings having an equivalent cross-sectional area of reinforcement per lineal foot of wall shall be permitted provided the spacing of the reinforcement does not exceed 72 inches in Seismic Design Categories A, B and C, and 48 inches in Seismic Design Categories D_0, D_1 and D_2.

c. Vertical reinforcement shall be Grade 60 minimum. The distance, *d*, from the face of the soil side of the wall to the center of vertical reinforcement shall be not less than 8.75 inches.

d. Soil classes are in accordance with the Unified Soil Classification System and design lateral soil loads are for moist conditions without hydrostatic pressure. Refer to Table R401.4.1(2).

e. Unbalanced backfill height is the difference in height between the exterior finish ground level and the lower of the top of the concrete footing that supports the foundation wall or the interior finish ground levels. Where an interior concrete slab-on-grade is provided and in contact with the interior surface of the foundation wall, measurement of the unbalanced backfill height is permitted to be measured from the exterior finish ground level to the top of the interior concrete slab is permitted.

f. The use of this table shall be prohibited for soil classifications not shown.

R404.1.4 Seismic Design Category D_0, D_1 or D_2.

R404.1.4.1 Masonry foundation walls. In *buildings* assigned to *Seismic Design Category* D_0, D_1 or D_2, as established in Table R301.2, masonry foundation walls shall comply with TMS 402 or the provisions of this section. In addition to the requirements of Table R404.1.2.1(1), plain masonry foundation walls shall comply with the following:

1. Wall height shall not exceed 8 feet (2438 mm).
2. Unbalanced backfill height shall not exceed 4 feet (1219 mm).
3. Minimum nominal thickness for plain masonry foundation walls shall be 8 inches (203 mm).
4. Masonry stem walls shall have a minimum vertical reinforcement of one No. 4 (No. 13) bar located not greater than 4 feet (1219 mm) on center in grouted cells. Vertical reinforcement shall be tied to the horizontal reinforcement in the footings.

Foundation walls, supporting more than 4 feet (1219 mm) of unbalanced backfill or exceeding 8 feet (2438 mm) in height shall be constructed in accordance with Table R404.1.2.1(2), R404.1.2.1(3) or R404.1.2.1(4). Masonry foundation walls shall have two No. 4 (No. 13) horizontal bars located in the upper 12 inches (305 mm) of the wall.

Reason: This proposal makes several changes to clarify and improve the requirements for masonry foundation walls.

1. Table R404.1.2.1 (1) - Solid 10 inch and 12 inch masonry units are not commonly available any longer. The proposal includes

modifying this table to replace solid 10 inch and 12 inch units in favor of grouted units of the same size. In unreinforced masonry, the strength of solid grouted masonry exceeds that of masonry constructed using solid units. As such, this change provides more useful, cost-effective solutions while concurrently increasing the strength of the assembly.

2. Tables R404.1.2.1(2), R404.1.2.1(3), and R404.1.2.1(4) - In may situations, the reinforcing schedule for walls with unbalanced backfill of 4 feet (or less) and 5 feet is the same. This change proposes to remove redundant requirements at those unbalanced backfill heights.

3. R404.1.4.1 - this section provides a prescriptive solution for masonry foundation walls in Seismic Design Category D_0, D_1, or D_2. No changes to the prescriptive solution are proposed, but an option to allow an engineered design per TMS 402 (Building Code Requirements for Masonry Structures) is proposed to be added. This is useful to provide an additional option in seismic areas that could create more economical designs, and can also be used in situations where the prescriptive solution is not feasible (such as when the wall height exceeds 8 feet).

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

Justification for no cost impact:

The changes are clarifications to reduce redundancy of foundation tables, remove outdated unit options, and provide an alternative path for engineering design of masonry foundation walls in seismic areas.

RB160-25

RB161-25

IRC: R404.1.3, R404.1.3.1, R404.1.3.2, R404.1.3.3.7.2 (New), R404.1.3.3.7.2, R404.1.3.3.7.4, R404.1.3.3.7.5, TABLE 404.1.3.3 (New), R404.1.3.3.7.6, TABLE R404.1.3.2(1), TABLE R404.1.3.2(10) (New), ACI Chapter 44 (New), ASTM Chapter 44 (New)

Proponents: Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); Jerzy Zemajtis, NEx, An ACI Center of Excellence for Nonmetallic Building Materials, representing Jerzy Zemajtis, NEx (jerzy.zemajtis@nonmetallic.org); John Busel, representing American Composites Manufacturers Association (jbusel@acmanet.org); Dr. Julian Mills-Beale, representing National Ready Mixed Concrete Association (jmills-beale@nrmca.org); Doug Gremel, representing Owens Corning (douglas.gremel@owenscorning.com)

2024 International Residential Code

R404.1.3 Concrete foundation walls. Concrete foundation walls that support light-frame walls shall be designed and constructed in accordance with the provisions of this section, ACI 318, ACI 332, ACI CODE 440.11 or PCA 100. Concrete foundation walls that support above-grade concrete walls that are within the applicability limits of Section R608.2 shall be designed and constructed in accordance with the provisions of this section, ACI 318, ACI 332, ACI CODE 440.11 or PCA 100. Concrete foundation walls that support above-grade concrete walls that are not within the applicability limits of Section R608.2 shall be designed and constructed in accordance with the provisions of ACI 318, ACI 332, ACI CODE 440.11 or PCA 100. Where ACI 318, ACI 332, ACI CODE 440.11, PCA 100 or the provisions of this section are used to design concrete foundation walls, project drawings, typical details and specifications are not required to bear the seal of the architect or engineer responsible for design, unless otherwise required by the state law of the *jurisdiction* having authority.

R404.1.3.1 Concrete cross section. Concrete walls constructed in accordance with this code shall comply with the shapes and minimum concrete cross-sectional dimensions required by Table R608.3. Other types of forming systems resulting in concrete walls not in compliance with this section and Table R608.3 shall be designed in accordance with ACI 318 or ACI CODE 440.11.

R404.1.3.2 Reinforcement for foundation walls. Concrete foundation walls shall be laterally supported at the top and bottom. Horizontal reinforcement shall be provided in accordance with Table R404.1.3.2(1). Vertical reinforcement shall be provided in accordance with Table R404.1.3.2(2), R404.1.3.2(3), R404.1.3.2(4), R404.1.3.2(5), R404.1.3.2(6), R404.1.3.2(7) or R404.1.3.2(8) for walls reinforced with steel reinforcement or Table R404.1.3.2(10) for walls reinforced with GFRP reinforcement. Vertical steel reinforcement for flat basement walls retaining 4 feet (1219 mm) or more of unbalanced backfill is permitted to be determined in accordance with Table R404.1.3.2(9). For *basement* walls supporting above-grade concrete walls, vertical steel reinforcement shall be the greater of that required by Tables R404.1.3.2(2) through R404.1.3.2(8) or by Section R608.6 for the above-grade wall. In *buildings* assigned to *Seismic Design Category* D_0, D_1 or D_2, concrete foundation walls shall also comply with Section R404.1.4.2.

Add new text as follows:

R404.1.3.3.7.2 Glass fiber reinforced polymer (GFRP) reinforcement. GFRP reinforcement shall comply with ASTM D7957. Concrete foundation walls reinforced with GFRP reinforcement shall only be permitted in buildings assigned to Seismic Design Category A.

R404.1.3.3.7.2 Location of reinforcement in wall. The center of vertical reinforcement in *basement* walls determined from Tables R404.1.3.2(2) through R404.1.3.2(7)for walls reinforced with steel reinforcement and Table 404.1.3.2(10) for walls with GFRP reinforcement shall be located at the centerline of the wall. Vertical reinforcement in *basement* walls determined from Table R404.1.3.2(8) shall be located to provide a maximum cover of 1$^{1}/_{4}$ inches (32 mm) measured from the inside face of the wall. Regardless of the table used to determine vertical wall reinforcement placement, the center of the ~~steel~~ reinforcing bars shall not vary from the specified location by more than the greater of 10 percent of the wall thickness and $^{3}/_{8}$ inch (10 mm). Horizontal and vertical reinforcement shall be located in foundation walls to provide the minimum cover required by Section R404.1.3.3.7.4.

R404.1.3.3.7.4 Support and cover. Reinforcement shall be secured in the proper location in the forms with tie wire or other bar support system to prevent displacement during the concrete placement operation. Steel reinforcement in concrete cast against the earth shall have a minimum cover of 3 inches (75 mm). Minimum cover for steel reinforcement in concrete cast in removable forms that will be exposed to the earth or weather shall be 1$^{1}/_{2}$ inches (38 mm) for No. 5 bars and smaller, and 2 inches (50 mm) for No. 6 bars and larger. For concrete cast in removable forms that will not be exposed to the earth or weather, and for concrete cast in stay-in-place forms, minimum cover for steel reinforcement shall be $^3/_4$ inch (19 mm). For concrete reinforced with GFRP reinforcement the minimum cover for any exposure shall be 3/4 inch (19 mm).The minus tolerance for cover shall not exceed the smaller of one-third the required cover or $^3/_8$ inch (10 mm).

R404.1.3.3.7.5 Lap splices. Vertical and horizontal wall reinforcement shall be the longest lengths practical. Where splices are necessary in reinforcement, the length of lap splice shall be in accordance with Table R608.5.4(1) for steel reinforcement or Table 404.1.3.3 for GFRP reinforcement and Figure R608.5.4(1). The maximum gap between noncontact parallel bars at a lap splice shall not exceed the smaller of one-fifth the required lap length and 6 inches (152 mm) [see Figure R608.5.4(1)].

TABLE 404.1.3.3 MINIMUM SPLICE LENGTH FOR HORIZONTAL GFRP REINFORCEMENT[a]

No. 4 bars	No. 5 bars	No. 6 bars
26 in.	32 in.	38 in.

a. Lap splices are not permitted for vertical GFRP reinforcement unless approved by a registered design professional.

R404.1.3.3.7.6 Alternate grade of steel reinforcement and spacing. Where tables in Section R404.1.3.2 specify vertical ~~wall~~ steel reinforcement based on minimum bar size and maximum spacing, which are based on Grade 60 (414 MPa) steel reinforcement, different size bars or bars made from a different grade of steel are permitted provided that an equivalent area of steel per linear foot of wall is provided. Use of Table R404.1.3.2(9) is permitted to determine the maximum bar spacing for different bar sizes than specified in the tables or bars made from a different grade of steel. Bars shall not be spaced less than one-half the wall thickness, or more than 48 inches (1219 mm) on center.

TABLE R404.1.3.2(1) MINIMUM HORIZONTAL REINFORCEMENT FOR CONCRETE ~~BASEMENT~~ FOUNDATION WALLS~~a, b~~

REINFORCEMENT TYPE	MAXIMUM UNSUPPORTED WALL HEIGHT (feet)	LOCATION OF HORIZONTAL REINFORCEMENT Steel
Steel[a, b]	≤ 8	Minimum of 3 No. 4 bars placed such that there is ~~O~~one ~~No. 4~~ bar within 12 inches of the top of the wall story and one ~~No. 4 bar~~ near mid-height of the wall story.
	> 8	Minimum of four No. 4 bars placed such that there is ~~O~~one ~~No. 4 bar~~ within 12 inches of the top of the wall story and one ~~No. 4 bar~~ near third points in the wall story.
GFRP	≤ 8	Minimum of four No. 4 bars placed such that there is one bar wihtin 24 inches of the top and bottom of the wall story and one bar near the third points in the wall story.
	> 8 and ≤ 10	Minimum of five No. 4 bars placed such that there is one bar within 12 inches of the top and bottom of the wall story and one bar near the quarter points of the wall story.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square inch = 6.895 kPa.

a. Horizontal reinforcement requirements are for reinforcing bars with a minimum yield strength of 40,000 psi and concrete with a minimum concrete compressive strength of 2,500 psi.

b. See Section R404.1.3.2 for minimum reinforcement required for foundation walls supporting above-grade concrete walls.

TABLE R404.1.3.2(10) MINIMUM VERTICAL GFRP REINFORCEMENT FOR FLAT CONCRETE WALLS [a,b]

		Minimum Vertical Reinforcement - Bar Size No, and Spacing (in.)								
		Maximum Design Lateral Soil Load psf/ft of depth								
Maximum Unsupported Wall Height (ft)	Maximum Unbalanced Fill (ft)	GW, GP, SW, SP 30			GM, GC, SM, SM-SC and ML 45			SC, ML-CL and Inorganic CL 60		
		Nominal Wall Thickness, in.			Nominal Wall Thickness, in			Nominal Wall Thickness, in		
		6	8	10	6	8	10	6	8	10
	4	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	5@32	NR	NR	6@31	NR	NR

8	6	5@32	NR	NR	6@26	NR	NR	6@13	6@32	NR
	7	6@29	NR	NR	6@12	6@27	NR	DR	6@19	NR
	8	6@17	6@32	6@32	DR	6@20	6@32	DR	6@10	6@19
9	4	NR	NR	NR	NR	NR	NR	NR	NR	NR
	5	NR	NR	NR	5@32	NR	NR	6@29	NR	NR
	6	5@27	NR	NR	6@23	NR	NR	6@10	6@26	NR
	7	6@25	NR	NR	6@8	6@24	NR	DR	6@62	6@28
	8	6@12	6@27	NR	DR	6@16	NR	DR	6@7	6@17
	9	6@6	6@21	6@32	DR	6@8	6@28	DR	DR	6@11
10	4	NR	NR	NR	NR	NR	6@18	NR	NR	NR
	5	NR	NR	NR	5@26	NR	NR	6@27	NR	NR
	6	6@32	NR	NR	6@20	NR	NR	6@8	6@24	NR
	7	6@22	NR	NR	6@6	6@22	NR	DR	6@13	6@21
	8	6@9	6@25	NR	DR	6@13	6@21	DR	DR	6@15
	9	DR	6@18	6@30	DR	6@6	6@16	DR	DR	6@8
	10	DR	6@11	6@20	DR	DR	6@10	DR	DR	DR

NR = Reinforcement not required.

DR = Design required.

a. Interpolation between values in these tables is not permitted. However, smaller bar sizes are permitted provided the bar cross sectional area divided by the bar spacing is greater than the bar cross sectional area divided by the bar spacing shown in the table. Bar cross sectional areas are provided in ASTM D7957-22.

b. Minimum vertical reinforcement spacing is 6 in.

Add new standard(s) as follows:

ACI

American Concrete Institute
38800 Country Club Drive
Farmington Hills, MI 48331

CODE 440.11	Building Code Requirements for Structural Concrete Reinforced with Glass Fiber-Reinforced Polymer (GFRP) Bars—Code and Commentary
D7957/D7957M-22	Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement

Reason: This proposal adds prescriptive provisions for the construction of concrete foundation walls reinforced with glass fiber reinforced polymer (GFRP) reinforcement. The design is based on ACI CODE 440.11 Building Code Requirements for Structural Concrete Reinforced with Glass Fiber-Reinforced Polymer (GFRP) Bars and limited to GFRP complying with ASTMD7957/D7957M-22—Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement. Both standards are proposed as referenced standards in this code change proposal. GFRP reinforcement can significantly improve safety and durability in corrosive environments which can be present for foundation wall systems.

This proposal does not alter current means of compliance for foundation walls, but adds minimum criteria where foundation walls are to be constructed using GFRP reinforcement.

This proposal introduces concrete foundation walls reinforced with GFRP into the IRC for building assigned to Seismic Design Category A. The 2024 International Building Code permits the use of structural concrete reinforced with GFRP reinforcement in accordance with ACI CODE 440.11 for SDC A. The criteria in ACI CODE 440.11 and the assumptions used to develop the steel reinforced foundation walls currently in the IRC were used to develop these pre-engineered criteria for 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:

This proposal provides minimum criteria for alternative means of design and construction of concrete foundation walls. It does alter current code compliance requirements.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:

ACICODE 440.11 Building Code Requirements for Structural Concrete Reinforced with Glass Fiber-Reinforced Polymer (GFRP) Bars—Code and Commentary

ASTMD7957/D7957M-22 Standard Specification for Solid Round Glass Fiber Reinforced Polymer Bars for Concrete Reinforcement

RB161-25

RB162-25

IRC: R404.1.6.1 (New)

Proponents: Scot Harris, Preston Wood & Associates, LLC. Jack Preston Wood AIBD/NCBDC, representing self (scot@jackprestonwood.com)

2024 International Residential Code

Add new text as follows:

R404.1.6.1 Crawl space grade height. Where a crawl space is open to grade, the finished grade shall not be higher than 4 inches below the top of concrete or similar perimeter beams, perimeter curbs, plinths, pier caps, or slab on grade where masonry veneer is used and not less than 6 inches elsewhere. The vapor retarder with gravel topping, where specified, shall not be part of this measurement when determining crawl space grade height.

Reason: No current definition exists that explicitly state this requirement.

Structural Engineers that provide a design where the crawl space is open to grade tend to overlook the crawl space finished grade height as part of the design. Floor drains will be required and subsequent design by a Civil Engineer will be required for the floor drain outfall. A civil designer may be a separate entity to that of a structural designer where delays in delivery of the finished product may 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 is for clarification only to reduce the likelihood of interpretations or oversights.

RB162-25

RB163-25

IRC: R404.1.8

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

Revise as follows:

R404.1.8 Rubble stone masonry. Rubble stone masonry foundation walls shall have a minimum thickness of 16 inches (406 mm), shall not support an unbalanced backfill exceeding 8 feet (2438 mm) in height, shall not support a soil pressure greater than 30 pounds per square foot per foot (4.71 kPa/m), and shall not be constructed in *Seismic Design Categories* D_0, D_1, D_2 or *townhouses* in *Seismic Design Category* C~~, as established in Figure R301.2(2)~~.

Reason: This code change proposal is editorial in nature, deleting a pointer that is no longer accurate. Figure R301.2(2) is a map of ultimate design wind speed, not Seismic Design Category. While it is possible to have Section R404.1.8 refer to Section R301.2.2.1, other citations of Seismic Design Category do not provide a pointer. Because the use of a pointer inherently requires maintenance through periodic code changes, it is preferable to match other references to Seismic Design Category and not have a pointer, thereby eliminating the need for maintenance.

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

Justification for no cost impact:

Proposal is entirely clarification and editorial to maintain past practice, with no substantive effect.

RB163-25

RB164-25

IRC: R408.3

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

R408.3 Unvented crawl space. For unvented under-floor spaces within the *building thermal envelope*, the following items shall be provided:

1. Exposed earth shall be covered with a continuous Class I vapor retarder. Joints of the vapor retarder shall overlap by 6 inches (152 mm) and shall be sealed or taped. The edges of the vapor retarder shall extend not less than 6 inches (152 mm) up the perimeter walls ~~stem wall~~ and shall be attached and sealed to the perimeter walls ~~stem wall~~ or insulation.
2. One of the following shall be provided for the under-floor space:
   - 2.1. Continuously operated mechanical exhaust *ventilation* at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m^2) of *crawl space* floor area, including an air pathway to the common area (such as a duct or transfer grille), ~~and perimeter walls insulated in accordance with Section N1102.2.11.1.~~
   - 2.2. *Conditioned air* supply sized to deliver at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m^2) of under-floor area, including a return air pathway to the common area (such as a duct or transfer grille), ~~and perimeter walls insulated in accordance with Section N1102.2.11.1.~~
   - 2.3. Plenum in existing structures complying with Section M1601.5, if under-floor space is used as a plenum.
   - 2.4. Dehumidification sized in accordance with manufacturer's specifications.

Reason: Underfloor dehumidification was included in the IRC with the intent of it being in a conditioned space, within the building thermal envelope, yet the IRC does not clearly state that. For the first two options, exhaust and conditioned supply, the same statement about perimeter wall insulation is repeated. Rather than repeat this a third time under the dehumidification option, a clear qualifying statement is made in the first sentence of the section. It is assumed that an unvented crawlspace is within the building thermal envelope, but this makes it clear.

1. Eliminate repeated statements to shorten and simplify the IRC.
2. "perimeter walls" of unvented crawlspaces are not always required to be insulated. Often there will be a conditioned basement space adjacent the crawlspace. The wall between is a "perimeter wall" of the crawl space but it is between two conditioned spaces and thus does not require insulation. By referencing the crawl space must be within the building thermal envelope, mention of insulation design is not necessary. This simplifies the IRC.
3. A wall between a crawlspace and basement may be wood framed and thus not a "stem wall". Though uncommon, the IRC provides prescriptive methods for a wood foundation wall. A stem wall is typically in reference to a concrete foundation wall. Use of the term "perimeter wall" is generic and not material specific.

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

Justification for no cost impact:

I have discussed this proposal with the professionals previously involved with creating the option for dehumidification, and was informed the original intent was for the crawl space to be within the thermal envelope. Therefore this proposal does not change the intended cost of construction, but simply clarifies the original intent.

RB164-25

RB165-25

IRC: R408.3

Proponents: Tom Marks, Stego Industries, LLC, representing Stego Industries

2024 International Residential Code

Revise as follows:

R408.3 Unvented crawl space. For unvented under-floor spaces, the following items shall be provided:

1. Exposed earth shall be covered with a continuous Class I vapor retarder complying with ASTM E1745. Joints of the vapor retarder shall overlap by 6 inches (152 mm) and shall be sealed or taped. The edges of the vapor retarder shall extend not less than 6 inches (152 mm) up the stem wall and shall be attached and sealed to the stem wall or insulation.
2. One of the following shall be provided for the under-floor space:
   2.1. Continuously operated mechanical exhaust *ventilation* at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m^2) of *crawl space* floor area, including an air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with Section N1102.2.11.1.
   2.2. *Conditioned air* supply sized to deliver at a rate equal to 1 cubic foot per minute (0.47 L/s) for each 50 square feet (4.7 m^2) of under-floor area, including a return air pathway to the common area (such as a duct or transfer grille), and perimeter walls insulated in accordance with Section N1102.2.11.1.
   2.3. Plenum in existing structures complying with Section M1601.5, if under-floor space is used as a plenum.
   2.4. Dehumidification sized in accordance with manufacturer's specifications.

Reason: Existing code verbiage calls for simply and explicitly a Class I vapor retarder as ground cover in unvented crawl spaces. However, Class I only correlates to water vapor permeance of materials (in this case essentially sheet vapor retarder films) and, thus, does not capture other important performance characteristics necessary for this application, such as strength/durability and longevity. Although no industry-established performance standard specifically for crawl space vapor retarders exists currently, ASTM E1745 is a useful performance specification in this application. This long-standing industry standard is written around flexible plastic films engineered to provide consistent and necessary performance for effectively isolating homes from water vapor diffusion from the ground. Although historically applied to below-slab vapor retarders, the scope of ASTM E1745 includes baseline and after conditioning (i.e., in-service conditions) water vapor permeance testing, as well as material strength benchmarks, including puncture resistance and tensile strength. These are all performance characteristics useful for a vapor retarder as ground cover in an unvented crawl space. In fact, the conditioning test methods come from ASTM E154, which covers "the determination of the properties of flexible membranes to be used as vapor retarders in contact with the earth under concrete slabs, against walls, or **as ground cover in crawl spaces**."

ASTM E1745 helps ensure the crawl space vapor retarder meets consistent levels of performance critical in an unvented crawl space and contributing to the durability, indoor air quality, and cost of ownership of the home. This may not generally be achieved in new home construction with merely the use of a Class I vapor retarder, often thin gauge standard (or commodity) polyethylene sheeting. Standard poly sheeting is generally comprised of majority reprocessed raw materials, resulting in sheet films with potentially wider variations in performance characteristics from one roll to the next, particularly for some of the critical characteristics necessary for this application, such as strength and long-term vapor permeance.

A vapor retarder more susceptible to damage or deterioration over time can be especially concerning in unvented crawl spaces. That is due to an unvented crawl space being essentially within the conditioned area of the home where natural (or mechanically driven) air movement from the crawl space makes achieving dry, healthy, and clean air in the crawl space critical. By contrast, a consistently low-permeance and durable vapor retarder, which meets ASTM E1745, will be more effective in isolating the crawl space from moisture and soil-vapor from the ground. Impeding water vapor diffusion from the ground will help prevent elevated relative humidity, the culprit in mold growth, structural and/or building material failures, energy inefficiency, and other moisture-induced issues. This level of protection can reduce the long-term operating costs for the homeowner due to material damage, repairs, and remediation. It can also offer utility in impeding soil vapor, airborne dirt/dust, or other concerns originating from the soil in a crawl space, contributing to improved indoor air quality.

This update would also be in closer harmonization with proposed changes to R506.3.3 for vapor retarders beneath concrete floor slabs. ASTM E1745 is an established, recognized, and recommended standard for vapor retarders used at the foundation of homes and even now referenced in industry guidelines and programs for the crawl space vapor retarder, such as EPA's Indoor AirPlus.

Finally, this update would represent a harmonization and benefit the proposed change to BE103.5.2 in which the soil-gas retarder in crawl spaces for Radon Control Methods references back to this section of the code. The durability and longevity of the soil-gas retarder in a radon control system is critical, but even more so when used as ground cover in a crawl space, as it serves exclusively to limit the advective (via air) movement of radon gas. Now that the Radon Control Methods section of the code references the appropriate vapor retarder code section for the soil-gas retarder beneath concrete floors (R506.3), the crawl space soil-gas retarder presumably should do the same.

Bibliography: ASTM E1745 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

ASTM E154 Standard Test Method for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposed change may represent a relatively small increase in the first cost to the homebuilder. Roughly \$0.10/ft^{2}for ASTM E1745 compliant vapor retarders compared to standard Class I polyethylene sheeting of equivalent thickness.

Estimated Immediate Cost Impact Justification (methodology and variables):

The reason for the increase in material cost is simply the higher performance of the membrane. Engineered films that meet ASTM E1745 generally utilize higher quality, strategically designed raw materials. This level of film engineering results in a vapor retarder with more consistent and higher-level performance for this application.

It is important to keep in mind that the potential reduced operational costs for the homeowner may far outweigh the relatively low first costs to the builder. A more durable and effective vapor retarder will impede more moisture vapor diffusion from the ground, helping to lower relative humidity and the potential for condensation within the crawl space. Condensation can lead to myriad destructive and costly issues, including structural concerns, building material failures, mold growth, etc.

ASTM E1745 compliant vapor retarders are commonplace in the industry currently, so there is an established competitive marketplace for these products and wide availability for homebuilders and trades from manufacturers and distributors throughout the country.

The proposed change is regarding the material performance only, no change in installation requirements or practical change in installation costs.

RB165-25

RB166-25

IRC: R501.2, R502.12.1, R801.2, R802.10.2

Proponents: Greg Greenlee, SBCA, representing SBCA, Technical Director (ggreenlee@sbcacomponents.com); Jay Jones, representing Truss Plate Institute, Executive Director (jpjones@tpinst.org)

2024 International Residential Code

Revise as follows:

R501.2 Requirements. Floor construction shall be capable of accommodating all loads in accordance with Section R301 and of transmitting the resulting loads to the supporting structural elements. Premanufactured elements used as floor framing members shall be designed in accordance with approved engineering practice and have a quality program that includes quality assurance audits performed by an *approved* third-party agency.

R502.12.1 Design. Wood trusses shall be designed in accordance with *approved* engineering practice. The design, ~~and~~ manufacture, and quality criteria of metal-plate-connected wood trusses shall comply with ANSI/TPI 1. The *truss design drawings* shall be prepared by a *registered design professional* where required by the statutes of the *jurisdiction* in which the project is to be constructed in accordance with Section R106.1. Quality assurance audits shall be performed by an *approved* third-party agency

R801.2 Requirements. Roof and ceiling construction shall be capable of accommodating all loads imposed in accordance with Section R301 and of transmitting the resulting loads to the supporting structural elements. Premanufactured elements used as roof framing members shall be designed in accordance with approved engineering practice and have a quality program that includes quality assurance audits performed by an *approved* third-party agency.

R802.10.2 Design. Wood trusses shall be designed in accordance with accepted engineering practice. The design, ~~and~~ manufacture, and quality criteria of metal-plate-connected wood trusses shall comply with ANSI/TPI 1. The *truss design drawings* shall be prepared by a *registered design professional* where required by the statutes of the *jurisdiction* in which the project is to be constructed in accordance with Section R106.1. Quality assurance audits shall be performed by an *approved* third-party agency.

Reason: These modifications reinforce that the quality requirements included in TPI 1 are required in the IRC to align with the requirements of the IBC, and require that premanufactured floor and roof framing members have quality assurance audits performed by an approved third-party agency.

There has been much confusion in the industry about the quality control and quality assurance requirements regarding metal plate connected wood trusses. Currently the IRC indicates that the design and manufacturing requirements of metal plate connected wood trusses shall conform to TPI 1. The IRC does not specifically state that the quality criteria of TPI 1 need to be followed, so clarification is needed.

The quality criteria in TPI 1 requires truss manufacturers to have a quality control manual, perform frequent quality control inspections, and have periodic quality assurance audits. The standard states that the truss manufacturers methods shall be subject to periodic audits for compliance with the requirements of TPI 1 by an approved agency per the IRC, or the IBC, where required by local authorities having jurisdiction, or by other means.

The IBC requires the periodic audits be performed by an approved third-party auditor. Having third-party audits is an important part of a quality management system. It focuses on the documented processes and policies and provides confidence that quality requirements will be fulfilled. It helps the manufacturer form a strategy for how it will proactively approach quality. Currently the IRC does not include the same requirement.

Commonly component manufacturers fabricate metal plate connected wood trusses for both structures built under the purview of the IRC and the IBC, so this change would not impact those manufacturers. It would only impact manufacturers that fabricate metal plate connected wood trusses only for IRC projects where the quality audits are performed by a member of the quality assurance staff.

Cost Impact: Increase

Estimated Immediate Cost Impact:

When amortized across all the truss projects a component manufacturer does, the cost of quarterly third-party audits is less than $1 per house.

Estimated Immediate Cost Impact Justification (methodology and variables):

Audits performed by third-party agencies cost around $350 dollars each and are typically performed quarterly. A small to average truss plant will manufacture around 500 truss packages a year. For these plants the additional cost per house would be less than $3/house. This assumes that the truss plant isn't doing any trusses constructed in compliance with the IBC which currently requires an audit.

Where truss manufacturers manufacture trusses for projects under both the IRC and the IBC there is no additional cost to construction. SBCA estimates that approximately 50 percent of the truss manufacturing facilities currently have audits performed by an accredited third-party auditor. However, the 50 percent of the truss facilities that currently have audits represent over 75 percent of the trusses that are manufactured annually. Therefore, the average cost increase across all houses constructed is less than $1/house.

RB166-25

RB167-25

IRC: SECTION 202 (New), R502.1.1.1 (New), R602.1.1.1 (New), R602.1.1.1.1 (New), R702.3.2.1 (New), R703.5.2.3 (New), R802.1.1.1 (New), ASTM Chapter 44 (New)

Proponents: Garian Cika, City of Eugene, representing City of Eugene

2024 International Residential Code

Add new definition as follows:

SALVAGE LUMBER. Sawn lumber that has been previously used in buildings or other structures.

Add new text as follows:

R502.1.1.1 Salvage Lumber. Used or salvaged sawn lumber shall be permitted to be used in accordance with Section R602.1.1.1.

R602.1.1.1 Salvage Lumber. *Salvage lumber* shall be free of areas of decay and insect damage. *Salvage lumber* shall be permitted for use in structural applications in accordance with Section R602.1.1.1.1. *Salvage lumber* that does not meet the provisions of Section R602.1.1.1.1shall be permitted for use in non-structural applications.

R602.1.1.1.1 Salvage Lumber in Structural applications. *Salvage lumber* used in structural applications shall be free of locations where net section has been reduced. Each piece of salvage lumber to be used in structural applications shall be proof loaded in flat-wise, third-point bending in accordance with ASTM D4761 to 2.1 times the reference bending design value, adjusted by the flat use factor, assigned to the selected grade of lumber in the AWC NDS. Pieces of *salvage lumber* that do not exhibit structural failure at a load corresponding to 2.1 times the reference bending design value shall be permitted for use in structural applications.

Exception: *Salvage lumber* identified by an existing *grade mark* in accordance with Section R602.1.1 shall be permitted to use 90% of the design values assigned to that grade of sawn lumber in the AWC NDS provided the following conditions are met:

1. The *salvage lumber* is free of locations where net section has been reduced.
2. A visual inspection of the salvage lumber shows no sign of failure.
3. It is known that the *salvage lumber* has not been subjected to sustained exposure to elevated temperatures above 100°F (38°C).

R702.3.2.1 Salvage Lumber. Used or salvaged sawn lumber shall be permitted to be used in accordance with Section R602.1.1.1.

R703.5.2.3 Salvage Lumber. Used or salvaged sawn lumber shall be permitted to be used in accordance with Sections R703.5.1 and R703.5.2, in accordance with section R602.1.1.1.

R802.1.1.1 Salvage Lumber. Used or salvaged sawn lumber shall be permitted to be used in accordance with Section R602.1.1.1.

Add new standard(s) as follows:

ASTM

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

D4761-19 Standard Test Methods for Mechanical Properties of Lumber and Wood-Based Structural Materials

Reason: Research, including studies by the Consortium for the Research on Renewable Industrial Materials (CORRIM 2010), highlights a key advantage of salvage lumber over materials reused like steel and concrete when it comes to energy use and carbon footprint (Lippke et al. 2004, Perez-Garcia et al. 2005). The timber framing industry understood this as early as the 1970s, using salvage lumber from industrial structures for new projects. Over the last 30 years, businesses selling salvage sawn lumber from deconstructed buildings have grown rapidly.

There's a significant opportunity here: since the early 1900s, more than 3 trillion board feet of lumber have been processed in the United States, much of which is still in use today (Steer 1948, Howard 2001). However, current building codes do not appear to specifically recognize the use of salvage sawn lumber, creating inconsistencies in how it's handled on job sites. Some building inspectors may allow salvage sawn lumber because it has a proven track record, while others may reject it outright due to a lack of official guidance administered by code. This uncertainty can be solved by updating codes to reflect the value of this material, permitting salvage sawn lumber to be reused safely.

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Howard, J. L. 2001. U.S. timber production, trade consumption, and price statistics 1965 to 1999. Research Paper FPL-RP-595. USDA Forest Service, Forest Products Laboratory, Madison, Wisconsin. 90 pp.

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

Justification for no cost impact:

There is no cost impact because sawn lumber is currently allowed by code. This code proposal adds another lumber choice for builders and designers; it is not a requirement to use salvage lumber. Data showing salvage lumber is equal (or less) in cost to non-salvage lumber from Reuse Institute:

Reclaimed Lumber Prices

From: The Reuse Center, Bellingham, WA — Prices good for week of: 11/18/2024

From: 'Deconstruction Dave' Bennink, Owner — *antique wood based on rough-sawn finish, like 100 years old or older; Antique is likely Douglas Fir not Hem Fir

Warehouse phone 360-733-1363

MATERIAL TYPE	Unit Type	Reuse Center Standard utility grade Price per unit	Reuse Center Antique/rustic* Price per unit	Comparison: Lowes Price listed online	Comparison: Lowes material description	
2x4	lineal foot	$0.39	$1	$0.54	Hemfir kiln dried	Lowes
2x6	lineal foot	$0.49	$2	$0.83	Hemfir kiln dried	Lowes
2x8	lineal foot	$0.75	$2.50	$1.12	Hemfir kiln dried	Lowes
2x10	lineal foot	$1.00	$3.35	$1.49	Hemfir kiln dried	Lowes
2x12	lineal foot	$1.33	$4.00	$1.86	Premiun Grade Fir	Home Depot
4x4	lineal foot	$0.65	$2.10	1.36	Premium Grade Fir #2	Home Depot
4x6	lineal foot	$1.10	$2.50	$2.04	Premium Grade Fir #2	Home Depot
6x6 treated post	lineal foot	$2.75	$6.25 Untreated	$6.48	Pole barn treated post, rough	
6x8 treated post	lineal foot	$3.75	$9.25 Untreated	$9.18	Pole barn treated post, rough	

NOTE: Standard Utility/framing grade is lumber milled from the 1970s to present date. Antique/rustic lumber was milled 100 years ago or older. There are many boards that fall between those two date sets and their price will fall between the prices listed for reclaimed.

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:

ASTM D4761-19 Standard Test Methods for Mechanical Properties of Lumber and Wood-Based Structural Materials

RB167-25

RB168-25

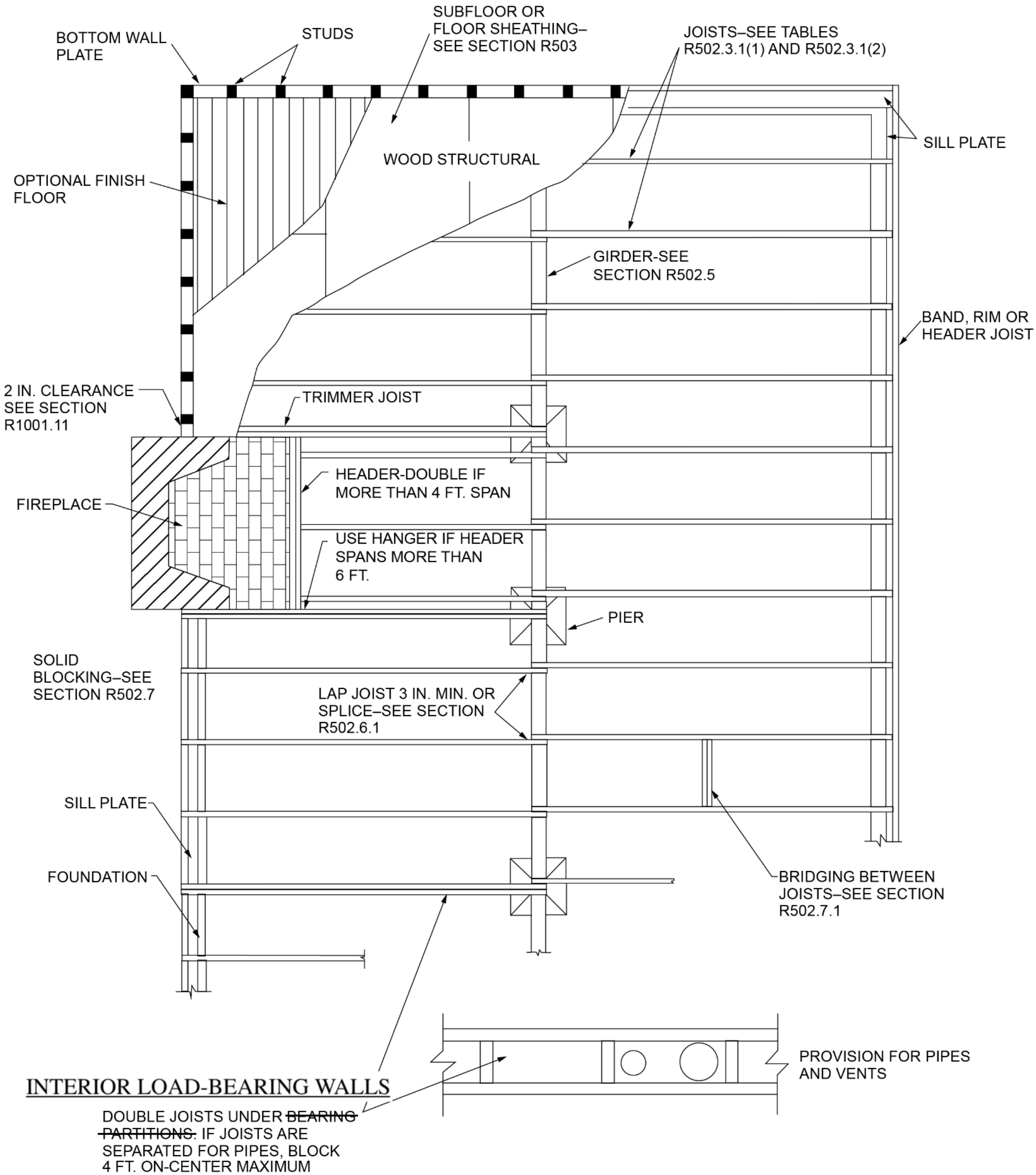
IRC: R502.2, R502.4, R602.3.2, R602.6, R802.4.5, R802.4.3, R802.5, R802.5.2.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

R502.2 Design and construction. Floors shall be designed and constructed in accordance with the provisions of this chapter, Figure R502.2 and Sections R304 and R305 or in accordance with ANSI AWC NDS.



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R502.2 FLOOR CONSTRUCTION

R502.4 Joists under <u>interior load-bearing walls</u> ~~bearing partitions~~. Joists under parallel <u>interior *load-bearing walls*</u> ~~bearing partitions~~

shall be of adequate size to support the load. Double joists, sized to adequately support the load, that are separated to permit the installation of piping or vents shall be full-depth solid blocked with lumber not less than 2 inches (51 mm) in nominal thickness spaced not more than 4 feet (1219 mm) on center. Interior *load-bearing walls* ~~Bearing partitions~~ perpendicular to joists shall not be offset from supporting girders~~,~~ or walls ~~or partitions~~ more than the joist depth unless such joists are of sufficient size to carry the additional load.

R602.3.2 Top plate. Wood stud walls shall be capped with a double top plate installed to provide overlapping at corners and intersections with interior *load-bearing walls* ~~bearing partitions~~. End joints in top plates shall be offset not less than 24 inches (610 mm). Joints in plates need not occur over studs. Plates shall be not less than 2-inches (51 mm) nominal thickness and have a width not less than the width of the studs.

Exception: A single top plate used as an alternative to a double top plate shall comply with the following:

1. The single top plate shall be tied at corners, intersecting walls, and at in-line splices in straight wall lines in accordance with Table R602.3.2.
2. The rafters or joists shall be centered over the studs with a tolerance of not more than 1 inch (25 mm).
3. Omission of the top plate is permitted over headers where the headers are adequately tied to adjacent wall sections in accordance with Table R602.3.2.

TABLE R602.3.2SINGLE TOP-PLATE SPLICE CONNECTION DETAILS

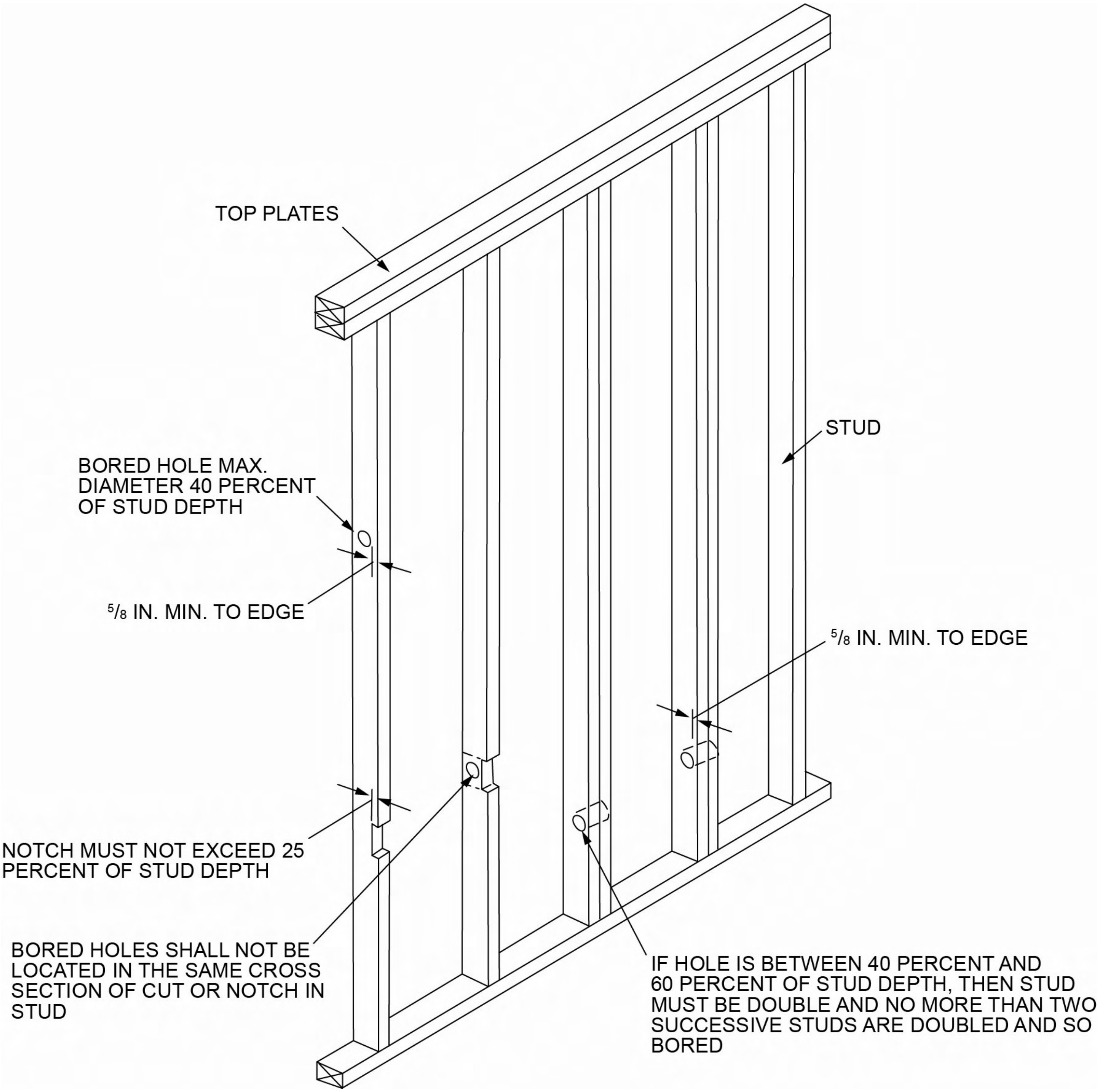
CONDITION	TOP-PLATE SPLICE LOCATION			
	Corners and intersecting walls		Butt joints in straight walls	
	Splice plate size	Minimum nails each side of joint	Splice plate size	Minimum nails each side of joint
Structures in SDC A-C; and in SDC D_0, D_1 and D_2 with braced wall line spacing less than 25 feet	3″ × 6″ × 0.036″ galvanized steel plate or equivalent	(6) 8d box ($2^1/_2$″ × 0.113″) nails	3″× 12″ × 0.036″ galvanized steel plate or equivalent	(12) 8d box ($2^1/_2$″ × 0.113″) nails
Structures in SDC D_0, D_1 and D_2, with braced wall line spacing greater than or equal to 25 feet	3″ × 8″ × 0.036″ galvanized steel plate or equivalent	(9) 8d box ($2^1/_2$″ × 0.113″) nails	3″ × 16″ × 0.036″ galvanized steel plate or equivalent	(18) 8d box ($2^1/_2$″ × 0.113″) nails

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

R602.6 Drilling and notching of studs. Drilling and notching of studs shall be in accordance with the following:

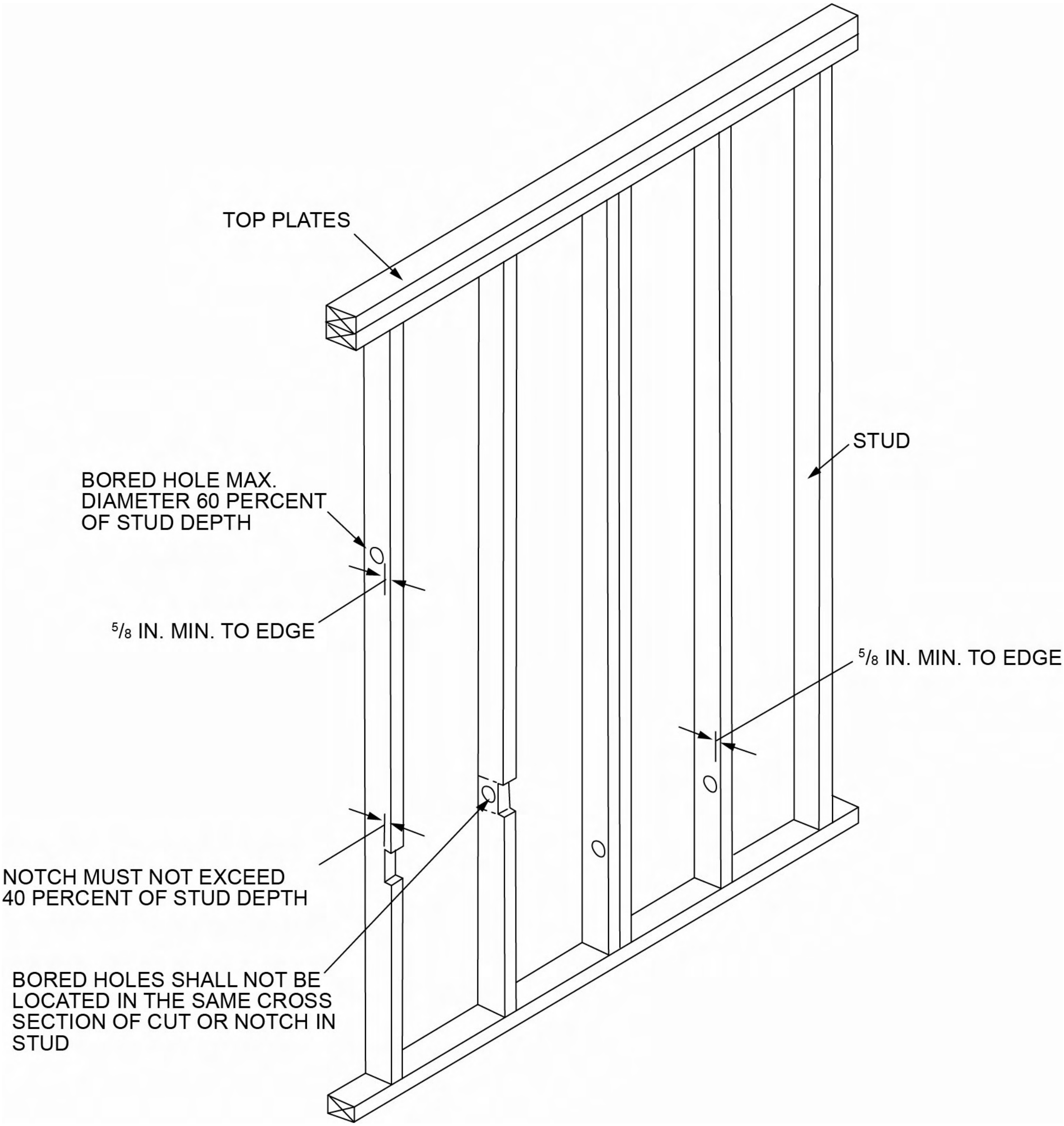
1. Notching. A stud in an exterior wall or interior *load-bearing wall* ~~bearing partition~~ shall not be cut or notched to a depth exceeding 25 percent of its depth. Studs in nonbearing interior walls ~~partitions~~ shall not be notched to a depth exceeding 40 percent of a single stud depth.
2. Boring. The diameter of bored holes in studs shall not exceed 60 percent of the stud depth, the edge of the hole shall not be less than $^5/_8$ inch (16 mm) from the edge of the stud, and the hole shall not be located in the same section as a cut or notch. Where the diameter of a bored hole in a stud located in exterior walls or interior *load-bearing walls* ~~bearing partitions~~ is over 40 percent, such stud shall be doubled and not more than two successive doubled studs shall be so bored. See Figures R602.6(1) and R602.6(2).

   Exception: Where *approved*, stud shoes are installed in accordance with the manufacturer's instructions.



For SI: 1 inch = 25.4 mm. Note: Condition for exterior and bearing walls.

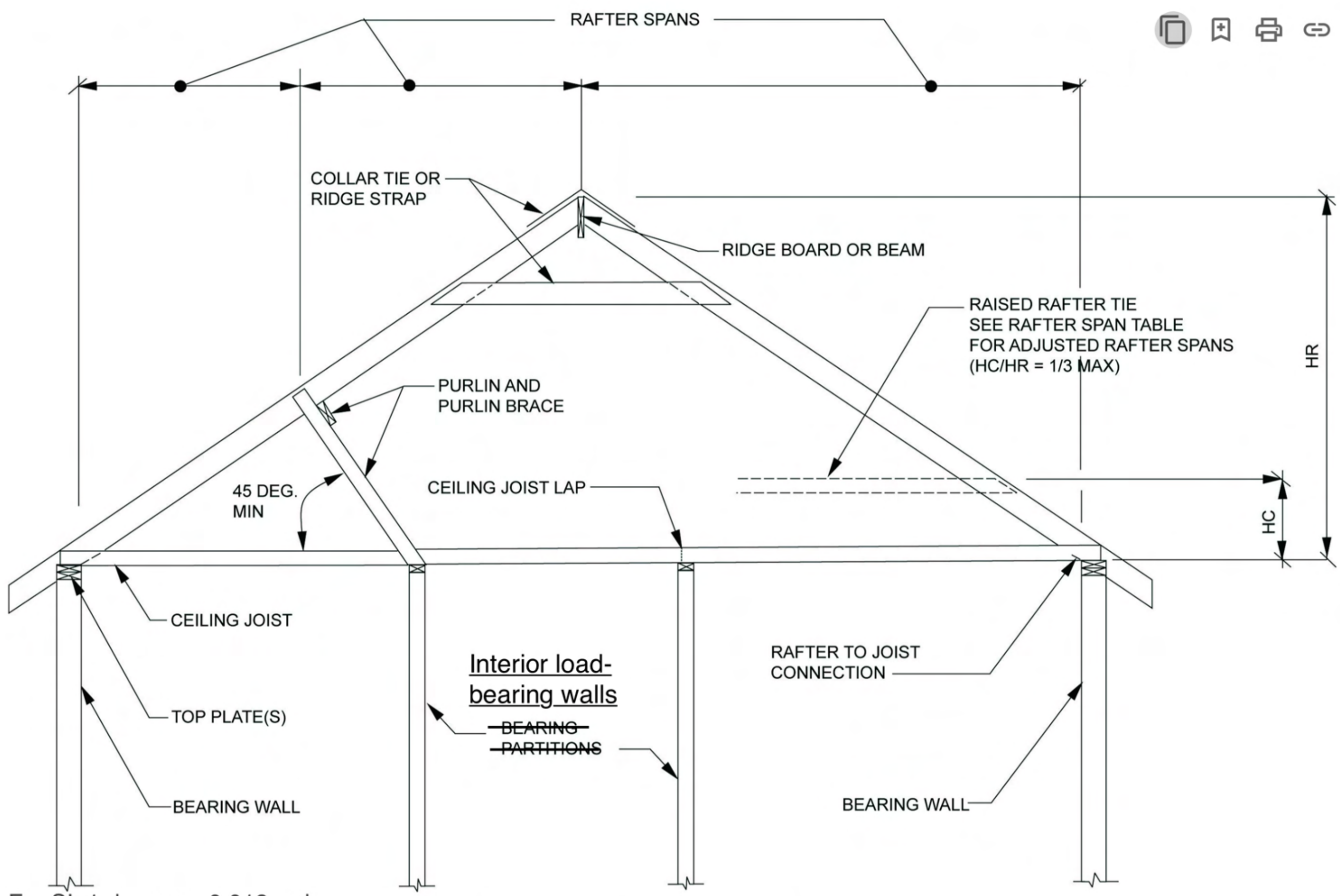
FIGURE R602.6(1) NOTCHING AND BORED HOLE LIMITATIONS FOR EXTERIOR WALLS AND BEARING WALLS



For SI: 1 inch = 25.4 mm.

FIGURE R602.6(2) NOTCHING AND BORED HOLE LIMITATIONS FOR INTERIOR NONBEARING WALLS

R802.4.5 Purlins. Installation of purlins to reduce the span of rafters is permitted as shown in Figure R802.4.5. Purlins shall be sized not less than the required size of the rafters that they support. Purlins shall be continuous and shall be supported by 2-inch by 4-inch (51 mm by 102 mm) braces installed to bearing walls at a slope not less than 45 degrees (0.79 rad) from the horizontal. The braces shall be spaced not more than 4 feet (1219 mm) on center and the unbraced length of braces shall not exceed 8 feet (2438 mm).



For SI: 1 degree = 0.018 rad.
H_C = Height of ceiling joists or rafter ties measured vertically above the top of rafter support walls.
H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

FIGURE R802.4.5 BRACED RAFTER CONSTRUCTION

For SI: 1 degree = 0.018 rad.

H_C = Height of ceiling joists or rafter ties measured vertically above the top of rafter support walls. H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

FIGURE R802.4.5 BRACED RAFTER CONSTRUCTION

R802.4.3 Hips and valleys. Hip and valley rafters shall be not less than 2 inches (51 mm) nominal in thickness and not less in depth than the cut end of the rafter. Hip and valley rafters shall be supported at the ridge by a brace to a *load-bearing wall* ~~bearing partition~~ or be designed to carry and distribute the specific load at that point.

R802.5 Ceiling joists. Ceiling joists shall be continuous across the structure or securely joined where they meet over interior walls ~~partitions~~ in accordance with Section R802.5.2.1. Ceiling joists shall be fastened to the top plate in accordance with Table R602.3(1).

R802.5.2.1 Ceiling joists lapped. Ends of ceiling joists shall be lapped not less than 3 inches (76 mm) or butted over *load-bearing walls* ~~bearing partitions~~ or beams and toenailed to the bearing member. Where ceiling joists are used to provide the continuous tie across the *building*, lapped joists shall be nailed together in accordance with Table R802.5.2(1) and butted joists shall be tied together with a connection of equivalent capacity. Laps in joists that do not provide the continuous tie across the *building* shall be permitted to be nailed in accordance with Table R602.3(1).

Reason: Use of the term "partition" to describe interior walls is from historical codes. The IRC more often refers to "interior walls". Walls is a defined term, as is “load-bearing wall”, but bearing and nonbearing partition is not. For consistency in interpretation and understanding, I am proposing replacing the term “partition” in the prescriptive wood framing provisions. Elsewhere in the code partition is used and not proposed for change. Those instances are when generally referring to an interior wall but not for structural design purposes. Often the phrase “wall and partition” is used. It is not as critical to change all those instances. Note the code section for drilling studs refers to “partitions” but the figure referenced is titled “interior nonbearing wall” and the text in R602.6.1 refers to the complete defined term “load-bearing wall”.

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

Justification for no cost impact:

This proposal does not affect the application or intent of the IRC and is only intended to make interpretation more consistent.

RB168-25

RB169-25

IRC: TABLE R502.3.1(1), TABLE R502.3.1(2)

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

Revise as follows:

TABLE R502.3.1(1) FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES (Residential sleeping areas, live load = 30 psf, L/Δ = 360)[a]

Portions of table not shown remain unchanged.

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
			(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)
12	Southern pine	SS	12-3	16-2	20-8	25-1	12-3	16-2	20-8	25-1
	Southern pine	#1	11-10	15-7	19-10	24-2	11-10	15-7	18-7	22-0
	Southern pine	#2	11-3	14-11	18-1	21-4	10-9	13-8	16-2	19-1
	Southern pine	#3	9-2	11-6	~~14-0~~13-11	16-6	8-2	10-3	12-6	14-9
16	Southern pine	SS	11-2	14-8	18-9	22-10	11-2	14-8	18-9	22-10
	Southern pine	#1	10-9	14-2	18-0	21-4	10-9	13-9	16-1	19-1
	Southern pine	#2	10-3	13-3	15-8	18-6	9-4	11-10	14-0	16-6
	Southern pine	#3	7-11	10-0	~~11-1~~12-1	14-4	7-1	8-11	10-10	12-10
19.2	Hem-fir	SS	10-1	13-4	17-0	20-8	10-1	13-4	17-0	20-7
	Hem-fir	#1	9-10	13-0	16-7	19-3	9-7	12-2	14-10	17-2
	Hem-fir	#2	9-5	12-5	15-6	~~17-1~~17-11	8-11	11-4	13-10	16-1
	Hem-fir	#3	7-8	9-9	11-10	13-9	6-10	8-8	10-7	12-4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

Note: Check sources for availability of lumber in lengths greater than 20 feet.

a. Dead load limits for townhouses in Seismic Design Category C and all structures in Seismic Design Categories D_0, D_1 and D_2 shall be determined in accordance with Section R301.2.2.2.

TABLE R502.3.1(2) FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES (Residential living areas, live load = 40 psf, L/Δ = 360)[b]

Portions of table not shown remain unchanged.

JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
			2 × 6	2 × 8	2 × 10	2 × 12	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum floor joist spans							
			(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)
24	Southern pine	SS	8-10	11-8	14-11	18-1	8-10	11-8	14-11	18-0
	Southern pine	#1	8-6	11-3	13-1	15-7	8-1	10-3	12-0	14-3
	Southern pine	#2	7-7	9-8	11-5	13-6	~~7-0~~6-11	8-10	10-5	12-4
	Southern pine	#3	5-9	7-3	8-10	10-5	5-3	6-8	8-1	9-6

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

Note: Check sources for availability of lumber in lengths greater than 20 feet.

a. End bearing length shall be increased to 2 inches.

b. Dead load limits for townhouses in Seismic Design Category C and all structures in Seismic Design Categories D_0, D_1, and D_2 shall be determined in accordance with Section R301.2.2.2.

Reason: This proposal updates the span tables to be aligned with ASCE 7-22 and corrects errors in spans that could not be corrected by ICC staff using ICC's editorial process. The proposed spans align with those found in the ANSI/AWC 2024 *Wood Frame Construction*

Manual (WFCM).

Cost Impact: The 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 corrects errors and updates for floor joist spans to align with the WFCM.

RB169-25

RB170-25

IRC: R502.6, TABLE R602.3(1), FIGURE R602.3(1)

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org); Jason Smart, representing American Wood Council (jsmart@awc.org)

2024 International Residential Code

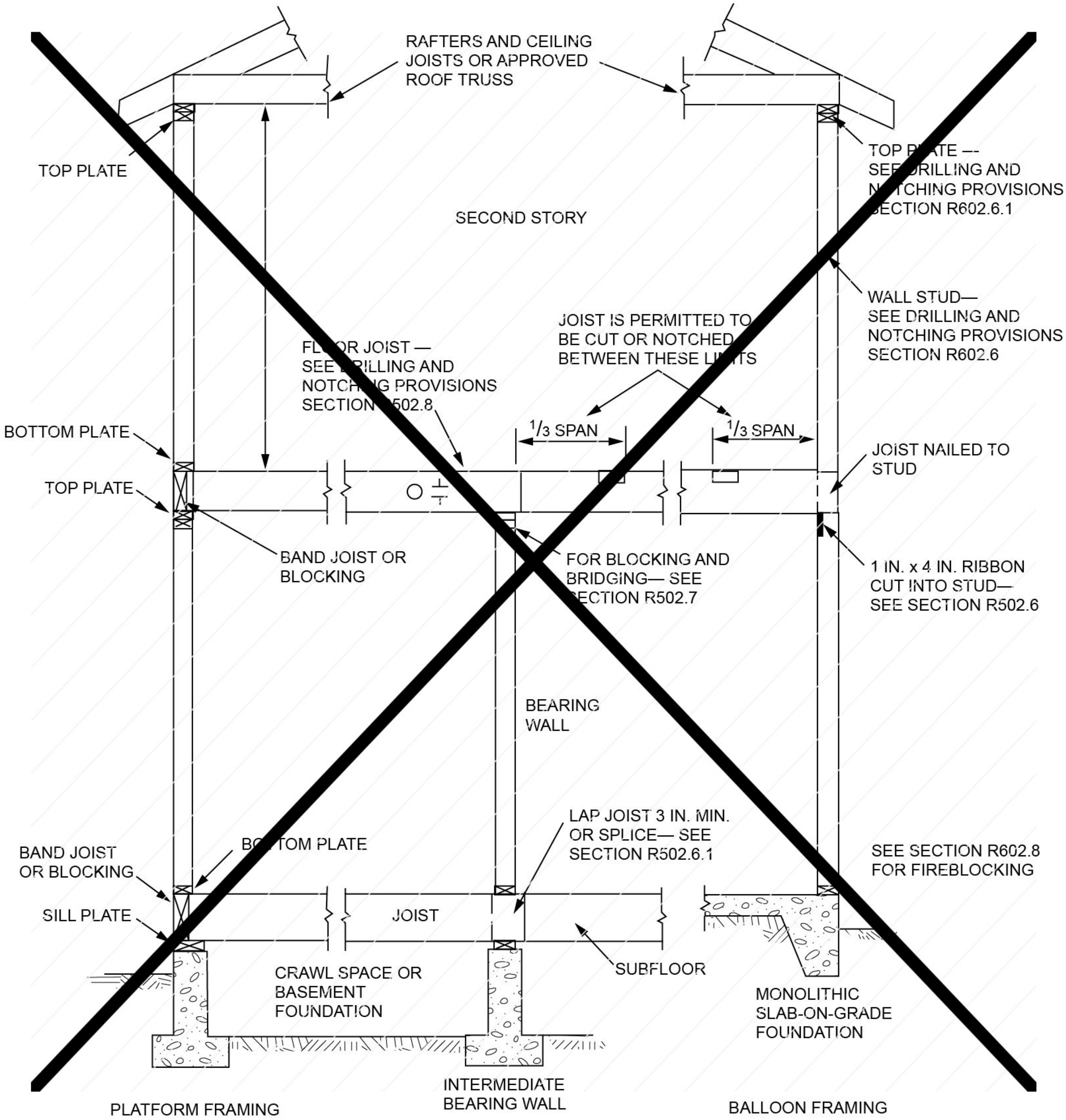
Revise as follows:

R502.6 Bearing. The ends of each joist, beam or girder shall have not less than 1 $^1/_2$ inches (38 mm) of bearing on wood or metal, have not less than 3 inches of bearing (76 mm) on masonry or concrete or be supported by *approved* joist hangers. Alternatively, the ends of joists shall be supported on a 1-inch by 4-inch (25 mm by 102 mm) let-in ribbon strip and the joist and ribbon strip shall be nailed to the adjacent stud in accordance with Table R602.3(1). The bearing on masonry or concrete shall be direct, or a sill plate of 2-inch-minimum (51 mm) nominal thickness shall be provided under the joist, beam or girder. The sill plate shall provide a minimum nominal bearing area of 48 square inches (30 865 mm^2).

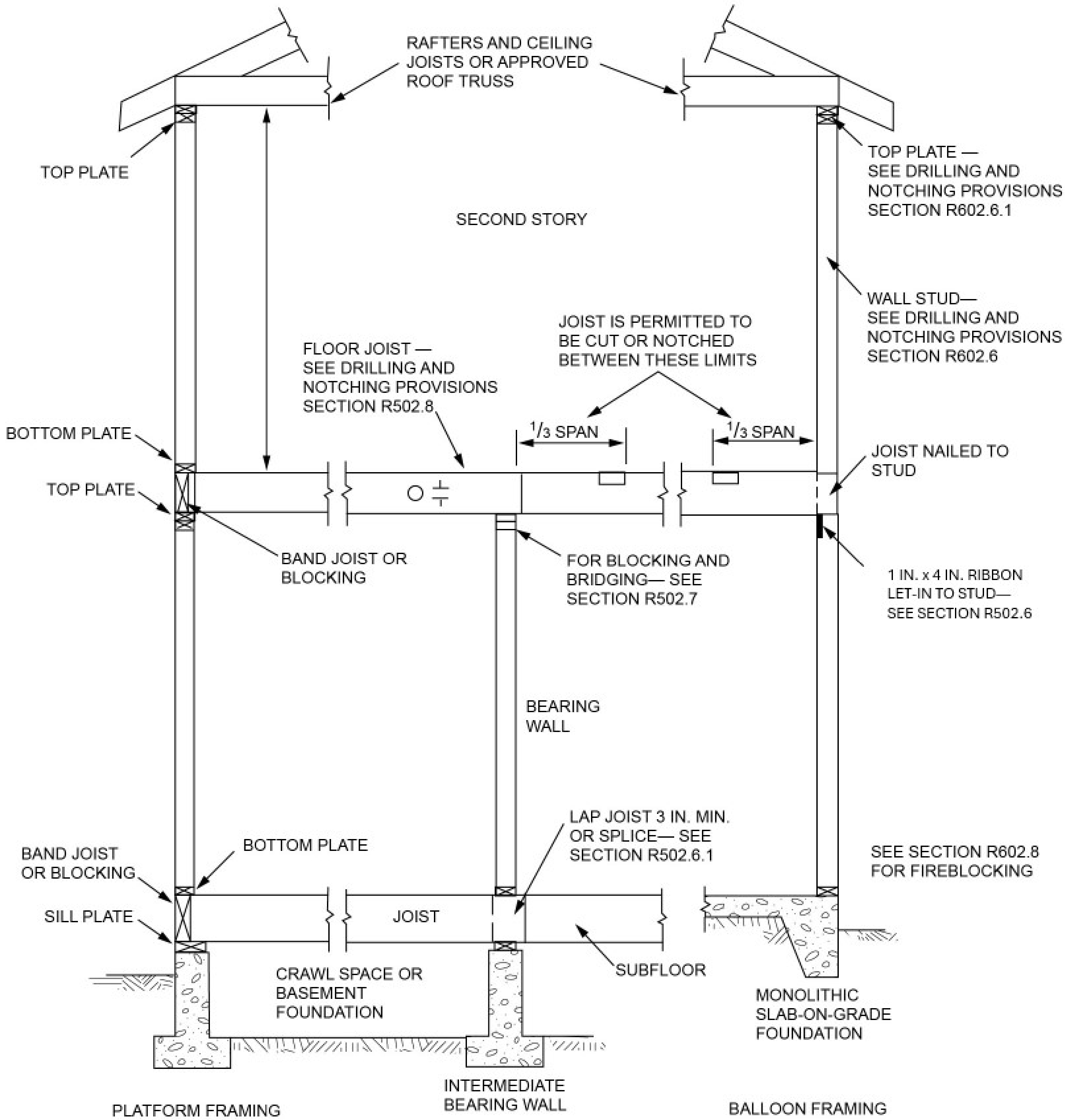
TABLE R602.3(1) FASTENING SCHEDULE

Portions of table not shown remain unchanged.

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER[a, b, c]	SPACING AND LOCATION
		Floor	
30	Ribbon strip to stud	3-8d box (2$^1/_2$″ × 0.113″); or 2-8d common (2$^1/_2$″ × 0.131″); or 2-10d box (3″ × 0.128″); or 2 staples, 1″ crown, 16 ga., 1$^3/_4$″ long	Face nail at each stud
31	Joist to stud where supported by ribbon strip	4-8d box (2$^1/_2$″ × 0.113″); or 3-8d common (2$^1/_2$″ × 0.131″); or 3-10d box (3″ × 0.128″); or 3-3″ × 0.131″ nails	Face nail



RAFTERS AND CEILING JOISTS OR APPROVED ROOF TRUSS
TOP PLATE
SECOND STORY
TOP PLATE –– SEE DRILLING AND NOTCHING PROVISIONS SECTION R602.6.1
WALL STUD— SEE DRILLING AND NOTCHING PROVISIONS SECTION R602.6
JOIST IS PERMITTED TO BE CUT OR NOTCHED BETWEEN THESE LIMITS
FLOOR JOIST — SEE DRILLING AND NOTCHING PROVISIONS SECTION R502.8
1/3 SPAN
1/3 SPAN
BOTTOM PLATE
JOIST NAILED TO STUD
TOP PLATE
BAND JOIST OR BLOCKING
FOR BLOCKING AND BRIDGING— SEE SECTION R502.7
1 IN. x 4 IN. RIBBON CUT INTO STUD— SEE SECTION R502.6
BEARING WALL
LAP JOIST 3 IN. MIN. OR SPLICE— SEE SECTION R502.6.1
BAND JOIST OR BLOCKING
BOTTOM PLATE
SEE SECTION R602.8 FOR FIREBLOCKING
SILL PLATE
JOIST
SUBFLOOR
CRAWL SPACE OR BASEMENT FOUNDATION
MONOLITHIC SLAB-ON-GRADE FOUNDATION
INTERMEDIATE BEARING WALL
PLATFORM FRAMING
BALLOON FRAMING



For SI: 1 inch = 25.4 mm.

FIGURE R602.3(1) TYPICAL WALL, FLOOR AND ROOF FRAMING

Reason: Section R502.6 permits a ribbon strip to provide bearing for joists but does not specify how the ribbon strip is required to be let-in to the stud and fastened.

Additionally, the joists are required to be nailed to the adjacent stud, but no fasteners are specified. This code change provides provisions for proper installation of the ribbon strip and associated fastening with two new rows being added to Table R602.3(1). The nailing for "Ribbon strip to supporting joists" is based on current item #20 and the nailing for "Joist to stud where supported by ribbon strip" is based on current item #22. Additionally, the ribbon strip callout in Figure R602.3(1) has been revised from "cut-in" to "let-in" to be consistent with the common terminology used in the code.

NOTE: The existing items in Table R602.3(1) will be renumbered accordingly but are not shown for brevity.

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

Justification for no cost impact:

This code change proposal provides clarification for installation of ribbon strips which is already a framing option in the code.

RB171-25

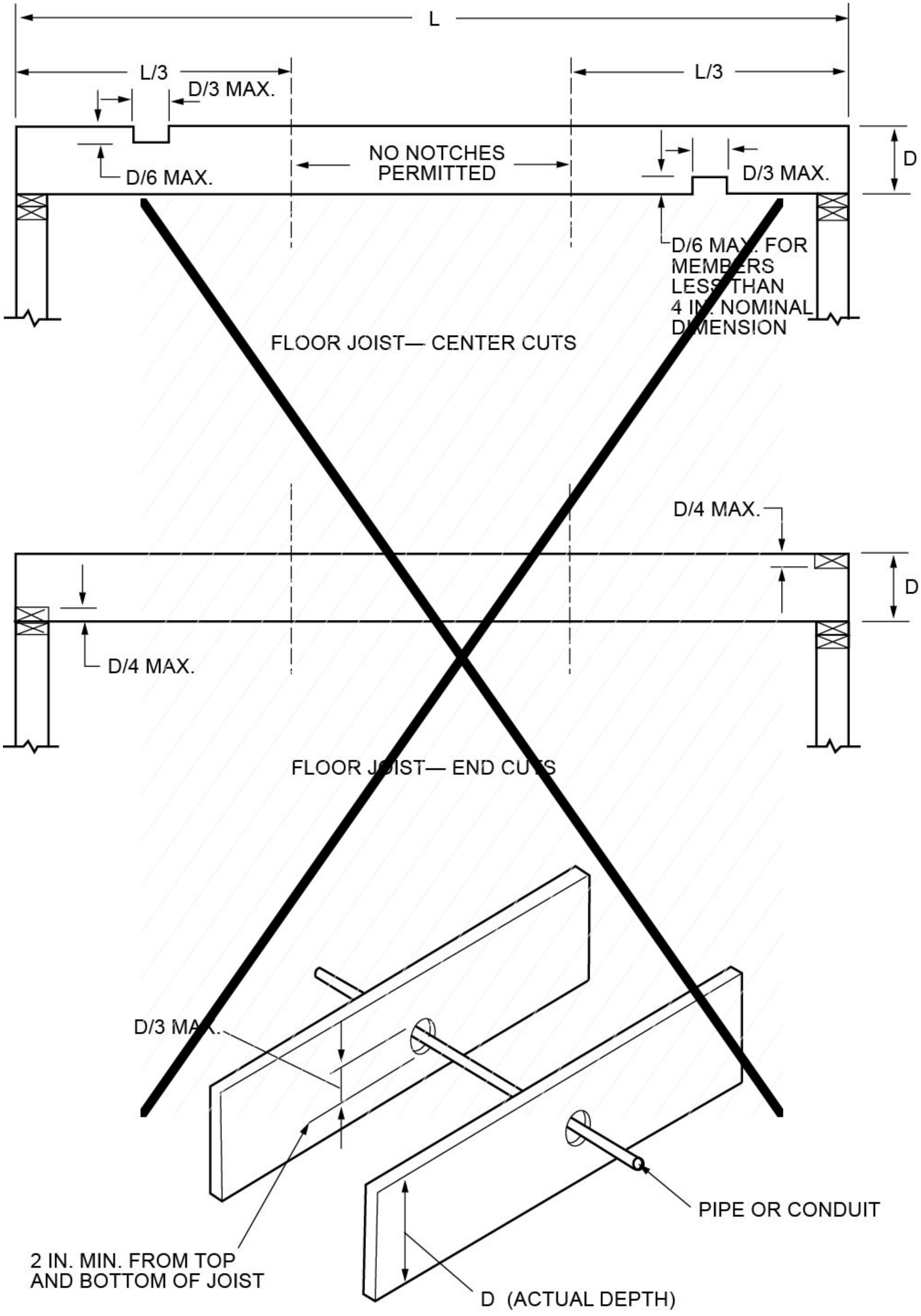
IRC: R502.8, FIGURE R502.8, R502.8.1, FIGURE R602.6(2), FIGURE R602.6(1), R602.6

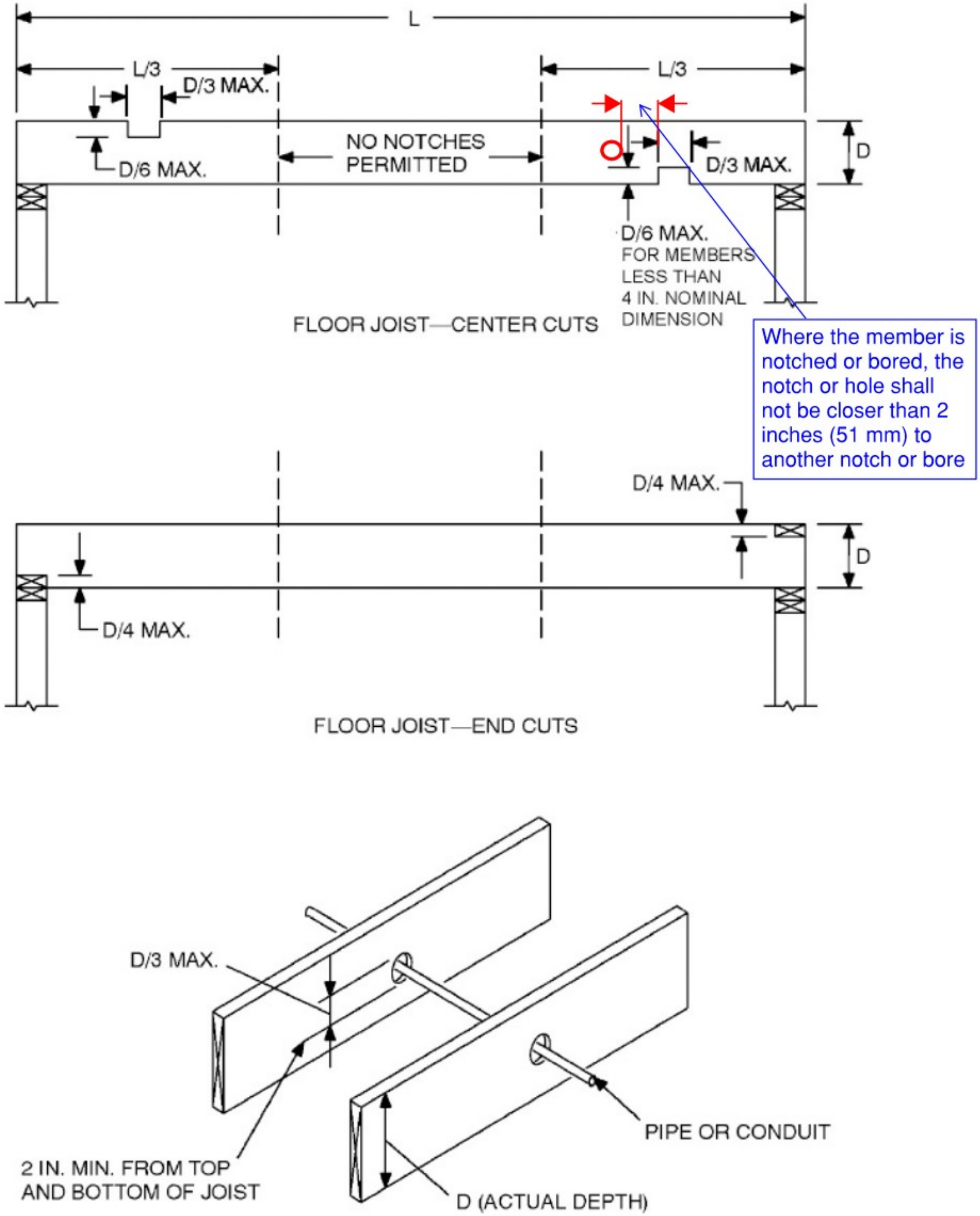
Proponents: Julius Carreon, City of Bellevue, representing Washington Association of Building Officials Technical Code Development Committee (jcarreon@bellevuewa.gov); Micah Chappell, Seattle Dept. of Construction and Inspections (SDCI), representing Washington Association of Building Officials Technical Code Development Committee (WABO TCD) (micah.chappell@seattle.gov)

2024 International Residential Code

R502.8 Cutting, drilling and notching. Structural floor members shall not be cut, bored or notched in excess of the limitations specified in this section. See Figure R502.8.

Revise as follows:

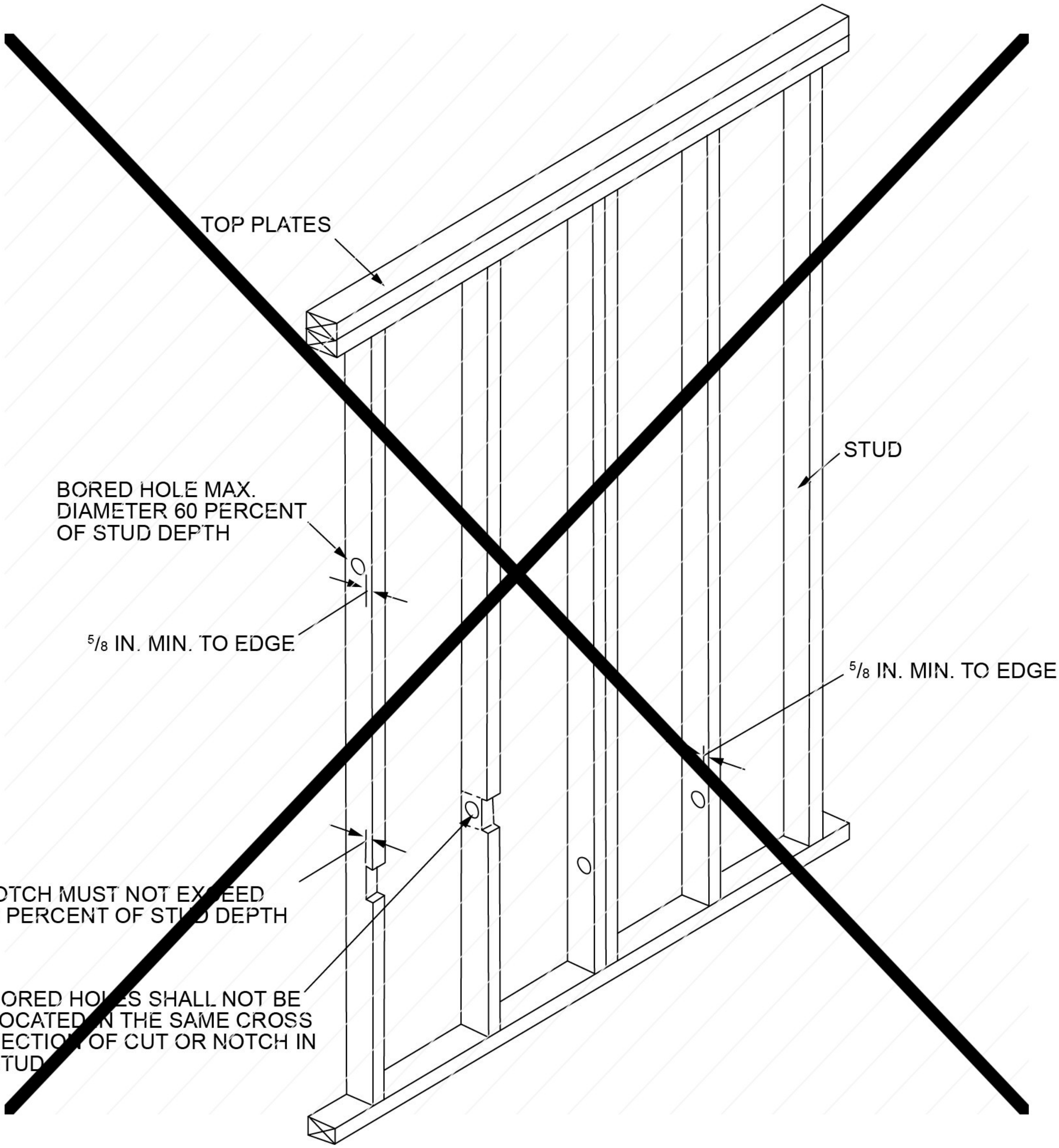

L
L/3
L/3
D/3 MAX.
NO NOTCHES
PERMITTED
D/3 MAX.
D
D/6 MAX.
D/6 MAX. FOR
MEMBERS
LESS THAN
4 IN. NOMINAL
DIMENSION
FLOOR JOIST— CENTER CUTS
D/4 MAX.
D
D/4 MAX.
FLOOR JOIST— END CUTS
D/3 MAX.
PIPE OR CONDUIT
2 IN. MIN. FROM TOP
AND BOTTOM OF JOIST
D (ACTUAL DEPTH)

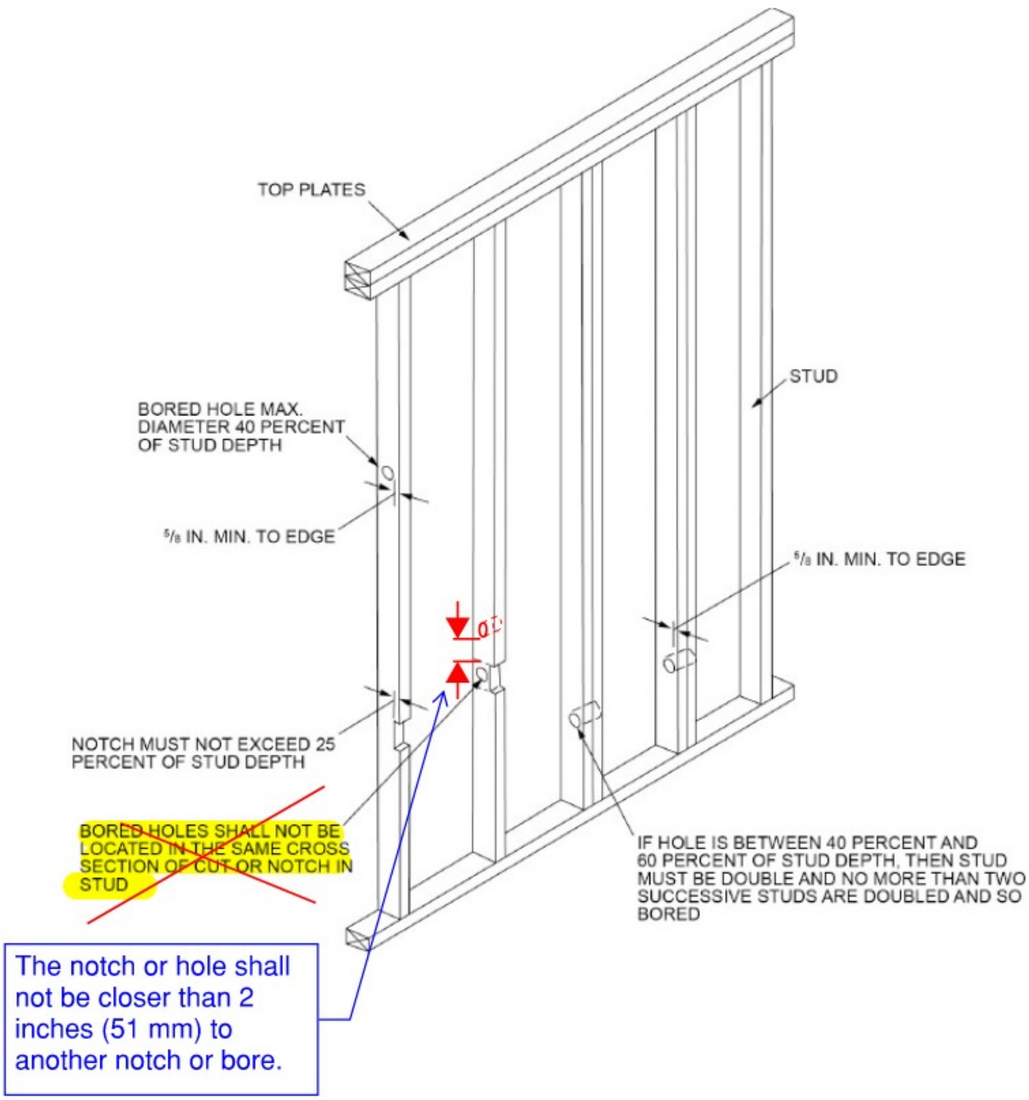


For SI: 1 inch = 25.4 mm.

FIGURE R502.8 CUTTING, NOTCHING AND DRILLING

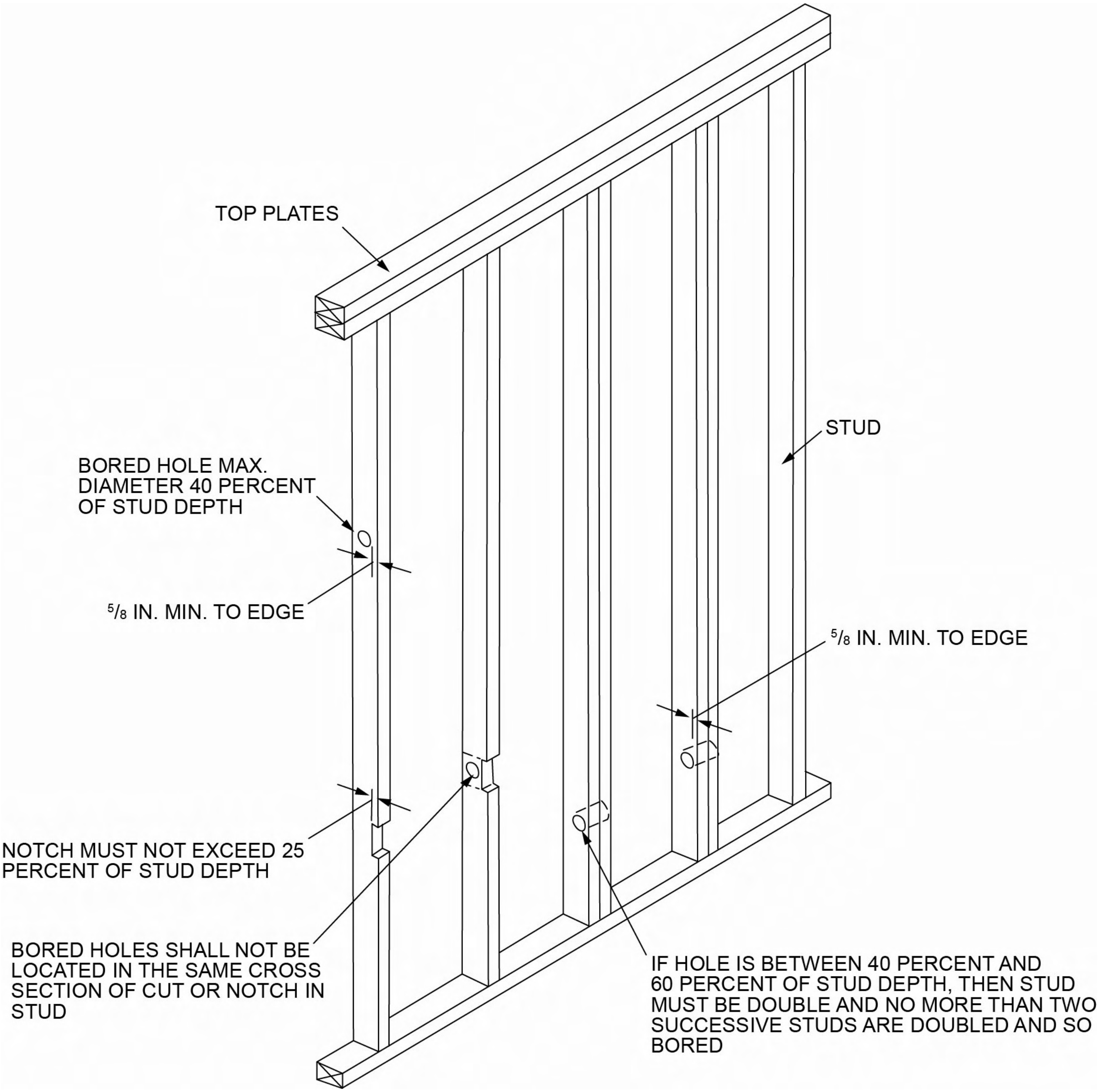
R502.8.1 Sawn lumber. Notches in solid lumber joists, rafters and beams shall not exceed one-sixth of the depth of the member, shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span. Notches at the ends of the member shall not exceed one-fourth the depth of the member. The tension side of members 4 inches (102 mm) or greater in nominal thickness shall not be notched except at the ends of the members. The diameter of holes bored or cut into members shall not exceed one-third the depth of the member. Holes shall not be closer than 2 inches (51 mm) to the top or bottom of the member, or to any other hole located in the member. Where the member is notched or bored, the notch or hole shall not be closer than 2 inches (51 mm) to ~~the~~ another notch or bore.





For SI: 1 inch = 25.4 mm.

FIGURE R602.6(2) NOTCHING AND BORED HOLE LIMITATIONS FOR INTERIOR NONBEARING WALLS



For SI: 1 inch = 25.4 mm. **Note:** Condition for exterior and bearing walls.

FIGURE R602.6(1) NOTCHING AND BORED HOLE LIMITATIONS FOR EXTERIOR WALLS AND BEARING WALLS

R602.6 Drilling and notching of studs. Notches or bores shall not be closer than 2 inches (51 mm) to another notch or bore. Drilling and notching of studs shall also be in accordance with the following:

1. Notching. A stud in an exterior wall or bearing partition shall not be cut or notched to a depth exceeding 25 percent of its depth. Studs in nonbearing partitions shall not be notched to a depth exceeding 40 percent of a single stud depth.

2. Boring. The diameter of bored holes in studs shall not exceed 60 percent of the stud depth, the edge of the hole shall not be less than $^5/_8$ inch (16 mm) from the edge of the stud. ~~, and the hole shall not be located in the same section as a cut or notch~~. Where the diameter of a bored hole in a stud located in exterior walls or bearing partitions is over 40 percent, such stud shall be doubled and not more than two successive doubled studs shall be so bored. See Figures R602.6(1) and R602.6(2).

   Exception: Where *approved*, stud shoes are installed in accordance with the manufacturer's instructions.

Reason: This code change proposal is intended to correct **inconsistencies** in the code provisions for cutting, notching, and boring of dimensional wood framing . We believe the following proposed revisions will clarify the intent of the code requirements:

- **R502.8.1 Sawn lumber:** The proposed amendment to the last sentence clarifies that the 2-inch minimum spacing allowance applies to wood members that are either notched or bored.
- **R602.6 Drilling and Notching of Studs:** The proposed amendment makes the boring and notching requirements for wall studs consistent with the permitted 2-inch spacing requirements for joists, rafters, and beams (IBC 2308.6.1/ R502.8.1).

WABO TCD has also submitted a separate and almost identical code change proposal to the IBC Section **2308.6.1 (Floor joists, roof rafters, and ceiling joists) and IBC Section 2308.6.3 (Bored holes**), that address the same items above.

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

Justification for no cost impact:

This proposal clarifies the intent of the code and does not result in any economic impact.

RB171-25

RB172-25

IRC: R502.8, R502.8.2, R502.8.1, FIGURE R502.8, R602.6 (New), R602.6.1 (New), R602.6, R602.6.1, R802.7, R802.7.2, R802.7.1, R802.7.1.1, FIGURE R802.7.1.1, R802.7.1.2, FIGURE R802.7.1.2

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

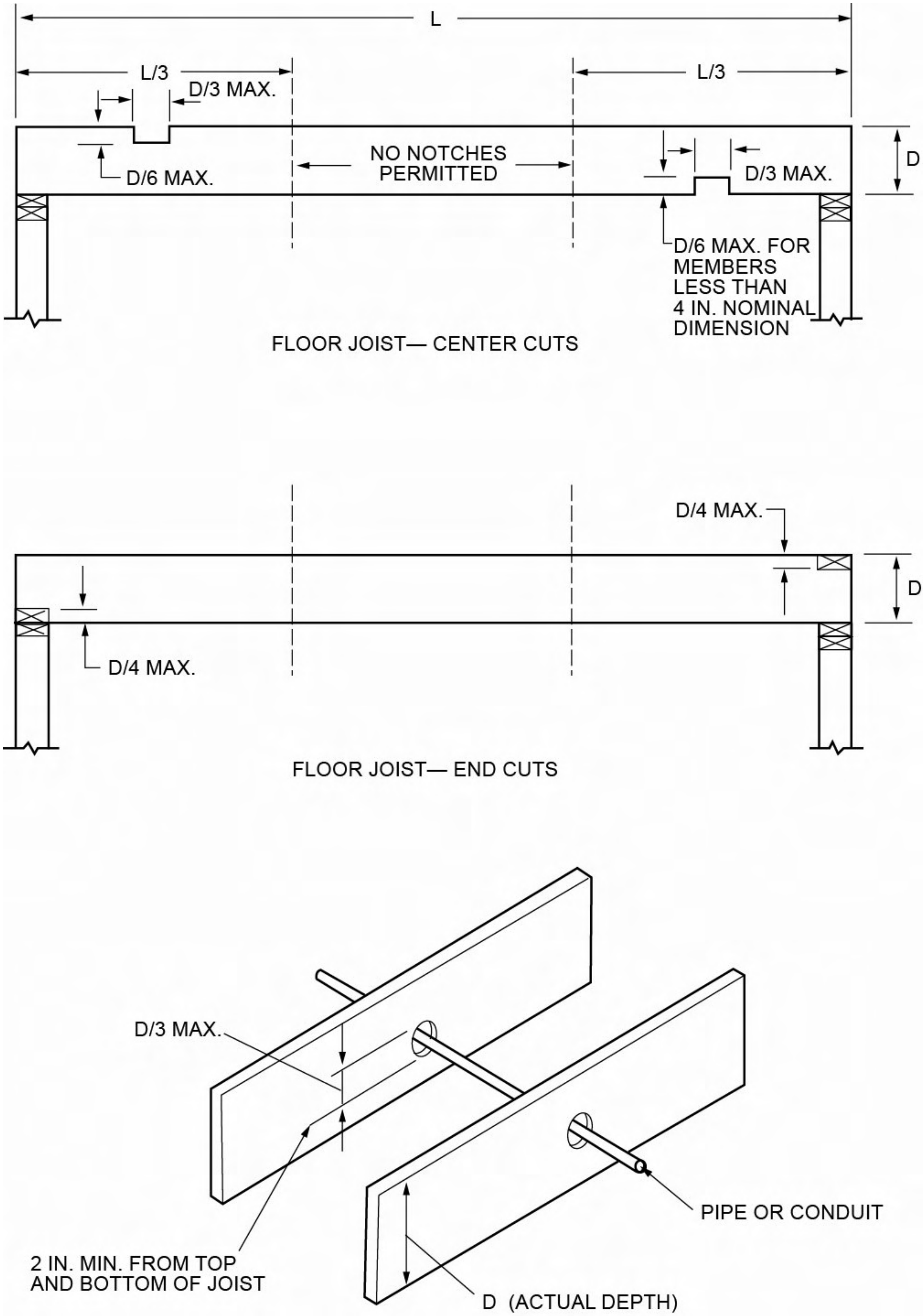
2024 International Residential Code

Revise as follows:

R502.8 Cutting, drilling and notching. Structural floor members shall not be cut, bored or notched in excess of the limitations specified in this section.~~ See Figure R502.8.~~

~~R502.8.2~~ R502.8.1 Engineered wood products. Cuts, notches and holes bored in trusses, *structural composite lumber*, structural glued-laminated ~~members~~ timber, cross-laminated timber ~~members~~ or prefabricated wood I-joists are prohibited except where permitted by the manufacturer's recommendations or where the effects of such *alterations* are specifically considered in the design of the member by a *registered design professional*.

~~R502.8.1~~ R502.8.2 Sawn lumber. Notches in ~~solid~~ sawn lumber joists, rafters and beams shall not exceed one-sixth of the depth of the member, shall not be longer than one-third of the depth of the member and shall not be located in the middle one-third of the span. Notches at the ends of the member shall not exceed one-fourth the depth of the member. The tension side of members 4 inches (102 mm) or greater in nominal thickness shall not be notched except at the ends of the members. The diameter of holes bored or cut into members shall not exceed one-third the depth of the member. Holes shall not be closer than 2 inches (51 mm) to the top or bottom of the member, or to any other hole located in the member. Where the member is notched, the hole shall not be closer than 2 inches (51 mm) to the notch. See Figure R502.8.2.



For SI: 1 inch = 25.4 mm.

FIGURE ~~R502.8~~ R502.8.2 CUTTING, NOTCHING AND DRILLING

Add new text as follows:

R602.6 Cutting, drilling and notching. Structural wall members shall not be cut, bored or notched in excess of the limitations specified in this section.

R602.6.1 Engineered wood products. Cuts, notches and holes bored in *structural composite lumber*, structural glue-laminated timber, *cross-laminated timber* or prefabricated wood I-joists are prohibited except where permitted by the manufacturer's recommendations or where the effects of such *alterations* are specifically considered in the design of the member by a *registered design professional*.

Revise as follows:

~~R602.6~~ R602.6.2 ~~Drilling and notching of studs~~Sawn lumber. Drilling and notching of sawn lumber studs shall be in accordance with the following:

1. Notching. A stud in an exterior wall or bearing partition shall not be cut or notched to a depth exceeding 25 percent of its depth. Studs in nonbearing partitions shall not be notched to a depth exceeding 40 percent of a single stud depth.
2. Boring. The diameter of bored holes in studs shall not exceed 60 percent of the stud depth, the edge of the hole shall not be less than $^{5}/_{8}$ inch (16 mm) from the edge of the stud, and the hole shall not be located in the same section as a cut or notch. Where the diameter of a bored hole in a stud located in exterior walls or bearing partitions is over 40 percent, such stud shall be doubled and not more than two successive doubled studs shall be so bored. See Figures R602.6(1) and R602.6(2).

   Exception: Where *approved*, stud shoes are installed in accordance with the manufacturer's instructions.

~~R602.6.1~~ R602.6.2.1 Drilling and notching of top plate. Where piping or ductwork is placed in or partly in an exterior wall or interior *load-bearing wall*, necessitating cutting, drilling or notching of the top plate by more than 50 percent of its width, a galvanized metal tie not less than 0.054 inch thick (1.37 mm) (16 ga) and $1^{1}/_{2}$ inches (38 mm) wide shall be fastened across and to the plate at each side of the opening with not less than eight 10d (0.148 inch diameter) nails having a minimum length of $1^{1}/_{2}$ inches (38 mm) at each side or equivalent. The metal tie must extend not less than 6 inches past the opening. See Figure R602.6.1.

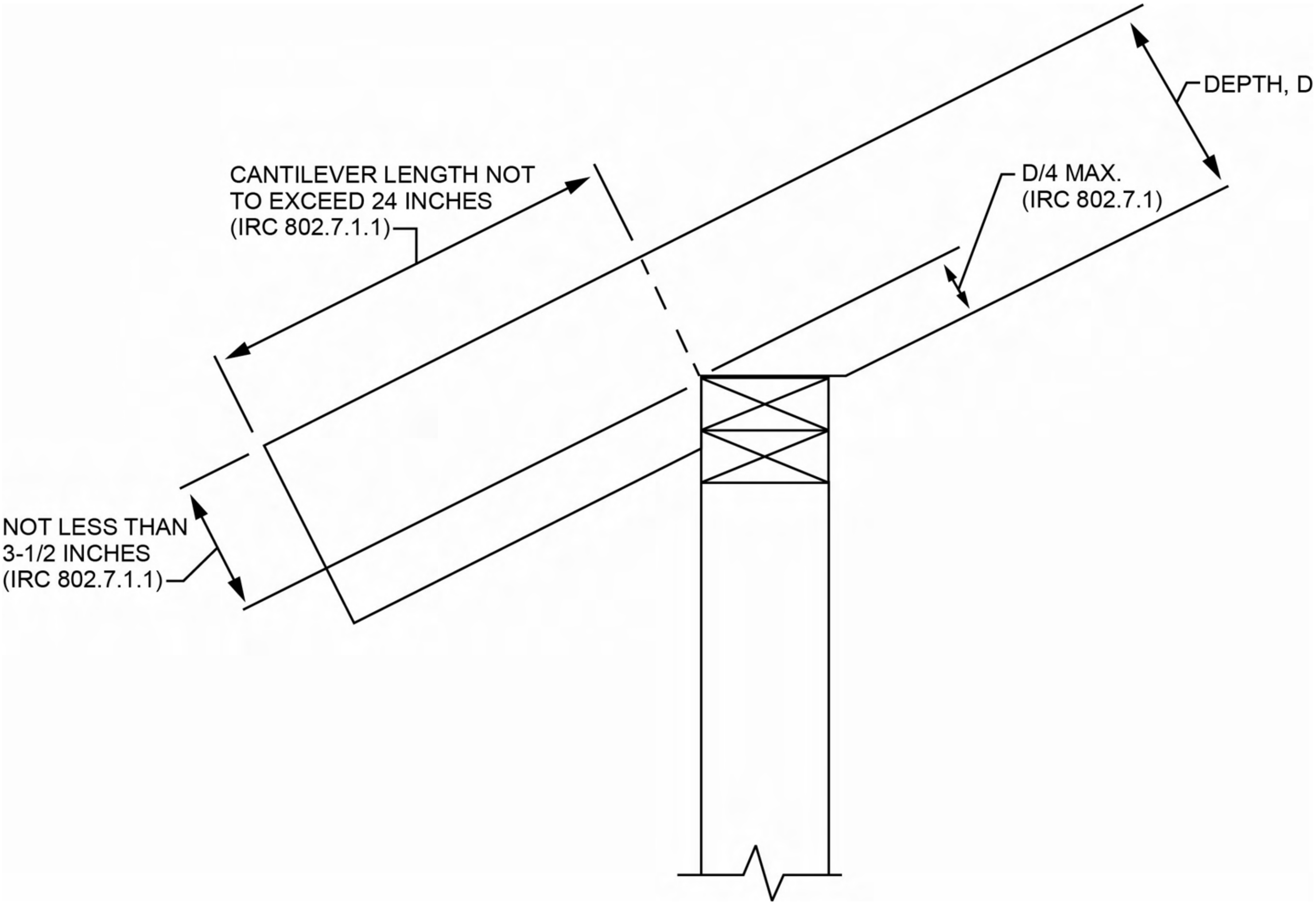
Exception: Where the entire side of the wall with the notch or cut is covered by *wood structural panel* sheathing.

R802.7 Cutting, drilling and notching. Structural roof members shall not be cut, bored or notched in excess of the limitations specified in this section.

~~R802.8.2~~ R802.7.1 Engineered wood products. Cuts, notches and holes bored in trusses, *structural composite lumber*, structural glue-laminated ~~members~~ timber, *cross-laminated timber* ~~members~~ or prefabricated wood I-joists are prohibited except where permitted by the manufacturer's recommendations or where the effects of such *alterations* are specifically considered in the design of the member by a *registered design professional*.

~~R802.7.1~~ R802.7.2 Sawn lumber. Cuts, notches and holes in ~~solid~~ sawn lumber joists, rafters, blocking and beams shall comply with the provisions of Section R502.8.1 except that cantilevered portions of rafters shall be permitted in accordance with Section ~~R802.7.1~~ R802.7.2.1.

~~R802.7.1.1~~ R802.7.2.1 Cantilevered portions of rafters. Notches on cantilevered portions of rafters are permitted provided the dimension of the remaining portion of the rafter is not less than $3^{1}/_{2}$ inches (89 mm) and the length of the cantilever does not exceed 24 inches (610 mm) in accordance with Figure ~~R802.7.1.1~~ R802.7.2.1.



For SI: 1 inch = 25.4 mm.

FIGURE ~~R802.7.1.1~~ R802.7.2.1 RAFTER NOTCH

~~R802.7.1.2~~ R802.7.2.2 Ceiling joist taper cut. Taper cuts at the ends of the ceiling joist shall not exceed one-fourth the depth of the member in accordance with Figure ~~R802.7.1.2~~ R802.7.2.2.

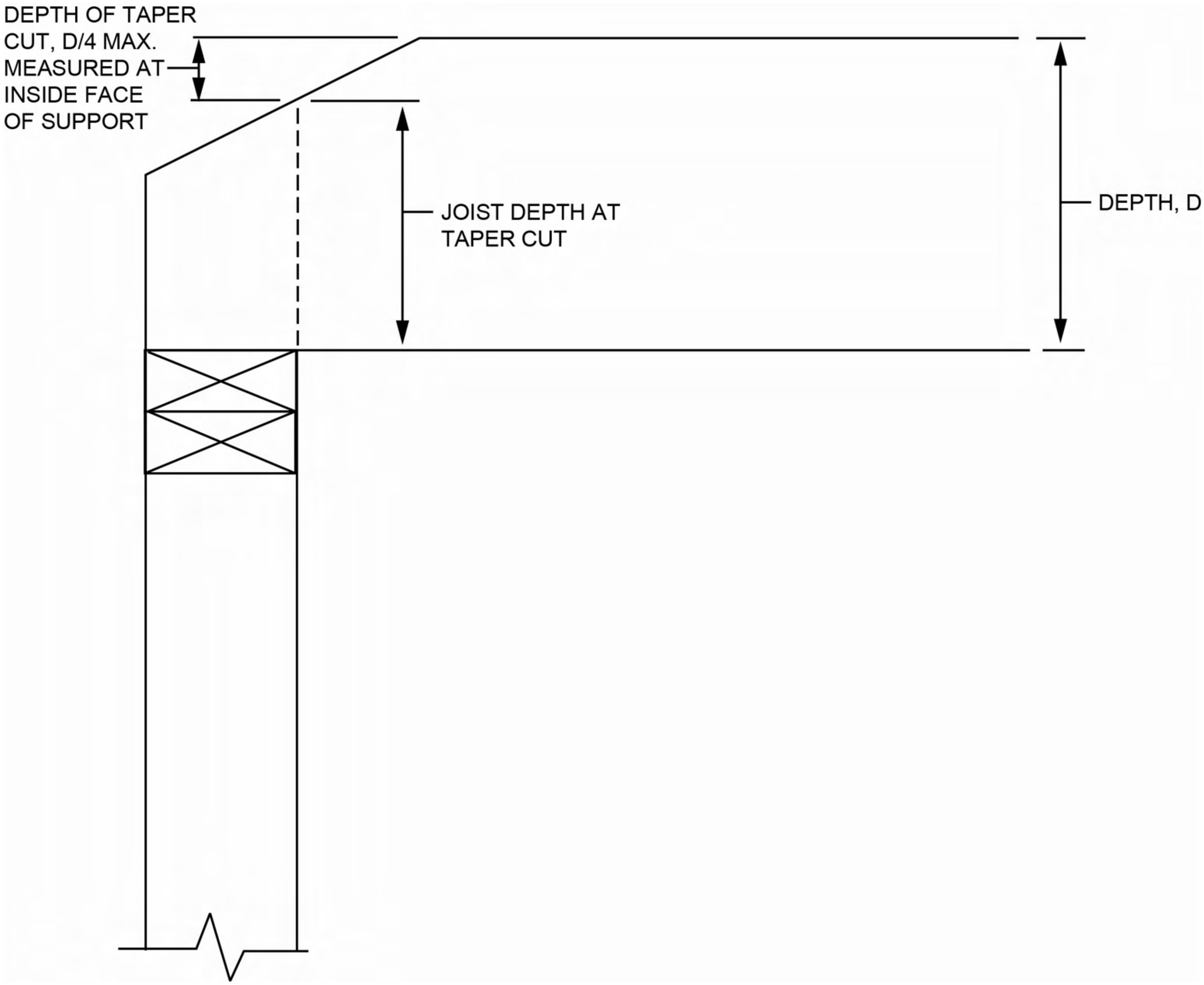


FIGURE ~~R802.7.1.2~~ R802.7.2.2 CEILING JOIST TAPER CUT

Reason: The IRC specifies that cuts, notches, and holes in engineered wood products are prohibited except where permitted by the manufacturer's recommendations for floor construction in R502.8.2 and for roof-ceiling construction in R802.7.2, but does not include such provisions in the wall framing section. This proposal adds a similar provision to the wall construction section.

Additionally, the sections have been reorganized for consistency and to prevent engineered wood product provisions from being overlooked. Terminology has been adjusted to say "sawn lumber" for technical accuracy and consistency where applicable.

Cost Impact: The 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 technical changes proposed in this code change. The proposal reorganizes and adds existing provisions where it is missing and clarifies the intent.

RB172-25

RB173-25

IRC: R503.1, TABLE R503.1, TABLE R507.9.1.3(1), TABLE R703.3(1), R703.3.3, R803.1, TABLE R803.1, TABLE R905.1.1(1), R905.2.1, R905.3.1, R905.4.1, R905.4.4.1, R905.5.1, R905.6.1, R905.7.1, R905.7.1.1, R905.8.1, R905.8.1.1, R905.10.1, R905.15.1, R905.16.1

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

Revise as follows:

R503.1 Sawn Lumber sheathing. Maximum allowable spans for sawn lumber ~~used as~~ floor sheathing shall conform to Table~~s~~ R503.1~~, R503.2.1.1(1) and R503.2.1.1(2)~~.

TABLE R503.1 MINIMUM THICKNESS OF SAWN LUMBER FLOOR SHEATHING

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 pound per square inch = 6.895 kPa.

N/A = Not Applicable.

a. For this support spacing, sawn lumber sheathing shall have a minimum F_b of 675 and minimum E of 1,100,000 (see ANSI AWC NDS).

b. For this support spacing, sawn lumber sheathing shall have a minimum F_b of 765 and minimum E of 1,400,000 (see ANSI AWC NDS).

c. For this support spacing, sawn lumber sheathing shall have a minimum F_b of 855 and minimum E of 1,700,000 (see ANSI AWC NDS).

TABLE R507.9.1.3(1) DECK LEDGER CONNECTION TO BAND JOIST

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Interpolation permitted. Extrapolation is not permitted.

b. Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.

c. Dead Load = 10 psf. Snow load shall not be assumed to act concurrently with live load.

d. The tip of the lag screw shall fully extend beyond the inside face of the band joist. Lag screws shall be full-body diameter screws.

e. Sheathing shall be wood structural panel or ~~solid~~ sawn lumber.

f. Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, sawn lumber or foam sheathing. Up to $^1/_2$-inch thickness of stacked washers shall be permitted to substitute for up to $^1/_2$ inch of allowable sheathing thickness where combined with wood structural panel or sawn lumber sheathing.

TABLE R703.3(1) SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESS

Portions of table not shown remain unchanged.

SIDING MATERIAL	NOMINAL THICKNESS (inches)	JOINT TREATMENT	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS					
			~~Wood~~ Sawn lumber or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud[l]	Direct to studs	Number or spacing of fasteners

R703.3.3 Fasteners. *Exterior wall coverings* shall be securely fastened with aluminum, galvanized, stainless steel or rust-preventative coated nails or staples in accordance with Table R703.3(1) or with other *approved* corrosion-resistant fasteners in accordance with the wall covering manufacturer's installation instructions. Nails and staples shall comply with ASTM F1667. Nails shall be T-head, modified round head, or round head with smooth or deformed shanks. Staples shall have a minimum crown width of $^7/_{16}$ inch (11.1 mm) outside diameter and be manufactured of minimum 16-gage wire. Where fiberboard, gypsum, or foam plastic sheathing backing is used, nails or staples shall be driven into the studs. Where ~~wood~~ sawn lumber sheathing or *wood structural panel* sheathing is used, fasteners shall be driven into studs unless otherwise permitted to be driven into sheathing in accordance with either the siding manufacturer's installation instructions or Table R703.3.3.

R803.1 Sawn Lumber sheathing. Allowable spans for sawn lumber ~~used as~~ roof sheathing shall conform to Table R803.1. Spaced sawn lumber sheathing for wood shingle and shake roofing shall conform to the requirements of Sections R905.7 and R905.8. Spaced sawn lumber sheathing is not allowed in *Seismic Design Category* D_2.

TABLE R803.1 MINIMUM THICKNESS OF SAWN LUMBER ROOF SHEATHING

Portions of table not shown remain unchanged.

TABLE R905.1.1(1) UNDERLAYMENT TYPES

Portions of table not shown remain unchanged.

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Wood shakes on ~~solid~~ wood structural panels or closely fitted sawn lumber sheathing	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Metal panels on ~~solid~~ wood structural panels or closely fitted sawn lumber sheathing	R905.10	ASTM D226 Type I or II ASTM D4869 Type I, II III or IV	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257

R905.2.1 Sheathing requirements. Asphalt shingles shall be fastened to *wood structural panels* or ~~solid~~ closely fitted sawn lumber sheathing.

R905.3.1 Sheathing requirements. Concrete and clay tile shall be installed over wood structural panels or ~~solid~~ closely fitted sawn lumber sheathing.

> **Exception:** Spaced sawn lumber sheathing in accordance with Section R803.1 shall be permitted in *Seismic Design Categories* A, B and C.

R905.4.1 Sheathing requirements. *Metal roof shingles* shall be fastened to *wood structural panels*~~, solid lumber sheathing~~ or closely fitted sawn lumber sheathing, except where the *roof covering* is specifically designed to be applied to spaced sawn lumber sheathing.

R905.4.4.1 Wind resistance of metal roof shingles. *Metal roof shingles* fastened to *wood structural panels*~~, solid lumber sheathing~~ or closely fitted sawn lumber sheathing shall be tested in accordance with ASTM D3161, FM 4474, UL 580 or UL 1897. *Metal roof shingles* tested in accordance with ASTM D3161 shall meet the classification requirements of Table R905.4.4.1 for the appropriate maximum *basic wind speed* and the metal shingle packaging shall bear a *label* to indicate compliance with ASTM D3161 and the required classification in Table R905.2.4.1.

R905.5.1 Sheathing requirements. Mineral-surfaced roll roofing shall be fastened to *wood structural panels* or ~~solid~~ closely fitted sawn lumber sheathing .

R905.6.1 Sheathing requirements. Slate shingles shall be fastened to *wood structural panels* or ~~solid~~ closely fitted sawn lumber sheathing.

R905.7.1 Sheathing requirements. Wood shingles shall be fastened to *wood structural panels*, ~~solid~~ closely fitted sawn lumber sheathing or spaced sawn lumber sheathing. Where spaced sawn lumber sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure from Table R905.7.6(1) to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sawn lumber sheathing is installed at 10 inches (254 mm) or greater, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. Where wood shingles are installed over spaced sawn lumber sheathing and the underside of the shingles are exposed to the *attic* space, the *attic* shall be ventilated in accordance with Sections R806.1, R806.2, R806.3 and R806.4. The shingles shall not be backed with materials that will occupy the required air gap space and prevent the free movement of air on the interior side of the spaced sawn lumber sheathing.

R905.7.1.1 ~~Solid sheathing required~~ Sheathing under ice barrier. ~~In areas where the average daily temperature in January is 25°F (-4°C) or less,~~ *wood structural panels* or ~~solid~~ closely fitted sawn lumber sheathing is required on ~~that~~ portions of the roof deck ~~requiring~~ where the application of an ice barrier is required by Section R905.1.2 .

R905.8.1 Sheathing requirements. Wood shakes shall be fastened to *wood structural panels*, ~~solid~~ closely fitted sawn lumber sheathing or spaced sawn lumber sheathing. Where spaced sawn lumber sheathing is used, sheathing boards shall be not less than 1-inch by 4-inch (25 mm by 102 mm) nominal dimensions and shall be spaced on centers equal to the weather exposure from Table R905.8.7 to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced sawn lumber sheathing is installed at 10 inches (254 mm) on center, additional 1-inch by 4-inch (25 mm by 102 mm) boards shall be installed between the sheathing boards. Where wood shakes are installed over spaced sawn lumber sheathing and the underside of the shakes are exposed to the *attic* space, the *attic* shall be ventilated in accordance with Sections R806.1, R806.2, R806.3 and R806.4. The shakes shall not be backed with materials that will occupy the required air gap space and prevent the free movement of air on the interior side of the spaced sawn lumber sheathing.

R905.8.1.1 ~~Solid sheathing required~~ Sheathing under ice barrier. ~~In areas where the average daily temperature in January is 25°F (-4°C) or less,~~ *wood structural panels* or ~~solid~~ closely fitted sawn lumber sheathing is required on ~~that~~ portions of the roof deck ~~requiring~~ where the application of an ice barrier is required by Section R905.1.2.

R905.10.1 Sheathing requirements. *Metal roof panel* roof coverings shall be fastened to *wood structural panels*, ~~solid~~ closely fitted sawn lumber sheathing or spaced sawn lumber sheathing, except where the *roof covering* is specifically designed to be applied to spaced supports without sheathing.

R905.15.1 Sheathing requirements. *BIPV shingles* shall be fastened to *wood structural panels*~~, solid lumber sheathing~~ or closely fitted sawn lumber sheathing, except where the *roof covering* is specifically designed to be applied over spaced sawn lumber sheathing.

R905.16.1 Sheathing requirements. *BIPV roof panels* shall be fastened to *wood structural panels*~~, solid lumber sheathing~~ or ~~closely fitted~~ closely fitted sawn lumber sheathing , except where the *roof covering* is specifically designed to be applied over spaced sawn lumber sheathing.

Reason: Code users have questioned if "lumber sheathing" is the same thing as "wood structural panels". This code change is intended to make a clearer distinction between the two by changing "lumber sheathing" to "sawn lumber sheathing" throughout. Sawn lumber is the appropriate terminology that refers to structural wood members that are not a composite and are rather sawn from a log.

Additionally, the phrase "solid sheathing" is misleading where sawn lumber is used as it leaves the code user to question if any gaps are permitted. The code also recognizes "closely fitted" as a phrase to indicate that sawn lumber used as sheathing is permitted to be installed with necessary gaps due to construction tolerances, provided they are closely fitted. Therefore the language has been cleaned up to only refer to "closely fitted" in the context of sawn lumber sheathing.

Lastly, a change has been made to the provisions for decking requirements of wood shakes and shingles to appropriately indicate Section R905.1.2 for the requirement to install an ice barrier, rather than have duplicated language in that section and the sheathing requirement sections.

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

Justification for no cost impact:

There are no technical changes proposed in this code change.

RB173-25

RB174-25

IRC: R506.3.3

Proponents: Allen Burris, Clark County Nevada, representing Southern Nevada Chapter (allen.burris@clarkcountynv.gov); Jeffrey Grove, representing Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Residential Code

Revise as follows:

R506.3.3 Vapor retarder. A minimum ~~6 mil (0.006 inch; 152 µm)~~ 10 mil (0.010 inch; 0.25mm) polyethylene or *approved* vapor retarder conforming to ASTM E 1745 requirementswith joints lapped not less than 6 inches (152 mm) shall be placed between the concrete floor slab and the base course or the prepared subgrade where a base course does not exist.

Exception: The vapor retarder is not required for the following:

1. Garages, utility *buildings* and other unheated *accessory structures*.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports.
3. Driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date.
4. Where *approved* by the *building official*, based on local site conditions.

Reason: Due to the change in the manufacturing process of polyethylene from virgin resins to post consumer products, 6mil is no longer sufficient in a generic product. The amount of post consumer polymers is not regulated. The organics in post consumer polymers break down when installed under a concrete slab in contact with soil causing premature failure of the vapor retarder. In addition to the organics, the material manufacturing is not consistent for generic polyethylene sheet material. Most manufactures use a single layer manufacturing process which results in a weaker material that is more susceptible to damage during the installation process. When workers walk on the product, the small pebbles and aggregates in the sub base materials can puncture the material resulting in an ineffective installation. The permeance rating of generic 6 mil polyethylene sheeting is 0.13 which exceeds the minimum 0.10 rating required for vapor retarders. Increasing the minimum thickness requirement will keep the integrity of the polyethylene when used in contact with soil. This keeps a prescriptive option in the code for ease of compliance for the builders and designers.

There are products on the market that can meet the performance requirements of a vapor barrier in a thinner material or a different composition. Adding the option to demonstrate compliance with ASTM E 1745 allows manufacturers to provide products that have been tested and proven to be sufficient for the application other than the generic polyethylene.

ACI 302.1R-15 “Guide to Concrete Floor and Slab Construction” highly recommends 10 mil vapor retarder in compliance with ASTM E1745 for concrete floors and slabs on grade (reference Chapter 5 Section 5.2.3.1 Vapor Retarder Permeance). Where moisture sensitive flooring (carpet, wood, linoleum, etc.…) will be installed over the concrete, a vapor retarder minimizes the transmission of moisture through the slab to the floor (reference Chapter 5 section 5.2.3 Moisture Protection). The increased thickness provides additional resiliency during construction and increases the resistance to moisture transmission for the life of the building. The current exemption addresses situations where moisture sensitive flooring is unlikely to be installed.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$22-$59

Estimated Immediate Cost Impact Justification (methodology and variables):

The median single family home is 1965 sq/ft. When the home is 2 stories with a 2 car garage, the first floor footprint requiring a vapor barrier would be reduced to 782 sq/ft. A single story house with 6 mil Polyethylene would cost $137. The same home using 10 mil would be $196 for an increase of $59. Using a 6 mil multi layer product meeting the ASTM standard would cost $245 for an increase of $108. roughly 50% of new homes are 2 stories which would reduce the average cost below these numbers.

RB174-25

RB175-25

IRC: R506.3.3

Proponents: Tom Marks, Stego Industries, LLC, representing Stego Industries

2024 International Residential Code

Revise as follows:

R506.3.3 Vapor retarder. A minimum 6 mil (0.006 inch; 152 µm) polyethylene or *approved* vapor retarder shall comply with ASTM E1745 with joints lapped not less than 6 inches (152 mm) shall be placed between the concrete floor slab and the base course or the prepared subgrade where a base course does not exist.

Exception: The vapor retarder is not required for the following:

1. Garages, utility *buildings* and other unheated *accessory structures*.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports.
3. Driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date.
4. Where *approved* by the *building official*, based on local site conditions.

Reason: Isolating concrete floor slabs from soil threats is a critical component to the longevity, durability, and indoor air quality of homes; as well as in helping reduce long-term operation costs for homeowners. A vapor retarder that meets ASTM E1745 represents a simple and relatively low up-front cost approach to more consistently and effectively control natural water vapor diffusion compared to 6 mil polyethylene sheeting (generally standard, commodity plastic films) referenced currently.

This is a section of the IRC that has gone through changes over the last couple cycles (2021 to 2024). The proposed change for IRC 2027 strikes a balance relative to previous verbiage and historical concerns. That is, 2021 IRC updated to a 10 mil ASTM E1745 Class A polyethylene sheet vapor retarder. But, in 2024 IRC this was reverted back to minimum 6 mil polyethylene sheet as the only prescriptive requirement, citing things like: Class A being potentially overkill for home construction, and upfront cost concerns.

However, when it comes to water vapor control between homes and the ground, ASTM E1745 is an industry-established performance standard for vapor retarders and should have a place in code for new home construction. Its scope ensures flexible sheet films meet consistent performance characteristics uniquely critical for this specific application, including baseline and after conditioning (e.g., simulated service conditions) water vapor permeance, puncture resistance, and tensile strength. The Class designations (A, B, and C) correlate to increasing strength levels. The performance benchmarks outlined in the standard are important because vapor retarders beneath concrete floor slabs should not only effectively impede water vapor diffusion but maintain a level of integrity during installation/concrete placement and over time beneath the slab. To meet this standard, vapor retarders are generally "engineered", meaning they are specifically designed and produced to consistently meet the performance requirements outlined in ASTM E1745 and suited for this below-slab application.

Standard, commodity polyethylene sheeting may have a useful place throughout code in other applications, including vapor control or reduction in other parts of the home enclosure. But, the problems with standard, commodity polyethylene sheeting beneath concrete floor slabs are well understood and documented. As standard poly sheeting is generally comprised of reprocessed and recycled raw materials, there is often variation in performance from one roll to the next. This inevitably leads to potential inconsistency in specific performance characteristics essential for this application: effective vapor permeance over, puncture resistance, longevity beneath the slab, etc.

As such, long-standing industry guidelines and best practices have moved past the use of generic polyethylene sheeting beneath concrete slabs. Although ACI 302.2R-06 Guide for Concrete Slabs that Receive Moisture Sensitive Flooring Materials was referenced in the 2021 comment cycle, it is likely more apt to draw attention to ACI 332-20 Code Requirements for Residential Concrete and ACI 332.1R-18 Guide to Residential Concrete Construction.

ACI 332-20 provides commentary related to and referencing ASTM E1745, but (in line with the proposed change here) without a specific Class threshold required. Even more, ACI 332.1R-18 clearly states: "Membrane materials should comply with ASTM E1745." The proposed comment aligns with ACI 332 guidance, including omitting a specific Class (e.g., Class A) level requirement. This will help reduce the first cost to the builder as it allows for more options to help meet project performance and budget needs, likely necessary in the new home construction landscape.

It may be worth noting that below-slab vapor retarders that meet ASTM E1745 are also outlined in guidance from the Portland Cement Association, EPA, and myriads of industry experts; as well as referenced in green certification programs for new homes, such as Indoor AirPlus. Incorporating ASTM E1745 as a prescriptive requirement for vapor retarders beneath concrete floor slabs would simply be aligning residential code with already established best practice.

The potential concerns to both homebuilders and homeowners as a result of unchecked (or inadequately prevented) water vapor migration into and through the concrete slab from the ground is also well understood and documented. Chief may be the potential for water vapor accumulation beneath resilient or other moisture-sensitive flooring materials, leading to adhesive and flooring failures. Floor failures are costly and impactful to remediate for the homeowner and can be a source liability for homebuilders.

There is also the potential for mold growth where water vapor accumulation (and increased RH) is realized, impacting the indoor air quality of the home. Indoor air quality may also be impacted when the vapor retarder beneath the concrete slab is serving utility as part of a radon mitigation system as well. Especially in a passive system, the performance and integrity of the vapor retarder becomes even more critical. In fact, now that the Radon Control Methods in the IRC (Appendix BE) specifically reference R506.3.3 for the soil-gas-retarder beneath slabs, it is even more beneficial to include ASTM E1745. The stakes for human health and safety get even higher when the vapor retarder/soil-gas-retarder is a component in a radon control system.

Bibliography: ASTM E1745-17 Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs

ASTM E1643-11Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

ACI 332.1-18Guide to Residential Concrete Construction

ACI 332-20 Code Requirements for Residential Concrete

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposed change may represent a relatively small increase in the first cost to the homebuilder. Roughly \$0.10/ft²over standard, commodity 6 mil polyethylene sheeting.

Estimated Immediate Cost Impact Justification (methodology and variables):

The reason for the increase in material cost is simply the higher performance of the membrane. Engineered films that meet ASTM E1745 and are, thus, intended and suited specifically for vapor protection beneath concrete floor slabs utilize higher quality, strategically designed raw materials.

Previous concerns with the premium cost of an ASTM E1745 vapor retarder are, in our opinion and expertise, mischaracterized. The material cost may go up a bit more if a homebuilder used a thicker vapor retarder (such as 15 mil), but we believe the estimate provided here is more in-line with the actual material cost expected for an ASTM E1745 compliant material at equivalent thicknesses of commodity poly sheeting builders may be using currently. Keep in mind there are many existing manufacturers that make products that meet these performance levels (vapor retarders that meet ASTM E1745 have been common in commercial construction for almost 30 years). So, there is already a competitive marketplace for these products and wide availability for homebuilders and trades.

It is important to keep in mind that the lowered operational costs (e.g., reduced humidity, prevented flooring failures, etc.) likely far outweigh the relatively low first cost to the builder with the use of a higher-performance below-slab vapor retarder. Moisture-induced concrete issues, like flooring failures, can be a source of repair costs and liability for builders. With insurance premium costs rising, inexpensive preventive approaches like this will benefit builders holistically.

RB175-25

RB176-25

IRC: R506.3.3, ASTM Chapter 44 (New)

Proponents: Tom Marks, Stego Industries, LLC, representing Stego Industries

2024 International Residential Code

Revise as follows:

R506.3.3 Vapor retarder. A minimum 6 mil (0.006 inch; 152 µm) polyethylene or *approved* vapor retarder with joints lapped not less than 6 inches (152 mm) shall be placed between the concrete floor slab and the base course or the prepared subgrade where a base course does not exist. <u>The vapor retarder shall be installed in accordance with ASTM E1643.</u>

Exception: The vapor retarder is not required for the following:

1. Garages, utility *buildings* and other unheated *accessory structures*.
2. For unheated storage rooms having an area of less than 70 square feet (6.5 m^2) and carports.
3. Driveways, walks, patios and other flatwork not likely to be enclosed and heated at a later date.
4. Where *approved* by the *building official*, based on local site conditions.

Add new standard(s) as follows:

ASTM

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

<u>E1643-24</u>	<u>Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs</u>

Reason: Isolating concrete floor slabs from soil threats is a critical component to the longevity, durability, and indoor air quality of homes; as well as in helping reduce long-term operational costs for homeowners. Installing the vapor retarder per ASTM E1643 will help ensure it appropriately impedes water vapor diffusion over the life of the home without adding significant up-front costs to the homebuilder.

ASTM E1643 is the Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs. It has served as the established industry standard for below-slab vapor retarder installation, helping achieve the system performance for effectively protecting homes and efficiency for the installer.

It includes best practices for the placement, protection, inspection, and repair of the vapor retarder. Pertinent and important aspects of ASTM E1643 are generally captured in current requirements of ACI 332-20 Code Requirements for Residential Concrete, including sealing around penetrations and sealing the 6 inch overlap at seams. The goal being a continuous membrane between the bottom of the concrete slab and ground.

Indoor air quality may also be impacted when the vapor retarder beneath the concrete slab is serving utility as part of a radon mitigation system as well. Especially in a passive system, the performance and integrity of the vapor retarder becomes even more critical. In fact, now that the Radon Control Methods in the IRC (Appendix BE) specifically reference R506.3.3 for the soil-gas-retarder beneath slabs, it is even more beneficial to include ASTM E1643. The stakes for human health and safety get even higher when the vapor retarder/soil-gas-retarder is a component in a radon control system. ASTM E1643 is written with steps and best practices helpful in achieving a more airtight vapor retarder useful in radon control.

Bibliography: ASTM E1643-11 Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

ACI 332-20 Code Requirements for Residential Concrete

Cost Impact: Increase

Estimated Immediate Cost Impact:

This proposed change may represent a relatively small increase in the first cost to the homebuilder. Roughly \$0.20-0.50/ft² per home.

Estimated Immediate Cost Impact Justification (methodology and variables):

The reason for the increase in material cost for potentially more specialized accessories for sealing seams, penetrations, and at the perimeter of the slab placement, as well as added installation costs for that work.

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
ASTM E1643-24 Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs

RB176-25

RB177-25

IRC: R507.2.2.2

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2024 International Residential Code

R507.2.2 Plastic composite deck boards, stair treads, guards or handrails. *Plastic composite* exterior deck boards, stair treads, *guards* and *handrails* shall comply with the requirements of ASTM D7032 and this section.

Revise as follows:

R507.2.2.2 Flame spread index. *Plastic composite* deck boards, stair treads, *guards*, and *handrails* shall exhibit a *flame spread index* not exceeding 200 when tested in accordance with ASTM E84 or UL 723 with the test specimen remaining in place during the test.

~~**Exception:** *Plastic composites* determined to be noncombustible.~~

Reason: This exception is potentially misleading because plastic composites are never noncombustible materials.

Plastic composites are not noncombustible materials because all of them have a very significant fraction of plastic in them and no plastics are noncombustible. Also, wood-plastic composites have a very significant (typically more than 50%) fraction of wood, and wood is also combustible.

In order for a material to be a plastic composite it must comply with the IRC definition of a plastic composite.

IRC definitions:

PLASTIC COMPOSITE. A generic designation that refers to wood-plastic composites and plastic lumber.

This issue merits looking further into how the ASTM committees responsible for wood-plastic composites and plastic lumber describe the products.

ASTM D7032 is the standard that all plastic composite deck boards (and so on) need to comply with (see Section 507.2.2). It is under the jurisdiction of ASTM committee D7 on wood. ASTM D6032 defines as follows:

plastic lumber*—a manufactured product made primarily from plastic materials (filled or unfilled), typically used as a building material, which is usually rectangular in cross section.*
wood-plastic composite (WPC)*—a composite made primarily from wood- or cellulose-based materials and plastic(s).*

ASTM D883 is the terminology standard for the committee on plastics (ASTM D20) that is responsible for the standards on plastic lumber, including ASTM D6662.

ASTM D883 defines as follows:

plastic composite, *n—a material consisting of two or more distinct immiscible materials, at least one of which is a plastic.*

Discussion—Codes identify plastic lumber and wood/plastic composites as plastic composites, for application as materials for exterior decking, stair treads, handrails and guardrails. Codes define plastic composite as "a generic designation that refers to wood/plastic composites and plastic lumber." Outside of code use, a wide variety of plastic composites exist, which are used for many applications. Such plastic composites can contain multiple types of fibrous fillers other than wood fibers (including glass reinforcements) or even contain no fibrous components. Plastic composites have in common only that they are composed of two or more constituent materials, one of which is a plastic.

plastic lumber, *n—a manufactured product made primarily from plastic materials (filled or unfilled), typically used as a building material for purposes similar to those of traditional lumber, which is usually rectangular in cross-section.*
Discussion—Plastic lumber is typically supplied in sizes similar to those of traditional lumber board, timber and dimension lumber; however the tolerances for plastic lumber and for traditional lumber are not necessarily the same.

For a material to be classified as a noncombustible material it must pass the requirements of ASTM E136, with the details shown in section 703.3.1 of the IBC.

Clearly, neither a material made "primarily from plastic materials" nor a material made "primarily from wood- or cellulose-based materials and plastic(s)" will be able to comply with the requirements of ASTM E136.

Note: The IBC has a similar exception in section 2612.3 and I forgot to make a proposal to delete 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 section is superfluous and potentially misleading since plastic composite materials are not noncombustible.

RB177-25

RB178-25

IRC: R507.3

Proponents: Lucas Pump, City of Cedar Rapids, representing Self (l.pump@cedar-rapids.org)

2024 International Residential Code

Revise as follows:

R507.3 Footings. Decks shall be supported on concrete footings or other *approved* structural systems designed to accommodate all loads in accordance with Section R301. Deck footings shall be sized to carry the imposed loads from the deck structure to the ground as shown in Figure R507.3.

Exceptions:

1. Footings shall not be required for free-standing decks consisting of joists directly supported on grade over their entire length.
2. Footings shall not be required for free-standing decks that meet all of the following criteria:
   2.1. The joists bear directly on *precast concrete* pier blocks at grade without support by beams or posts.
   2.2. The area of the deck does not exceed 200 square feet (18.6 m^2).
   2.3. The walking surface is not more than ~~20 inches (508 mm)~~ 30 inches (762 mm) above grade at any point within 36 inches (914 mm) measured horizontally from the edge.

Reason: This proposal would match the criteria for requiring a building permit per Section R105.2 (10). If an exterior deck is under 30" above grade (and less than 200 sq. ft.) it doesn't require a permit, therefore the footing requirement should match this requirement. This also matches the language from guardrail requirements - as this height of 30" above grade has been determined to be the threshold in which the deck is more hazardous; so permitting, guardrails and other code requirements of Section 507 are required.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$100-$500 per deck . This would decrease the cost of construction of decks that are between 20" to 30" above grade because they will not be required to be on a footing.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost saving would vary based on the size of the deck and post/footing spacing would be determined by the size of the beam, but could save $100 - $500 per deck, plus the deck builder wouldn't have to wait on an inspector for a "footing inspection" on a deck that is a low hazard.

RB178-25

RB179-25

IRC: TABLE R507.3.1

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS

LIVE OR GROUND SNOW LOAD[b] (psf)	TRIBUTARY AREA[e] (ft²)	LOAD-BEARING VALUE OF SOILS[a, c, d] (psf)								
		1,500			2,000			≥ 3,000		
		Side of a square footing (inches)	Diameter of a round footing (inches)	Plain concrete thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Plain concrete thickness (inches)	Side of a square footing (inches)	Diameter of a round footing (inches)	Plain concrete thickness (inches)
40	5	7	8	6	7	8	6	7	8	6
	20	10	12	6	9	9	6	7	8	6
	40	14	16	6	12	14	6	10	12	6
	60	17	19	6	15	17	6	12	14	6
	80	20	22	7	17	19	6	14	16	6
	100	22	25	8	19	21	6	15	17	6
	120	24	27	9	21	23	7	17	19	6
	140	26	29	10	22	25	8	18	21	6
	160	28	31	11	24	27	9	20	22	7
50	5	7	8	6	7	8	6	7	8	6
	20	11	13	6	10	11	6	8	9	6
	40	15	17	6	13	15	6	11	13	6
	60	19	21	6	16	18	6	13	15	6
	80	21	24	8	19	21	6	15	17	6
	100	24	27	9	21	23	7	17	19	6
	120	26	30	10	23	26	8	19	21	6
	140	28	32	11	25	28	9	20	23	7
	160	30	34	12	26	30	10	21	24	8
60	5	7	8	6	7	8	6	7	8	6
	20	12	14	6	11	12	6	9	10	6
	40	16	19	6	14	16	8	12	14	6
	60	20	23	7	17	20	6	14	16	6
	80	23	26	9	20	23	7	16	19	6
	100	26	29	10	22	25	8	18	21	6
	120	28	32	11	25	28	9	20	23	7
	140	31	35	12	27	30	10	22	24	8
	160	33	37	13	28	32	11	23	26	9
70	5	7	8	6	7	8	6	7	8	6
	20	12	14	6	11	13	6	9	10	6
	40	18	20	6	15	17	6	12	14	6
	60	21	24	8	19	21	6	15	17	6
	80	25	28	9	21	24	8	18	20	6
	100	28	31	11	24	27	9	20	22	7
	120	30	34	12	26	30	10	21	24	8
	140	33	37	13	28	32	11	23	26	9
	160	35	40	15	30	34	12	25	28	9

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2, 1 pound per square foot = 0.0479 kPa.

a. Interpolation permitted, extrapolation not permitted.

b. Based on highest load case: Dead + Live or Dead + Snow.

   Dead load = 10 psf. Snow load is not assumed to be concurrent with live load.

c. Footing dimensions shall allow complete bearing of the post.

d. If the support is a brick or CMU pier, the footing shall have a minimum 2-inch projection on all sides.

e. Area, in square feet, of deck surface supported by post and footings.

Reason: The added text is provided to clarify how to use the table for the code users and be consistent with other tables in the code. This code change clarifies the use of column "LIVE OR GROUND SNOW LOADb (psf)" in the table. The table values are based on the highest load case: Dead + Live or Dead + Snow. Dead load = 10 psf. Snow load is not assumed to be concurrent with live load.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

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

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

Justification for no cost impact:

The proposal clarifies how to use the table values.

RB179-25

RB180-25

IRC: TABLE R507.6

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

TABLE R507.6 MAXIMUM DECK JOIST SPANS

LOAD[a] (psf)	JOIST SPECIES[b]	JOIST SIZE	ALLOWABLE JOIST SPAN[b, c] (feet-inches) Joist spacing (inches)			MAXIMUM CANTILEVER[d, f] (feet-inches) Joist back span[g] (feet)							
			12	16	24	4	6	8	10	12	14	16	18
40 live load	Southern pine	2 × 6	9-11	9-0	7-7	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2 × 8	13-1	11-10	9-8	1-0	1-6	2-0	2-6	2-3	NP	NP	NP
		2 × 10	16-2	14-0	11-5	1-0	1-6	2-0	2-6	3-0	3-4	3-4	NP
		2 × 12	18-0	16-6	13-6	1-0	1-6	2-0	2-6	3-0	3-6	4-0	4-1
	Douglas fir-larch[e] Hem-fir[e] Spruce-pine-fir[e]	2 × 6	9-6	8-4	6-10	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2 × 8	12-6	11-1	9-1	1-0	1-6	2-0	2-3	2-0	NP	NP	NP
		2 × 10	15-8	13-7	11-1	1-0	1-6	2-0	2-6	3-0	3-3	NP	NP
		2 × 12	18-0	15-9	12-10	1-0	1-6	2-0	2-6	3-0	3-6	3-11	3-11
	Redwood[f] Western cedars[f] Ponderosa pine[f] Red pine[f]	2 × 6	8-10	8-0	6-10	1-0	1-4	1-1	NP	NP	NP	NP	NP
		2 × 8	11-8	10-7	8-8	1-0	1-6	2-0	1-11	NP	NP	NP	NP
		2 × 10	14-11	13-0	10-7	1-0	1-6	2-0	2-6	3-0	2-9	NP	NP
		2 × 12	17-5	15-1	12-4	1-0	1-6	2-0	2-6	3-0	3-6	3-8	NP
50 ground snow load	Southern pine	2 × 6	9-2	8-4	7-4	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2 × 8	12-1	11-0	9-5	1-0	1-6	2-0	2-5	2-3	NP	NP	NP
		2 × 10	15-5	13-9	11-3	1-0	1-6	2-0	2-6	3-0	3-1	NP	NP
		2 × 12	18-0	16-2	13-2	1-0	1-6	2-0	2-6	3-0	3-6	3-10	3-10
	Douglas fir-larch[e] Hem-fir[e] Spruce-pine-fir[e]	2 × 6	8-10	8-0	6-8	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2 × 8	11-7	10-7	8-11	1-0	1-6	2-0	2-3	NP	NP	NP	NP
		2 × 10	14-10	13-3	10-10	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP
		2 × 12	17-9	15-5	12-7	1-0	1-6	2-0	2-6	3-0	3-6	3-8	NP
	Redwood[f] Western cedars[f] Ponderosa pine[f] Red pine[f]	2 × 6	8-3	7-6	6-6	1-0	1-4	1-1	NP	NP	NP	NP	NP
		2 × 8	10-10	9-10	8-6	1-0	1-6	2-0	1-11	NP	NP	NP	NP
		2 × 10	13-10	12-7	10-5	1-0	1-6	2-0	2-6	2-9	NP	NP	NP
		2 × 12	16-10	14-9	12-1	1-0	1-6	2-0	2-6	3-0	3-5	3-5	NP
60 ground snow load	Southern pine	2 × 6	8-8	7-10	6-10	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2 × 8	11-5	10-4	8-9	1-0	1-6	2-0	2-4	NP	NP	NP	NP
		2 × 10	14-7	12-9	10-5	1-0	1-6	2-0	2-6	2-11	2-11	NP	NP
		2 × 12	17-3	15-0	12-3	1-0	1-6	2-0	2-6	3-0	3-6	3-7	NP
	Douglas fir-larch[e] Hem-fir[e] Spruce-pine-fir[e]	2 × 6	8-4	7-6	6-2	1-0	1-6	1-4	NP	NP	NP	NP	NP
		2 × 8	10-11	9-11	8-3	1-0	1-6	2-0	2-2	NP	NP	NP	NP
		2 × 10	13-11	12-4	10-0	1-0	1-6	2-0	2-6	2-10	NP	NP	NP
		2 × 12	16-6	14-3	11-8	1-0	1-6	2-0	2-6	3-0	3-5	3-5	NP
	Redwood[f] Western cedars[f] Ponderosa pine[f] Red pine[f]	2 × 6	7-9	7-0	6-2	1-0	1-4	NP	NP	NP	NP	NP	NP
		2 × 8	10-2	9-3	7-11	1-0	1-6	2-0	1-11	NP	NP	NP	NP
		2 × 10	13-0	11-9	9-7	1-0	1-6	2-0	2-6	2-7	NP	NP	NP
		2 × 12	15-9	13-8	11-2	1-0	1-6	2-0	2-6	3-0	3-2	NP	NP
70 ground snow load	Southern pine	2 × 6	8-3	7-6	6-5	1-0	1-6	1-5	NP	NP	NP	NP	NP
		2 × 8	10-10	9-10	8-2	1-0	1-6	2-0	2-2	NP	NP	NP	NP
		2 × 10	13-9	11-11	9-9	1-0	1-6	2-0	2-6	2-9	NP	NP	NP
		2 × 12	16-2	14-0	11-5	1-0	1-6	2-0	2-6	3-0	3-5	3-5	NP
	Douglas fir-larch[e] Hem-fir[e] Spruce-pine-fir[e]	2 × 6	7-11	7-1	5-9	1-0	1-6	NP	NP	NP	NP	NP	NP
		2 × 8	10-5	9-5	7-8	1-0	1-6	2-0	2-1	NP	NP	NP	NP
		2 × 10	13-3	11-6	9-5	1-0	1-6	2-0	2-6	2-8	NP	NP	NP
		2 × 12	15-5	13-4	10-11	1-0	1-6	2-0	2-6	3-0	3-3	NP	NP
	Redwood[f] Western cedars[f] Ponderosa pine[f] Red pine[f]	2 × 6	7-4	6-8	5-10	1-0	1-4	NP	NP	NP	NP	NP	NP
		2 × 8	9-8	8-10	7-4	1-0	1-6	1-11	NP	NP	NP	NP	NP
		2 × 10	12-4	11-0	9-0	1-0	1-6	2-0	2-6	2-6	NP	NP	NP
		2 × 12	14-9	12-9	10-5	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

NP = Not Permitted.

a. Dead load = 10 psf. Snow load not assumed to be concurrent with live load.

b. No. 2 grade, wet service factor included.

c. L/Δ = 360 at main span.

d. L/Δ = 180 at cantilever with a 220-pound point load applied to end.

e. Includes incising factor.

f. Incising factor not included.

g. Interpolation permitted ~~allowed~~. Extrapolation not permitted ~~is not allowed~~.

Reason: "allowed" and "not allowed" are not standard code language. In addition, all the other design tables in Section 507 are written "Interpolation permitted, extrapolation not permitted", as proposed herein. As a professional standard, consistent language is preferred.

Cost Impact: The 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 only for consistency of terminology and language. There is no impact to the cost of construction.

RB180-25

RB181-25

IRC: R507.6.2

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

R507.6.2 Deck joist lateral restraint. Joist ends and bearing locations shall be provided with lateral resistance to prevent rotation. Where lateral restraint is provided by joist hangers or blocking between joists, their depth shall equal not less than 60 percent of the joist depth. Where lateral restraint is provided by rim joists, they shall be secured to the end of each joist with not fewer than three 10d (3-inch by 0.128-inch) (76 mm by 3.3 mm) nails or three No. 10 x 3-inch-long (76 mm) wood screws.

<u>**Exception.** Where the joist cantilever length is 24 inches or less and the building is assigned to Seismic Design Category A, B or C, blocking at the support for the cantilever shall not be required.</u>

Reason: Section R502.3.3 of the IRC requires blocking at joist bearing locations when the joist is cantilevered, but not when the cantilever length is 24 inches or less. This applies to joists that are supporting a bearing wall on their cantilevered ends, so it should be appropriate for deck joist cantilevers as well. Deck joists cantilevers are not receiving the additional load of a bearing wall supporting a roof assembly.

This change first occurred in the creation for the 2015 IRC through proposal RB247-13 from the National Association of Home Builders. Their reason statement is as follows:

The purpose of this code change proposal is to restore an exception to the requirement for full-depth blocking at the supported end of cantilever for low-seismic areas and short cantilevers. This exception was originally proposed by the Virginia Building and Code Officials Association as part of a revision to 2006 IRC Section R602.10.8 (RB225-06/07) and approved for the 2009 IRC (see 2009 IRC Section 602.10.7, Item #1). The provision made sense as the full-depth rim joist is close enough to the cantilever support (24” or less) to provide the rotational restraint that would otherwise be provided by the blocking at the support. There is no need for two closely-spaced sets of full-depth blocking in the specified case. During the ICC Ad-Hoc Wall Bracing Committee’s work on the “Mothership” proposal (RB105-09/10), it was realized the provision in R602.10 conflicted with existing footnotes in Tables R502.3.3(1) and R502.3.3.(2). The Ad-Hoc Committee opted to remove the exception rather than attempting to fix the conflict, leaving just a pointer allowing cantilevered floor joists complying with Section R502.3.3 to support braced wall panels. This proposal restores the original intent of the 2006/2007 VBCOA proposal by adding the exception to the two footnotes.

Cost Impact: The 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 will have a very minor impact of reducing the cost of deck construction, so I decided not to attempt to quantify and justify it. Often blocking material is so short it gets thrown away anyway. Some labor time is saved. Mostly this change is intended to reduce unnecessary requirements and build public trust in the requirements of the IRC.

RB181-25

RB182-25

IRC: R507.8, R507.9, R507.9.1, R507.9.1.1, R507.9.1.2, R507.9.1.3, R507.9.1.4, R507.9.1.5, R507.9.1.6, R507.9.1.7, R507.9.1.8, R507.9.2, TABLE R507.9.1.3(1), FIGURE R507.9.1.3(1), TABLE R507.9.1.3(2), FIGURE R507.9.1.3(2), FIGURE R507.9.2(1), FIGURE R507.9.2(2)

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

R507.8 Vertical and lateral supports. Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. For decks with cantilevered framing members, connection to exterior walls or other framing members shall be designed and constructed to resist uplift resulting from the full *live load* specified in Table R301.5 acting on the cantilevered portion of the deck. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting.

Delete without substitution:

~~**R507.9 Vertical and lateral supports at band joist.** Vertical and lateral supports for decks shall comply with this section.~~

~~**R507.9.1 Vertical supports.** Vertical loads shall be transferred to band joists with ledgers in accordance with this section.~~

Revise as follows:

~~**R507.9.1.1**~~ <u>**R507.8.1**</u> **Ledger details.** Deck ledgers shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, No. 2 grade or better pressure-preservative-treated Southern pine, incised pressure-preservative-treated hem-fir, or decay-resistant, *naturally durable wood* . Deck ledgers shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

~~**R507.9.1.2**~~ <u>**R507.8.2**</u> **Band joist details.** Band joists supporting a ledger shall be a minimum 2-inch-nominal (51 mm), solid-sawn, spruce-pine-fir or better lumber or a minimum 1-inch (25 mm) nominal engineered wood rim boards in accordance with Section R502.1.7. Band joists shall bear fully on the primary structure capable of supporting all required loads.

~~**R507.9.1.3**~~ <u>**R507.8.3**</u> **Ledger to band joist details.** Where ledgers are fastened in accordance with Table <u>R507.8.3(1)</u> ~~R507.9.1.3(1)~~ , fasteners shall comply with Section R507.2.3 and shall be installed in accordance with Table <u>R507.8.3(2)</u> ~~R507.9.1.3(2)~~ and Figures <u>R507.8.3(1)</u> ~~R507.9.1.3(1)~~ and <u>R507.8.3(2)</u> ~~R507.9.1.3(2)~~. Holes for $^1/_2$-inch (12.7 mm) lag screws shall be predrilled with two drill bits so that a hole $^1/_2$ inch (12.7mm) in diameter is drilled through the ledger and sheathing, if present, and a hole $^5/_{16}$ inch (7.9 mm) to $^3/_8$ inch (9.5mm) in diameter is drilled through the band joist.

~~**R507.9.1.4**~~ <u>**R507.8.4**</u> **Alternate ledger details.** Alternate framing configurations supporting a ledger constructed to meet the load requirements of Section R301.5 shall be permitted.

~~**R507.9.1.5**~~ <u>**R507.8.5**</u> **Ledger flashing.** Where ledgers are attached to wood-frame construction, flashing shall be installed above the ledger to prevent the entry of water into the wall cavity or behind the ledger. Flashing shall extend vertically not less than 2 inches (51 mm) above the ledger. Flashing shall extend horizontally not less than 4 inches (102 mm) beyond the ledger face or shall extend to the ledger face and not less than $^1/_4$ inch down the ledger face.

Exceptions:

1. Where a window or door opening is located less than 2 inches (51 mm) above the ledger, flashing shall extend to the bottom of the wall opening.
2. Flashing is not required where the ledger is spaced horizontally from the *exterior wall covering* not less than $^1/_4$ inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

~~R507.9.1.6~~ **R507.8.6 Water-resistive barrier.** The water-resistive barrier required by Section R703.2 shall be lapped over a vertical leg of the ledger flashing or counterflashing extending up the wall by not less than 2 inches (51 mm) or the height of the vertical flashing leg, whichever is less. The *water-resistive barrier* shall continue from the top of the ledger flashing down the wall and behind the ledger flashing and ledger.

Exceptions:

1. Flashing shall be permitted to be placed against the face of the *water-resistive barrier* where a self-adhering membrane counterflashing is installed not less than 2 inches (51 mm) over the vertical leg of the flashing and not less than 2 inches (51 mm) onto the *water-resistive barrier*.
2. Flashing shall be permitted to be placed in front of the *water-resistive barrier* and behind the *exterior wall covering* where ledgers are spaced horizontally from the exterior wall not less than $^1/_4$ inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

~~R507.9.1.7~~ **R507.8.7 Existing walls.** Where ledgers are attached to existing walls without water-resistive barriers, a *water-resistive barrier* shall be installed behind the ledger and ledger flashing. The *water-resistive barrier* shall extend to the top of the ledger flashing vertical leg and not less than $^1/_2$ inch (12.7 mm) beyond the sides and bottom of the ledger. A self-adhering membrane counterflashing shall be installed not less than 2 inches (51 mm) over the vertical leg of the ledger flashing and not less than 2 inches (51 mm) onto the existing sheathing.

Exceptions:

1. Where a window or door opening is located less than 2 inches (51 mm) above the ledger, flashing shall extend to the bottom of the wall opening.
2. Flashing is not required where the ledger is spaced horizontally from the *exterior wall covering* not less than $^1/_4$ inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

~~R507.9.1.8~~ **R507.8.8 Exterior wall coverings.** *Exterior wall coverings* shall be terminated above the finished deck surface in accordance with the covering manufacturer's requirements and Chapter 7, as applicable to the type of covering.

Exception: *Exterior wall covering*s shall be permitted behind ledgers in accordance with Section R507.8.5 ~~R507.9.1.5~~ where capable of resisting compression forces from the ledger attachment.

~~R507.9.2~~ **R507.9 Lateral ~~connection~~ bracing.** Lateral loads shall be transferred to the ground or to a structure capable of transmitting them to the ground. Where ~~the~~ lateral bracing is provided with a load connection ~~is provided~~ in accordance with Figure R507.9~~.2~~(1), hold-down tension devices shall be installed in not less than two locations per deck, within 24 inches (610 mm) of each end of the deck. Each device shall have an allowable stress design capacity of not less than 1,500 pounds (6672 N). Where the lateral load connections are provided in accordance with Figure R507.9~~.2~~(2), the hold-down tension devices shall be installed in not less than four locations per deck, and each device shall have an allowable stress design capacity of not less than 750 pounds (3336 N).

TABLE ~~R507.9.1.3(1)~~ R507.8.3(1) DECK LEDGER CONNECTION TO BAND JOIST

Portions of table not shown remain unchanged.

LOAD[c] (psf)	JOIST SPAN[a] (feet)	ON-CENTER SPACING OF FASTENERS[b] (inches)		
		$^1/_2$-inch diameter lag screw with $^1/_2$-inch maximum sheathing[d, e]	$^1/_2$-inch diameter bolt with $^1/_2$-inch maximum sheathing[e]	$^1/_2$-inch diameter bolt with 1-inch maximum sheathing[f]
40 live load	6	30	36	36
	8	23	36	36
	10	18	34	29
	12	15	29	24
	14	13	24	21
	16	11	21	18
	18	10	19	16
50 ground snow load	6	29	36	36
	8	22	36	35
	10	17	33	28
	12	14	27	23

	14	12	23	20
	16	11	20	17
	18	9	18	15
	6	25	36	36
	8	18	35	30
	10	15	28	24
60 ground snow load	12	12	23	20
	14	10	20	17
	16	9	17	15
	18	8	15	13
	6	22	36	35
	8	16	31	26
	10	13	25	21
70 ground snow load	12	11	20	17
	14	9	17	15
	16	8	15	13
	18	7	13	11

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Interpolation permitted. Extrapolation is not permitted.

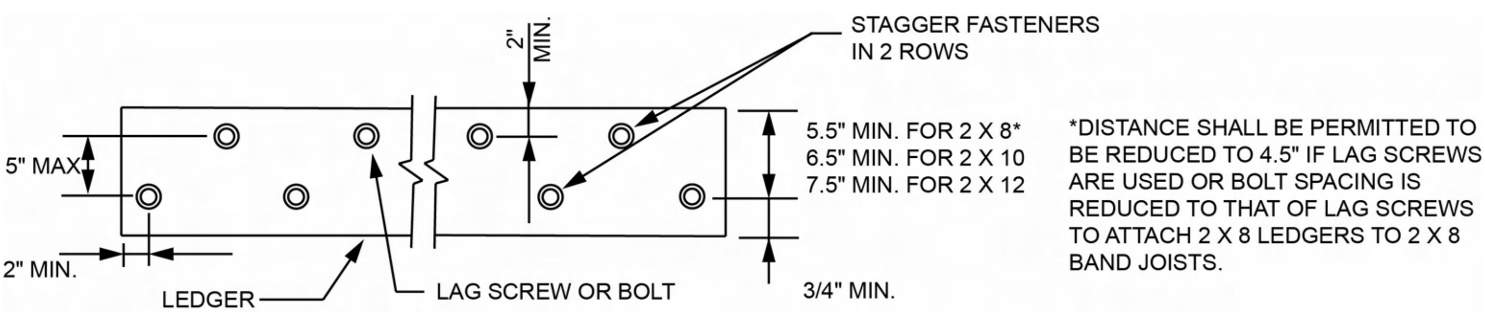
b. Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.

c. Dead Load = 10 psf. Snow load shall not be assumed to act concurrently with live load.

d. The tip of the lag screw shall fully extend beyond the inside face of the band joist. Lag screws shall be full-body diameter screws.

e. Sheathing shall be wood structural panel or solid sawn lumber.

f. Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber or foam sheathing. Up to $^{1}/_{2}$-inch thickness of stacked washers shall be permitted to substitute for up to $^{1}/_{2}$ inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.



For SI: 1 inch = 25.4 mm.

FIGURE ~~R507.9.1.3(1)~~ R507.8.3(1) PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS

TABLE ~~R507.9.1.3(2)~~ R507.8.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

	MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS			
	TOP EDGE	BOTTOM EDGE	ENDS	ROW SPACING
Ledger[a]	2 inches[d]	$^{3}/_{4}$ inch	2 inches[b]	1$^{5}/_{8}$ inches[b]
Band Joist[c]	$^{3}/_{4}$ inch	2 inches	2 inches	1$^{5}/_{8}$ inches[b]

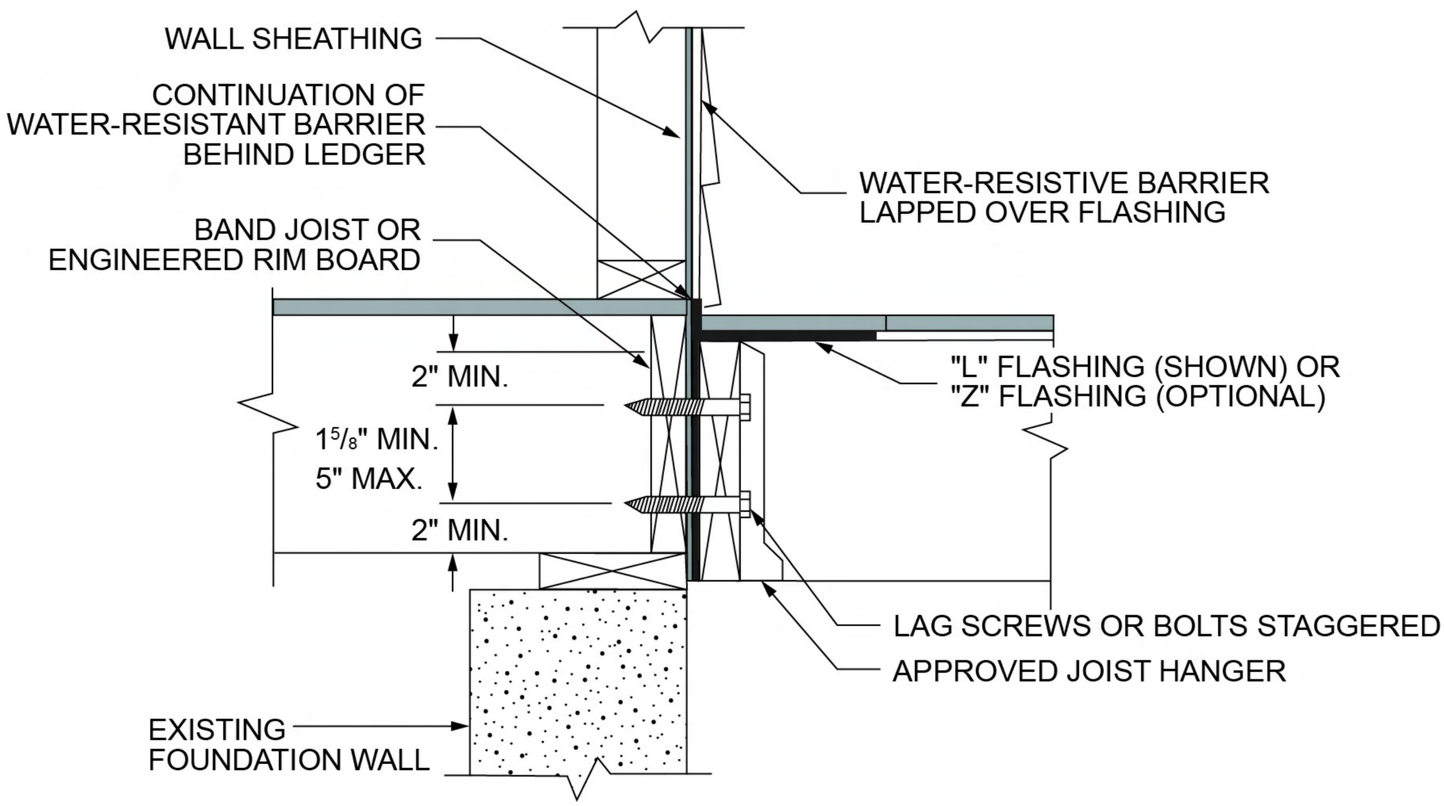
For SI: 1 inch = 25.4 mm.

a. Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.9.1.3(1).

b. Maximum 5 inches.

c. For engineered rim joists, the manufacturer's recommendations shall govern.

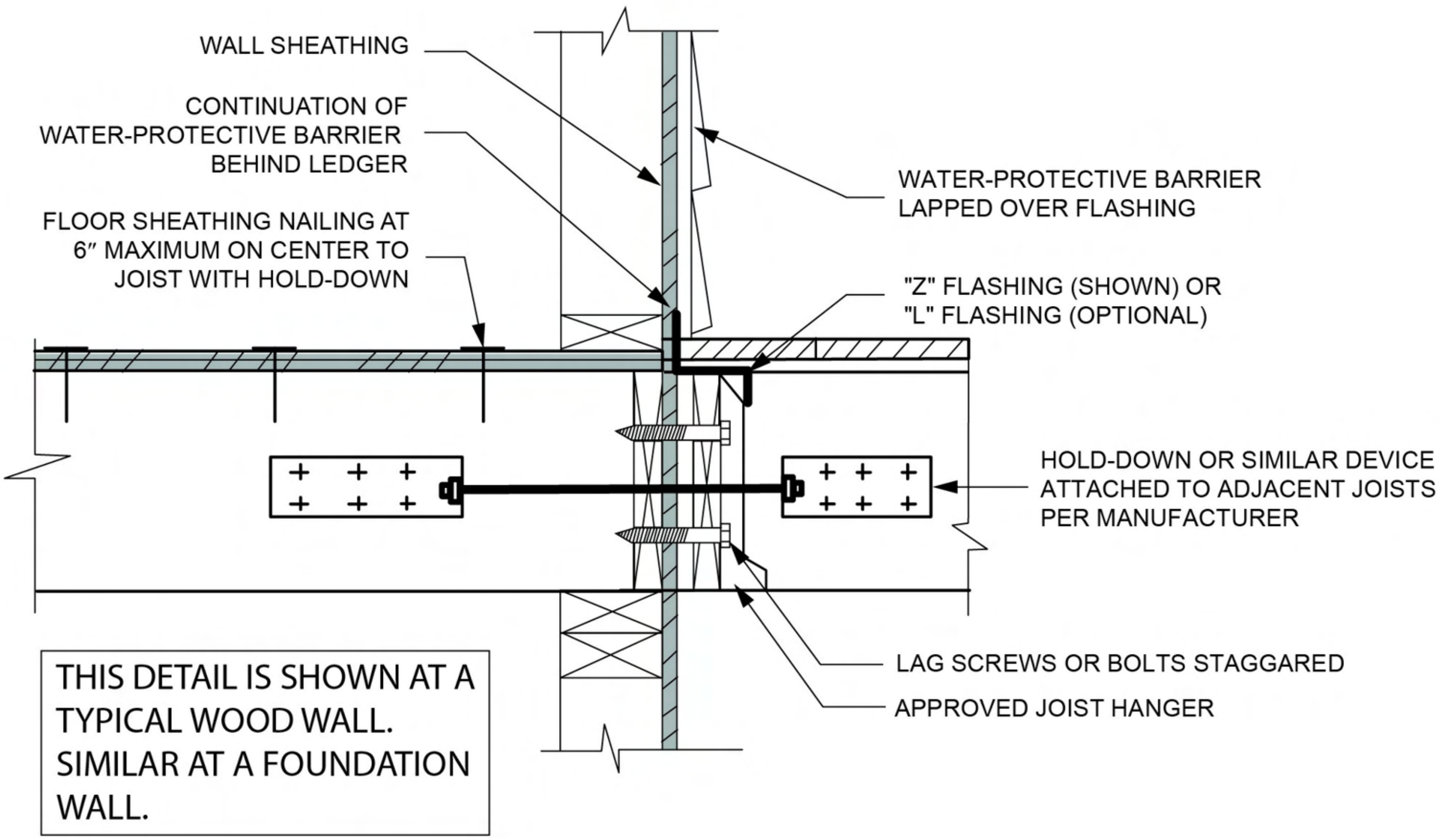
d. The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure R507.9.1.3(1).



THIS DETAIL IS SHOWN AT A TYPICAL FOUNDATION WALL LOCATION. SIMILAR AT WOOD WALL.

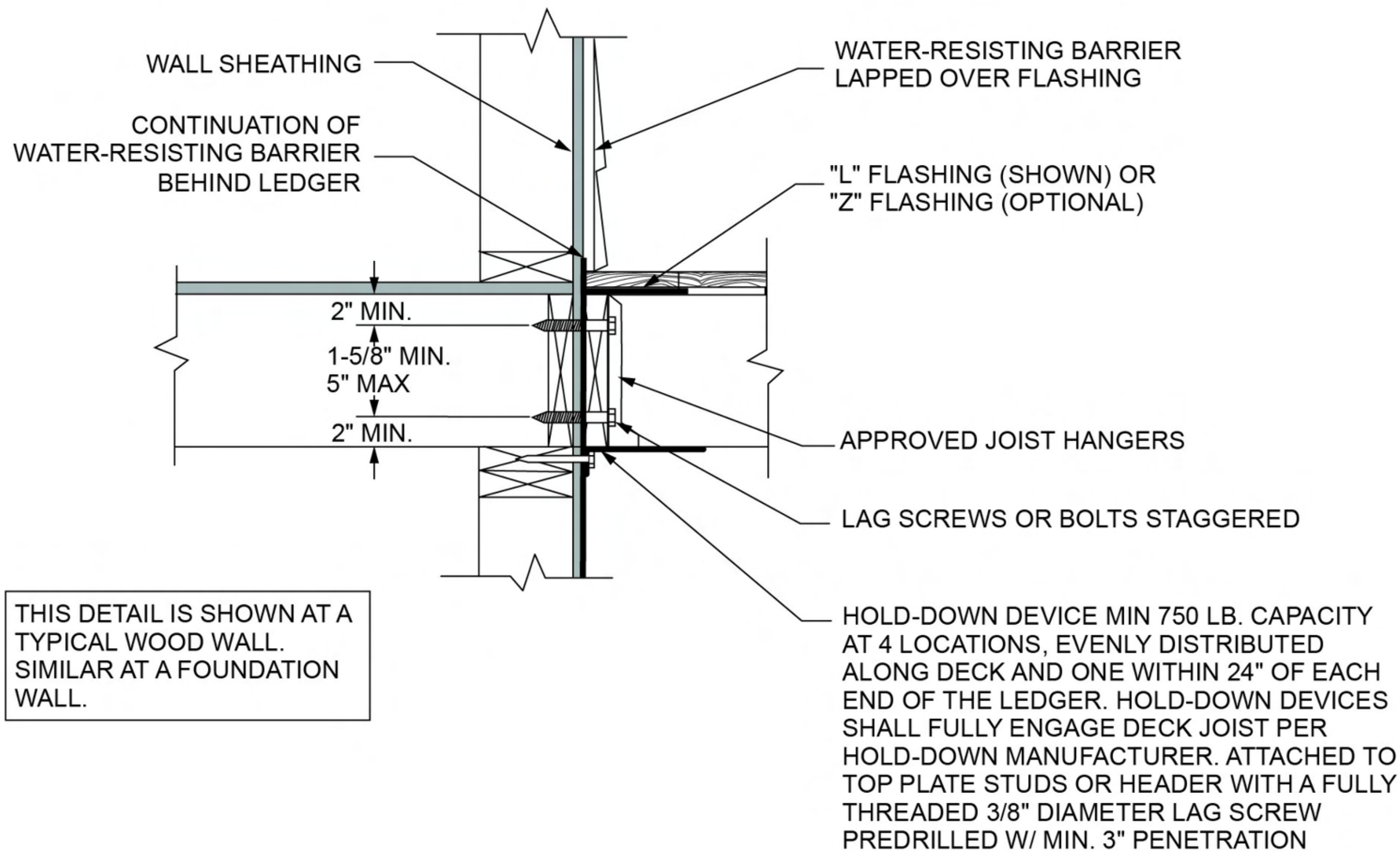
For SI: 1 inch = 25.4 mm.

FIGURE ~~R507.9.1.3(2)~~ R507.8.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS



For SI: 1 inch = 25.4 mm.

FIGURE ~~R507.9.2(1)~~ R507.9(1) DECK ATTACHMENT FOR LATERAL LOADS



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE ~~R507.9.2(2)~~ R507.9(2) DECK ATTACHMENT FOR LATERAL LOADS

Reason: Since the 2015 IRC, new deck design provisions have been added or improved in each edition thanks to the collaborative efforts of many private professionals, organizations, and building officials, informally called "The Deck Code Coalition". Though so much great work was done in providing prescriptive deck design codes, a major component of a sound deck structure has not been addressed, lateral live loads. In the 2024 IRC, I wrote a proposal attempting to address this by shining light on the fact that a deck without bracing will sway and the IRC only provides hold down connections at the ledger to address lateral loads. This would be like having design codes for a wall that includes hold downs at the foundation but no wall sheathing or bracing. What kind of house would that build? My efforts in 2024 were met with much opposition and were disapproved. I do not believe anyone has worked on research for prescriptive methods for deck lateral bracing since then.

The purpose of this proposal is to continue to draw attention to the need to complete the design provisions for decks by addressing lateral bracing. This proposal eliminates unnecessary subsections resulting in long strings of section numbers. It also places the lateral load section in its own subsection under R507 instead of being under the ledger provisions. There are many ways to brace a deck that are not just connections at the ledger. Connections at the ledger only brace a deck when build in an inside corner. By renaming that section "lateral bracing" it is my hope the reader of the IRC will recognize that some sort of bracing is necessary, whether provided with details in the IRC or not.

This proposal will better set up the IRC for the attention it needs and for a proposal in 2030.

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

Justification for no cost impact:

This proposal only restructures the organization of existing code language. There is some change in language but only to clarify what is already necessary.

RB182-25

RB183-25

IRC: TABLE R507.9.1.3(1)

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

TABLE R507.9.1.3(1) DECK LEDGER CONNECTION TO BAND JOIST

LOAD[c] (psf)	JOIST SPAN[a] (feet)	ON-CENTER SPACING OF FASTENERS[b] (inches)		
		1/2-inch diameter lag screw with 1/2-inch maximum sheathing[d, e]	1/2-inch diameter bolt with 1/2-inch maximum sheathing[e]	1/2-inch diameter bolt with 1-inch maximum sheathing[f]
40 live load	6	30	36	36
	8	23	36	36
	10	18	34	29
	12	15	29	24
	14	13	24	21
	16	11	21	18
	18	10	19	16
50 ground snow load	6	29	36	36
	8	22	36	35
	10	17	33	28
	12	14	27	23
	14	12	23	20
	16	11	20	17
	18	9	18	15
60 ground snow load	6	25	36	36
	8	18	35	30
	10	15	28	24
	12	12	23	20
	14	10	20	17
	16	9	17	15
	18	8	15	13
70 ground snow load	6	22	36	35
	8	16	31	26
	10	13	25	21
	12	11	20	17
	14	9	17	15
	16	8	15	13
	18	7	13	11

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Interpolation permitted. Extrapolation is not permitted.

b. Ledgers shall be flashed in accordance with Section ~~R703.4~~ R507.9.1.5 ~~to prevent water from contacting the house band joist~~.

c. Dead Load = 10 psf. Snow load shall not be assumed to act concurrently with live load.

d. The tip of the lag screw shall fully extend beyond the inside face of the band joist. Lag screws shall be full-body diameter screws.

e. Sheathing shall be wood structural panel or solid sawn lumber.

f. Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber or foam sheathing. Up to 1/2-inch thickness of stacked washers shall be permitted to substitute for up to 1/2 inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.

Reason: Section R703.4 "Flashing" was changed in the 2024 IRC to reference deck ledger flashing to the new Section R507.9.1.5. This proposal simply bypasses that double reference. I suggest deleting the statement about ledger flashing performance (not let water contact the band joist), as this footnote is just meant as a reminder that there are additional ledger flashing codes. The ledger flashing codes referenced in this footnote provide sufficient detail for ledger flashing performance.

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

Justification for no cost impact:

This proposal only clarifies the current intent of the IRC.

RB183-25

RB184-25

IRC: R507.9.1.6, R507.9.1.7

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

R507.9.1.6 Water-resistive barrier. The *water-resistive barrier* ~~water-resistive barrier~~ required by Section R703.2 shall be lapped over a vertical leg of the ledger flashing or counterflashing extending up the wall by not less than 2 inches (51 mm) or the height of the vertical flashing leg, whichever is less. The *water-resistive barrier* shall continue from the top of the ledger flashing down the wall and behind the ledger flashing and ledger.

Exceptions:

1. Flashing shall be permitted ~~to be placed~~ in front of ~~against the face of~~ the *water-resistive barrier* where a self-adhering membrane counterflashing is installed not less than 2 inches (51 mm) over the vertical leg of the flashing and not less than 2 inches (51 mm) onto the *water-resistive barrier*.
2. Flashing shall be permitted ~~to be placed~~ in front of the *water-resistive barrier* and behind the *exterior wall covering* where ledgers are spaced horizontally from the exterior wall not less than $^1/_4$ inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

R507.9.1.7 Existing walls. Where ledgers are attached to existing walls without *water-resistive barriers* ~~water-resistive barriers~~, a *water-resistive barrier* shall be installed behind the ledger and ledger flashing. The *water-resistive barrier* shall extend to the top of the ledger flashing vertical leg and not less than $^1/_2$ inch (12.7 mm) beyond the sides and bottom of the ledger. A self-adhering membrane counterflashing shall be installed not less than 2 inches (51 mm) over the vertical leg of the ledger flashing and not less than 2 inches (51 mm) onto the existing sheathing.

Exceptions:

1. Where a window or door opening is located less than 2 inches (51 mm) above the ledger, flashing shall extend to the bottom of the wall opening.
2. Flashing is not required where the ledger is spaced horizontally from the *exterior wall covering* not less than $^1/_4$ inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

Reason: The language of exception 1 under water-resistive barriers is changed to match exception 2, for no reason other than consistency in language. The phrase "to be placed" is unnecessary.

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

Justification for no cost impact:

This proposal only clarifies the current intent of these sections. There is no impact on the cost of construction.

RB184-25

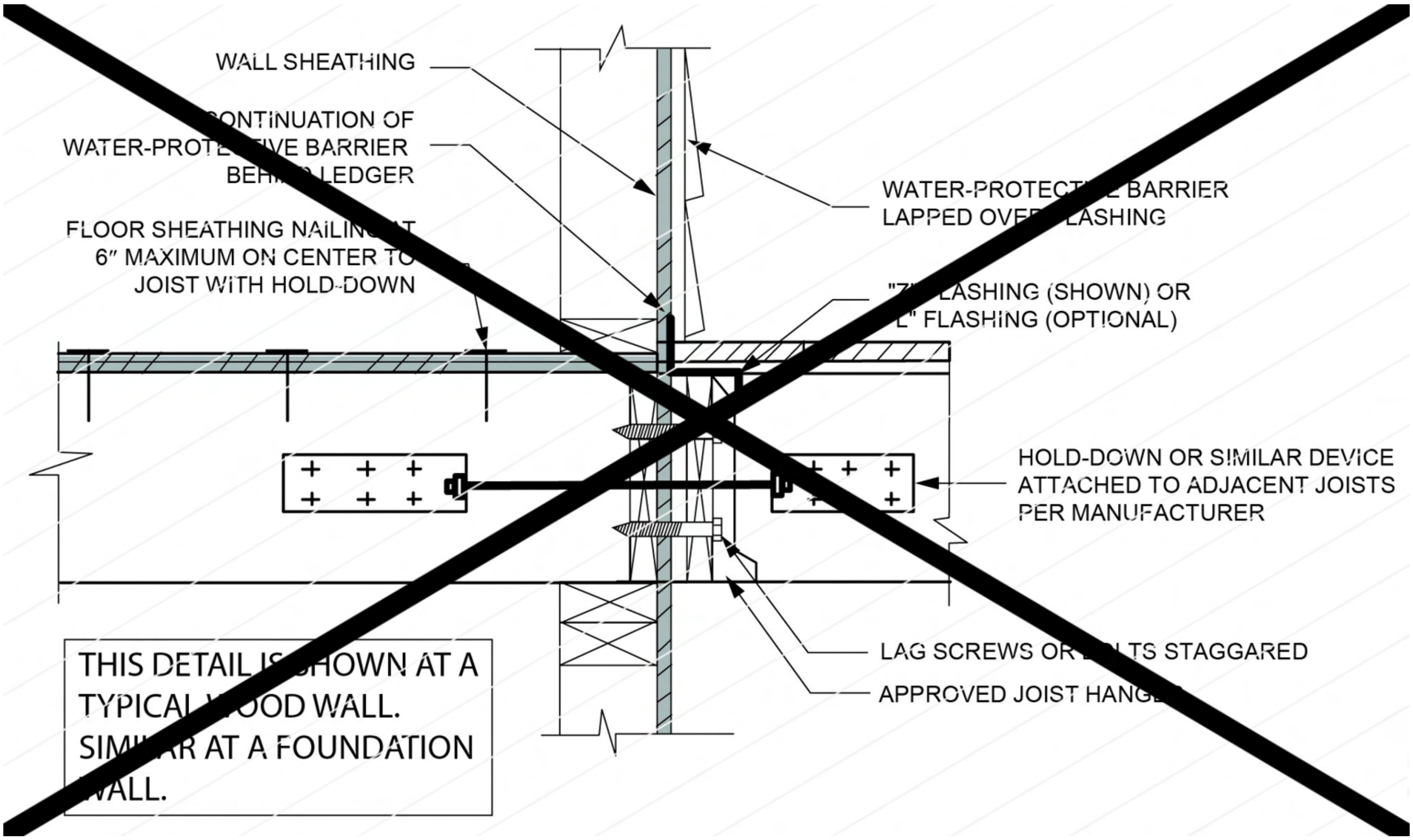
RB185-25

IRC: FIGURE R507.9.2(1)

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

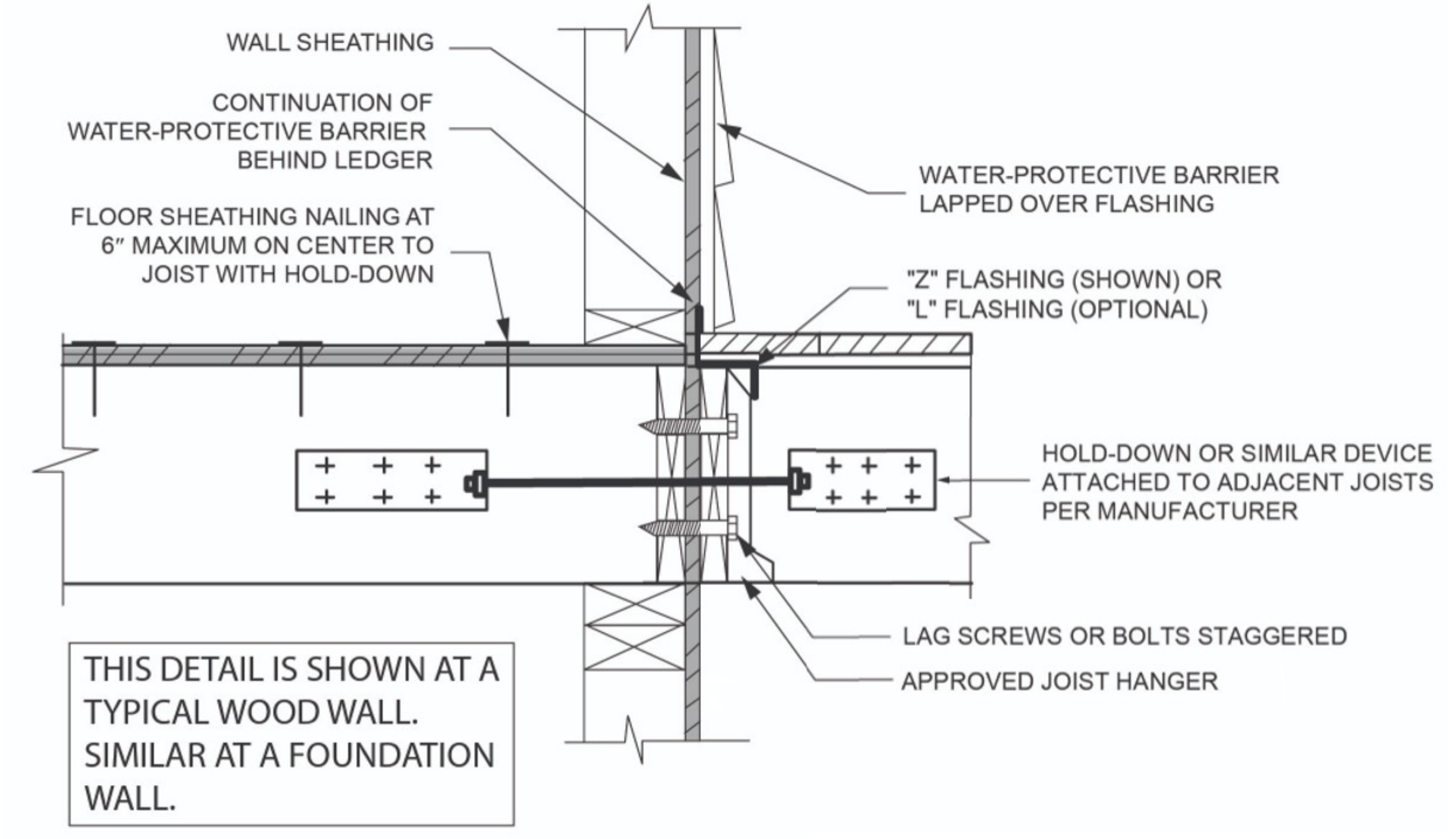
2024 International Residential Code

Delete and substitute as follows:



~~For SI: 1 inch = 25.4 mm.~~

~~FIGURE R507.9.2(1) DECK ATTACHMENT FOR LATERAL LOADS~~



For SI: 1 inch = 25.4 mm.

FIGURE R507.9.2(1) DECK ATTACHMENT FOR LATERAL LOADS

Reason: The existing Figure R507.9.2(1) has an unlabeled gap between the ledger and the wall sheathing, which caused some confusion about siding material or an air gap being permitted between them. This is an editorial fix to the figure to remove that gap to show that the ledger needs to be tight to the wall sheathing. A spelling error in the existing Figure was also corrected.

Cost Impact: The 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 technical change proposed in this code change. The Figure is being modified to clarify existing code requirements.

RB185-25

RB186-25

IRC: R507.10.2

Proponents: Edward Lisinski, American Wood Council, representing ICC Region III Code Development Committee (elisinski@awc.org)

2024 International Residential Code

Revise as follows:

R507.10.2 Wood posts at deck guards. Where ~~4-inch by 4-inch (102 mm by 102 mm)~~ wood posts support guard loads applied to the top of the *guard*, such posts shall not be notched at the connection to the supporting structure.

Reason: This section was originally referring only to 4x4 guard posts on residential decks. Most of that language was removed for the 2021 IRC code edition, however this reference to a 4x4 guard post remained. This issue that comes up is that it does not address a 2x4, 4x6 or any other size guard post. It does not address a guard post made up of (2) 2x4s. If a notch is permitted in a 6x6 post, there is no limit on how much could be notched. By removing the reference to a 4x4 guard post only, this will require all guard posts using the prescriptive requirements of R507 to be unnotched. If there is a situation where a guard post is needed to be notched, then these prescriptive requirements would not apply, and the deck could be designed through engineering analysis or through an alternative means and materials approval process.

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

Justification for no cost impact:

In order to prescriptively meet load requirements, no guard posts should be notched. This proposal just clarifies that requirement.

RB186-25

RB187-25

IRC: TABLE R602.3(1)

Proponents: Tim Earl, GBH International, representing the Gypsum Association (tearl@gbhint.com)

2024 International Residential Code

Revise as follows:

TABLE R602.3(1) FASTENING SCHEDULE

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 ksi = 6.895 MPa.

a. Nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections are carbon steel and shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less. Connections using nails and staples of other materials, such as stainless steel, shall be designed by accepted engineering practice or approved under Section R104.2.2.

b. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.

d. Four-foot by 8-foot or 4-foot by 9-foot panels shall be applied vertically.

e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).

f. For wood structural panel roof sheathing attached to gable end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ultimate design wind speed is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C. Fastener spacing applies where roof framing specific gravity is 0.42 or larger. Where roof framing specific gravity is greater than or equal to 0.35 but less than 0.42 in accordance with AWC NDS, fastening of roof sheathing shall be with RSRS-03 ($2^1/_2$″ × 0.131″ × 0.281″ head) nails.

g. Paper-faced gypsum ~~Gypsum~~ sheathing shall conform to ASTM C1396 . Glass-mat gypsum sheathing shall conform to ASTM C1177. ~~and~~ gypsum sheathing shall be installed in accordance with ASTM C1280 or GA 253. Fiberboard sheathing shall conform to ASTM C208.

h. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

i. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

Reason: This proposal adds the appropriate ASTM standard for glass-mat gypsum sheathing to the footnote. It is already referenced elsewhere 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:

This adds an additional ASTM specification which was missing from the list.

RB188-25

IRC: TABLE R602.3(1), TABLE R602.3(2), TABLE R602.3(3), R608.9.2, R608.9.3, R608.10, TABLE R703.15.1, TABLE R703.15.2, TABLE R703.16.2, TABLE R704.3.4, R802.11

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

Revise as follows:

TABLE R602.3(1) FASTENING SCHEDULE

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1 ksi = 6.895 MPa.

a. Nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections are carbon steel and shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less. Connections using nails and staples of other materials, such as stainless steel, shall be designed by accepted engineering practice or approved under Section R104.2.2.

b. RSRS-01 is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667.

c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.

d. Four-foot by 8-foot or 4-foot by 9-foot panels shall be applied vertically.

e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).

f. For wood structural panel roof sheathing attached to gable end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 4 inches on center where the ultimate design wind speed is greater than 130 mph in Exposure B or greater than 110 mph in Exposure C. Fastener spacing applies where roof framing is Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, or other species with specific gravity ~~is~~ greater than or equal to 0.42 ~~or larger~~ in accordance with AWC NDS. Where roof framing specific gravity is greater than or equal to 0.35 but less than 0.42 ~~in accordance with AWC NDS~~, fastening of roof sheathing shall be with RSRS-03 ($2^1/_2$″ × 0.131″ × 0.281″ head) nails.

g. Gypsum sheathing shall conform to ASTM C1396 and shall be installed in accordance with ASTM C1280 or GA 253. Fiberboard sheathing shall conform to ASTM C208.

h. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

i. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

TABLE R602.3(2) ALTERNATE ATTACHMENTS TO TABLE R602.3(1)

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm.

g. Alternate fastening is only permitted for roof sheathing where the ultimate design wind speed is less than or equal to 110 mph, and where fasteners are installed 3 inches on center at all supports, and where fastening is to wood framing of Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, or other ~~a~~ species with specific gravity greater than or equal to 0.42 in accordance with AWC NDS.

TABLE R602.3(3) REQUIREMENTS FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES[a, b, c]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

d. Fastener spacing applies where wall framing is Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, or other species with specific gravity ~~is~~ greater than or equal to 0.42 ~~or larger~~ in accordance with AWC NDS. Where wall framing specific gravity is greater than or equal to 0.35 but less than 0.42 ~~in accordance with AWC NDS~~, maximum nail spacing in the field of the panel shall be 8 inches.

R608.9.2 Connections between concrete walls and light-frame floor systems. Connections between concrete walls and light-frame floor systems shall be in accordance with one of the following:

1. For floor systems of wood-framed construction, the provisions of Section R608.9.1 and the prescriptive details of Figures R608.9(1) through R608.9(4), where permitted by the tables accompanying those figures. Portions of connections of wood-framed floor systems not noted in the figures shall be in accordance with Section R502, or AWC WFCM, if applicable. Wood framing members shall be of ~~a~~ Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, or other species having a specific gravity equal to or greater than 0.42 in accordance with AWC NDS.
2. For floor systems of cold-formed steel construction, the provisions of Section R608.9.1 and the prescriptive details of Figures R608.9(5) through R608.9(8), where permitted by the tables accompanying those figures. Portions of connections of cold-formed steel-framed floor systems not noted in the figures shall be in accordance with Section R505, or AISI S230, if applicable.
3. Proprietary connectors selected to resist loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
4. An engineered design using loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
5. An engineered design using loads and material design provisions in accordance with this code, or in accordance with ASCE 7, ACI 318, and AWC NDS for wood-framed construction or AISI S100 for cold-formed steel frame construction.

R608.9.3 Connections between concrete walls and light-frame ceiling and roof systems. Connections between concrete walls and light-frame ceiling and roof systems shall be in accordance with one of the following:

1. For ceiling and roof systems of wood-framed construction, the provisions of Section R608.9.1 and the prescriptive details of Figures R608.9(9) and R608.9(10), where permitted by the tables accompanying those figures. Portions of connections of wood-framed ceiling and roof systems not noted in the figures shall be in accordance with Section R802, or AWC WFCM, if applicable. Wood framing members shall be ~~of a~~ Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, or other species having a specific gravity equal to or greater than 0.42 in accordance with AWC NDS.
2. For ceiling and roof systems of cold-formed steel construction, the provisions of Section R608.9.1 and the prescriptive details of Figures R608.9(11) and R608.9(12), where permitted by the tables accompanying those figures. Portions of connections of cold-formed steel-framed ceiling and roof systems not noted in the figures shall be in accordance with Section R804, or AISI S230, if applicable.
3. Proprietary connectors selected to resist loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.

4. An engineered design using loads and load combinations in accordance with Appendix A (ASD) or Appendix B (LRFD) of PCA 100.
5. An engineered design using loads and material design provisions in accordance with this code, or in accordance with ASCE 7, ACI 318, and AWC NDS for wood-framed construction or AISI S100 for cold-formed steel-framed construction.

R608.10 Floor, roof and ceiling diaphragms. Floors and roofs in *buildings* with exterior walls of concrete shall be designed and constructed as *diaphragms*. Where gable-end walls occur, ceilings shall be designed and constructed as *diaphragms*. The design and construction of floors, roofs and ceilings of wood framing or cold-formed-steel framing serving as *diaphragms* shall comply with the applicable requirements of this code, or AWC WFCM or AISI S230, if applicable. Wood framing members shall be ~~of a~~ Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, or other species having a specific gravity equal to or greater than 0.42 in accordance with AWC NDS.

TABLE R703.15.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

a. Wood framing shall be Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, ~~Spruce-pine-fir~~ or ~~any wood~~ other species with a specific gravity of 0.42 or greater in accordance with AWC NDS.

b. The thickness of wood structural panels complying with the specific gravity requirement of Note a shall be permitted to be included in satisfying the minimum penetration into framing. For cladding connections to wood structural panels, refer to Table R703.3.3. For brick veneer tie connections to wood structural panels, refer to Table R703.8.4(2).

c. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

d. Fastener vertical spacing is an average spacing associated with the following nail count per foot: 6-inch spacing is associated with two nails per foot, 8-inch spacing is associated with 1.5 nails per foot, and 12-inch spacing is associated with one nail per foot.

e. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

f. Cladding weight is the maximum weight of cladding materials in pounds per square foot of wall area. The 3 psf category typically applies to panel and lap siding materials; the 11 psf category typically applies to conventional three-coat stucco of $^{7}/_{8}$-inch thickness; and 15 psf to 25 psf categories typically apply to adhered masonry veneers.

TABLE R703.15.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a, b]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

a. Wood framing and furring shall be Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir ~~Spruce-pine-fir~~ or other ~~any wood~~ species with a specific gravity of 0.42 or greater in accordance with AWC NDS.

b. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.

c. The thickness of wood structural panels complying with the specific gravity requirements of Note a shall be permitted to be included in satisfying the minimum required penetration into framing.

d. Where the required cladding fastener penetration into wood material exceeds $^3/_4$ inch and is not more than $1^1/_2$ inches, a minimum 2× wood furring or an approved design shall be used.

e. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

f. Furring shall be spaced not more than 24 inches on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

g. Cladding weight is the maximum weight of cladding materials in pounds per square foot of wall area. The 3 psf category typically applies to panel and lap siding materials; the 11 psf category typically applies to conventional three-coat stucco of $^7/_8$-inch thickness; and 15 psf to 25 psf categories typically apply to adhered masonry veneers.

TABLE R703.16.2 FURRING MINIMUM FASTENING REQUIREMENTS FOR APPLICATION OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT[a]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm, 1 pound per square foot = 0.0479 kPa, 1 pound per square inch = 6.895 kPa.

DR = Design Required.

o.c. = On Center.

a. Wood furring shall be Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, ~~Spruce-pine-fir~~ or other ~~any softwood~~ species with a specific gravity of 0.42 or greater in accordance with AWC NDS. Steel furring shall be minimum 33-ksi steel. Steel studs shall be minimum 33-ksi steel for 33-mil and 43-mil thickness, and 50-ksi steel for 54-mil steel or thicker.

b. Screws shall comply with the requirements of ASTM C1513.

c. Where the required cladding fastener penetration into wood material exceeds $^3/_4$ inch and is not more than $1^1/_2$ inches, a minimum 2-inch nominal wood furring or an approved design shall be used.

d. Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.

e. Furring shall be spaced not more than 24 inches (610 mm) on center, in a vertical or horizontal orientation. In a vertical orientation, furring shall be located over wall studs and attached with the required fastener spacing. In a horizontal orientation, the indicated 8-inch and 12-inch fastener spacing in furring shall be achieved by use of two fasteners into studs at 16 inches and 24 inches on center, respectively.

TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE FOR WOOD STRUCTURAL PANEL EXTERIOR SOFFIT [b, c, d, e]

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

e. Fastener spacing applies where wood exterior soffit framing member~~ specific gravity~~ is Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, or other species with specific gravity greater than or equal to 0.42 ~~or larger~~ in accordance with AWC NDS. Where the specific gravity of exterior soffit framing members is greater than or equal to 0.35 but less than 0.42 ~~in accordance with AWC NDS~~, the fastener spacing shall be multiplied by 0.67 or the same fastener spacing as prescribed for galvanized steel nails shall be permitted to be used where RSRS-01 (2-inch by 0.099-inch by 0.266-inch head) nails replace 6d box nails and RSRS-03 ($2^1/_2$-inch × 0.131-inch × 0.281-inch head) nails replace 8d common nails or 10d box nails. RSRS is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667. Framing members shall be minimum 2 × 3 nominal with the larger dimension in the cross section aligning with the length of fasteners to provide sufficient embedment depths.

R802.11 Roof tie uplift resistance. *Roof assemblies* shall have uplift resistance in accordance with Sections R802.11.1 and R802.11.2.

Exceptions: Rafters or trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1) where either of the following occur:

1. Where ~~the specific gravity of the wood species used for~~ wall framing is Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, or other species with specific gravity greater than or equal to 0.42 in accordance with AWC NDS and the uplift force per rafter or truss does not exceed 200 pounds (90.8 kg) as determined by Table R802.11.
2. Where the *basic wind speed* does not exceed 115 miles per hour (51.4 m/s), the wind exposure category is B, the roof pitch is 5 units vertical in 12 units horizontal (42-percent slope) or greater, the roof span is 32 feet (9754 mm) or less, and rafters and trusses are spaced not more than 24 inches (610 mm) on center.

Reason: There are several sections of the IRC which direct the user to the ANSI/AWC *National Design Specification (NDS) for Wood Construction* to determine the specific gravity of the wood. This code change proposes to add names of common wood species that have a specific gravity of 0.42 or greater to reduce the need to lookup wood specific gravity in the NDS. The common wood species names listed (i.e., Southern Pine, Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir) all have specific gravity of 0.42 or greater and are used elsewhere in the code such as in span tables for joist, rafters, and headers. This revision will make the code easier to use without changing the technical requirements.

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

Justification for no cost impact:

There is no technical change proposed in this code change. The footnote clarifications improve the ease-of-use of the code.

RB188-25

RB189-25

IRC: R602.6, FIGURE R602.6(1), FIGURE R602.6(2)

Proponents: John Grenier, representing National Council of Structural Engineers Associations (NCSEA) (jgrenier@greniereng.com); Emily Guglielmo, representing NCSEA (eguglielmo@martinmartin.com)

2024 International Residential Code

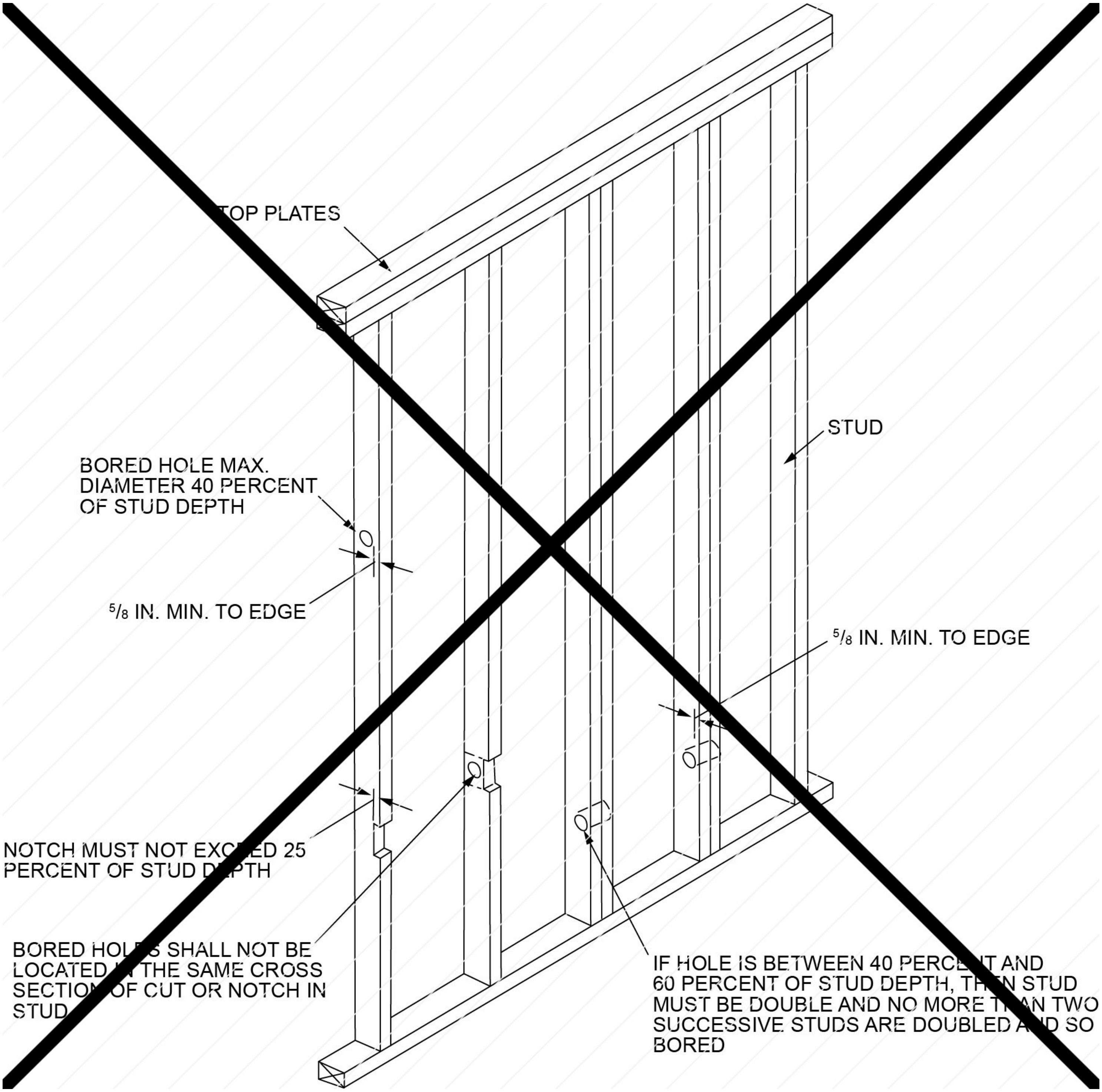
Revise as follows:

R602.6 Drilling and notching of studs. Drilling and notching of studs shall be in accordance with the following:

1. Notching. A stud in an exterior wall or bearing partition shall not be cut or notched in the middle one-third of the stud length and the cut or notch shall not exceed t ~~o a depth exceeding~~ 25 percent of its depth. Studs in nonbearing partitions shall not be notched to a depth exceeding 40 percent of a single stud depth.
2. Boring. The diameter of bored holes in studs shall not exceed 60 percent of the stud depth, the edge of the hole shall not be less than $^{5}/_{8}$ inch (16 mm) from the edge of the stud, and the hole shall not be located in the same section as a cut or notch. Where the diameter of a bored hole in a stud located in exterior walls or bearing partitions is over 40 percent, such stud shall be doubled and not more than two successive doubled studs shall be so bored. See Figures R602.6(1) and R602.6(2).

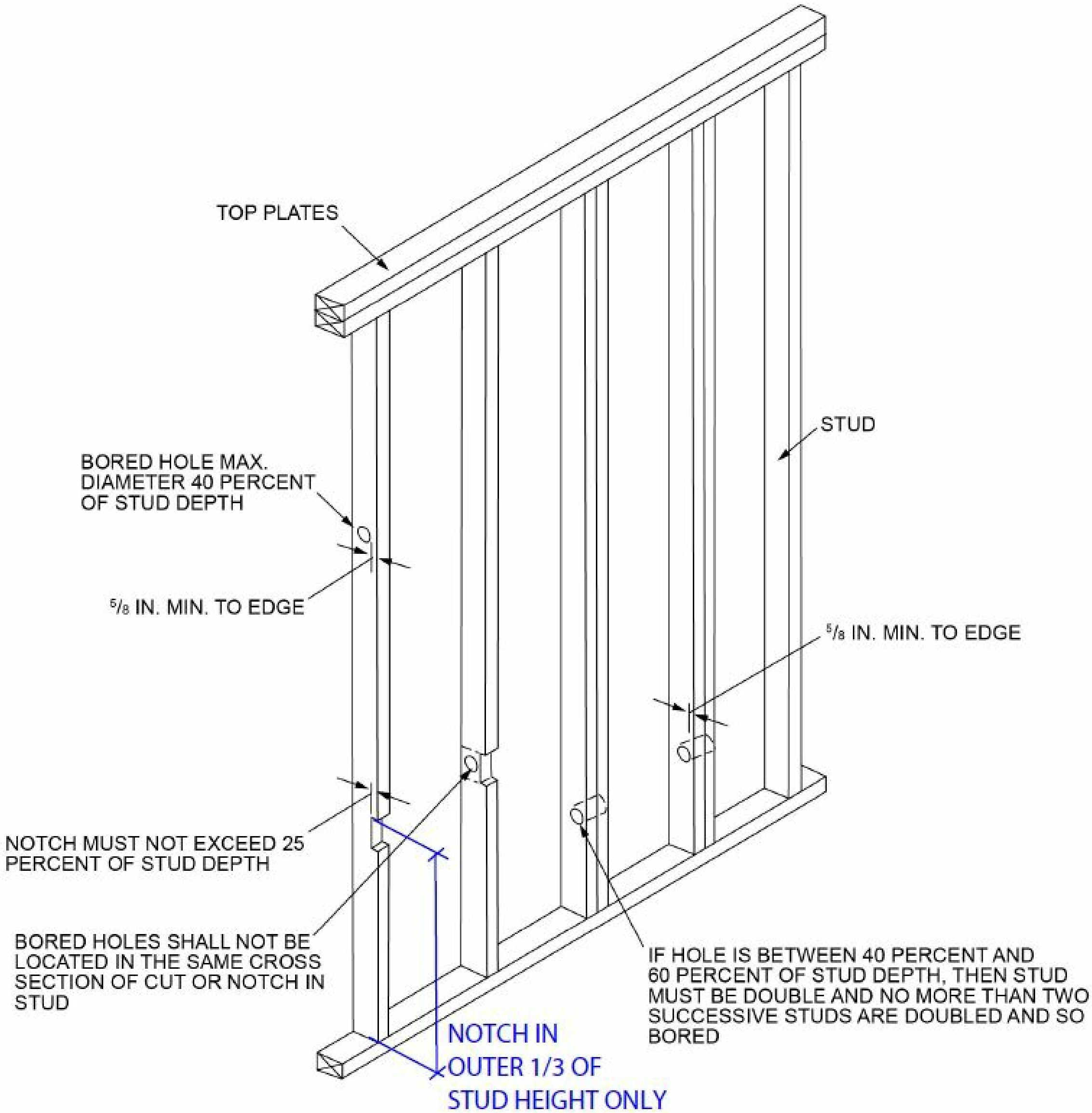
   Exception: Where *approved*, stud shoes are installed in accordance with the manufacturer's instructions.

Delete and substitute as follows:



~~For SI: 1 inch = 25.4 mm.~~ ~~**Note:**~~ ~~Condition for exterior and bearing walls.~~

~~**FIGURE R602.6(1) NOTCHING AND BORED HOLE LIMITATIONS FOR EXTERIOR WALLS AND BEARING WALLS**~~

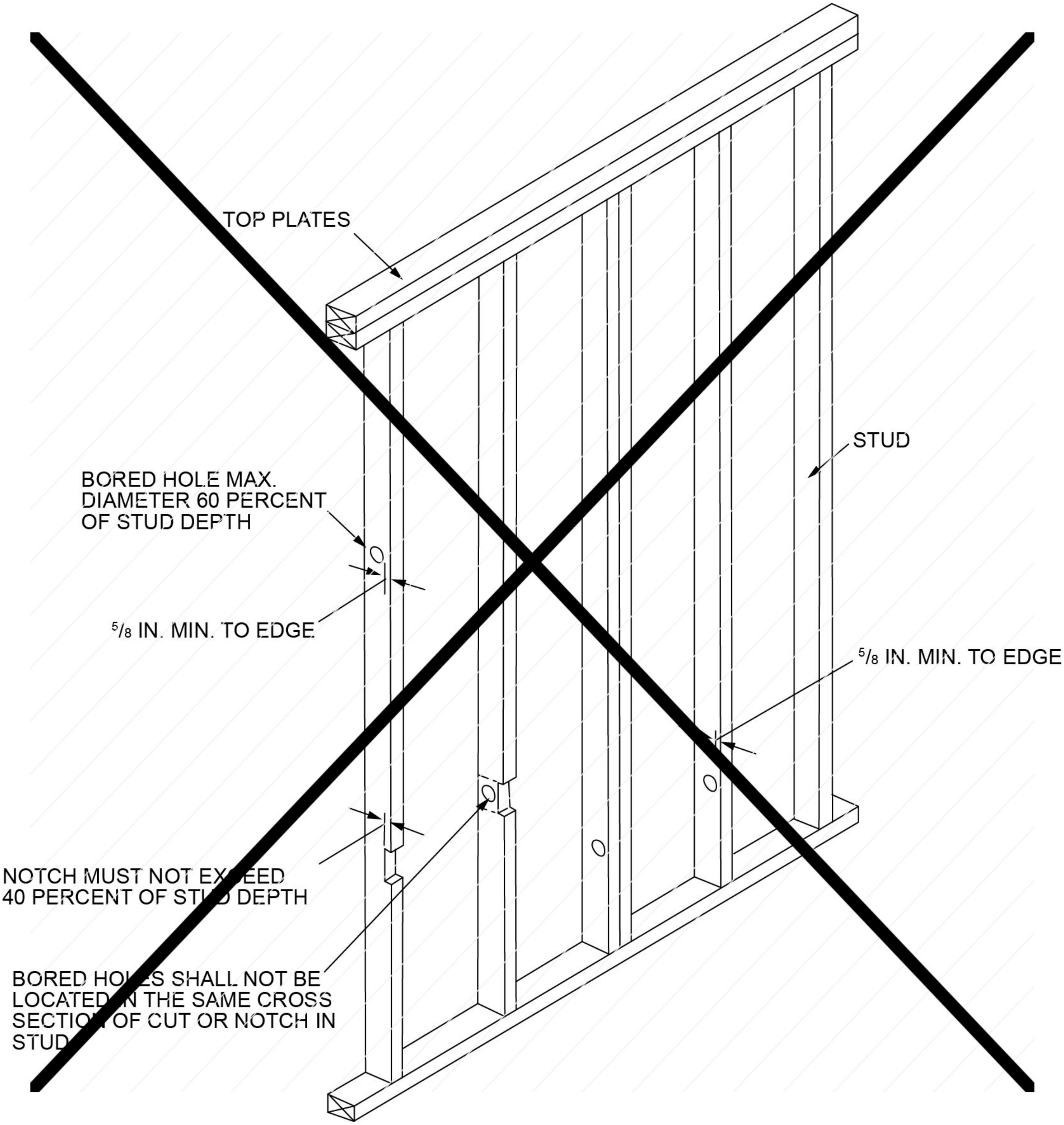


For SI: 1 inch = 25.4 mm.
Note: Condition for exterior and bearing walls.

FIGURE R602.6(1)
NOTCHING AND BORED HOLE LIMITATIONS FOR EXTERIOR WALLS AND BEARING WALLS

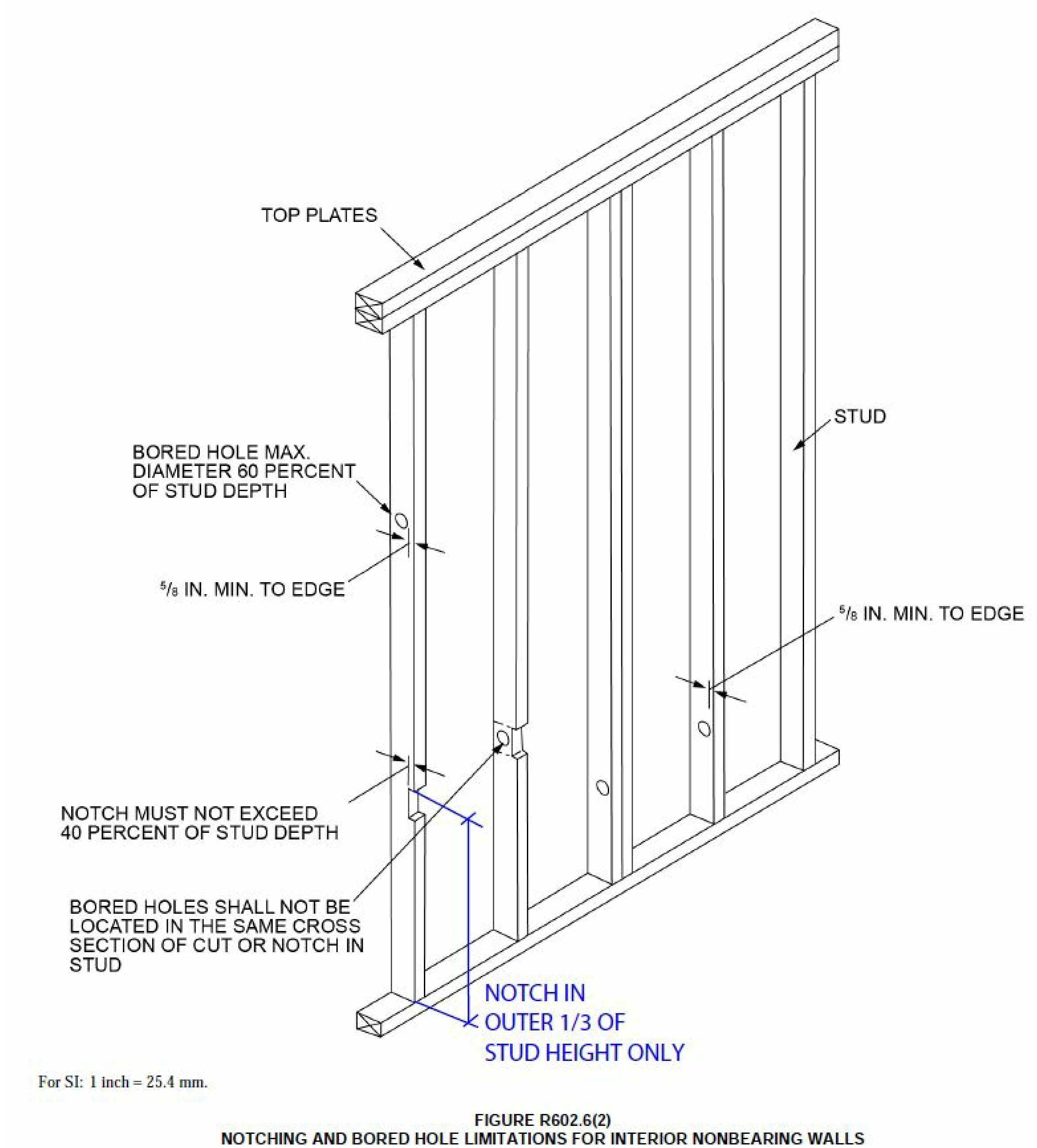
For SI: 1 inch = 25.4 mm. **Note:** Condition for exterior and bearing walls.

FIGURE R602.6(1) NOTCHING AND BORED HOLE LIMITATIONS FOR EXTERIOR WALLS AND BEARING WALLS



~~For SI: 1 inch = 25.4 mm.~~

~~FIGURE R602.6(2) NOTCHING AND BORED HOLE LIMITATIONS FOR INTERIOR NONBEARING WALLS~~



For SI: 1 inch = 25.4 mm.

FIGURE R602.6(2) NOTCHING AND BORED HOLE LIMITATIONS FOR INTERIOR NONBEARING WALLS

Reason: Proposal seeks to clarify language for notching of exterior, bearing and nonbearing partitions. Additional limitations are applied so that notching and cuts are limited to the limited to the outer 1/3rd of studs. This is consistent with limitations on studs notching location limits contained in the NDS WFCM.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0. This proposal may slightly increase the cost of construction. Notching limitations on stud walls will limit where notches can occur thus potentially increasing the cost of construction

Estimated Immediate Cost Impact Justification (methodology and variables):

By clarifying the limitations on cutting, notching or boring of wood studs, the contractor will need to more carefully plan for the installation of electrical wiring and the in wall plumbing for a project, resulting in potentially more time needed during the construction process.

Estimated Life Cycle Cost Impact:

Decrease

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

This proposal has the potential of reducing life cycle costs by eliminating distressed or damaged wall framing that would require replacement or strengthening.

RB189-25

RB190-25

IRC: TABLE R602.7(1)

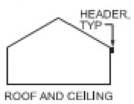
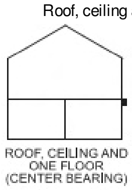
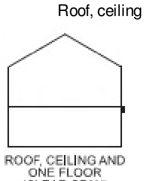
Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

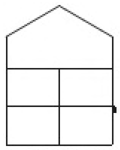
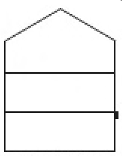
2024 International Residential Code

Revise as follows:

TABLE R602.7(1) GIRDER SPANS[a] AND HEADER SPANS[a] FOR EXTERIOR BEARING WALLS (Maximum spans for Douglas fir-larch, hem-fir, Southern pine and spruce-pine-fir[b] and required number of jack studs)

Portions of table not shown remain unchanged.

GIRDERS AND HEADERS SUPPORTING	SIZE	ALLOWABLE STRESS DESIGN GROUND SNOW LOAD, $P_{g(asd)}$ (psf)[e]																	
		30						50						70					
		Building width[c] (feet)																	
		12		24		36		12		24		36		12		24		36	
		Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]
	1-2 × 6	4-0	1	~~3-1~~ 3-0	2	~~2-7~~ 2-6	2	3-5	1	~~2-8~~ 2-7	2	~~2-3~~ 2-2	2	3-0	2	2-4	2	~~2-0~~ 1-11	2
	1-2 × 8	5-1	2	~~3-11~~ 3-10	2	3-3	2	4-4	2	~~3-4~~ 3-3	2	~~2-10~~ 2-9	2	3-10	2	~~3-0~~ 2-11	2	~~2-6~~ 2-5	3
	1-2 × 10	6-0	2	~~4-8~~ 4-7	2	~~3-11~~ 3-10	2	5-2	2	~~4-0~~ 3-11	2	~~3-4~~ 3-3	3	4-7	2	~~3-6~~ 3-5	3	~~3-0~~ 2-11	3
	1-2 × 12	7-1	2	~~5-5~~ 5-4	2	~~4-7~~ 4-6	3	6-1	2	~~4-8~~ 4-7	3	~~3-11~~ 3-10	3	~~5-5~~ 5-4	2	~~4-2~~ 4-1	3	~~3-6~~ 3-5	3
	2-2 × 4	4-0	1	~~3-1~~ 3-0	1	~~2-7~~ 2-6	1	3-5	1	2-7	1	2-2	1	3-0	1	~~2-4~~ 2-3	1	~~2-0~~ 1-11	1
Roof and ceiling	2-2 × 6	~~6-0~~ 5-11	1	~~4-7~~ 4-6	1	~~3-10~~ 3-9	1	5-1	1	~~3-11~~ 3-10	1	~~3-3~~ 3-2	2	4-6	1	~~3-6~~ 3-5	2	~~2-11~~ 2-10	2
	2-2 × 8	~~7-7~~ 7-6	1	~~5-9~~ 5-8	1	~~4-10~~ 4-9	2	6-5	1	~~5-0~~ 4-10	2	~~4-2~~ 4-1	2	~~5-9~~ 5-8	1	~~4-5~~ 4-4	2	~~3-9~~ 3-7	2
	2-2 × 10	~~9-0~~ 8-11	1	~~6-10~~ 6-9	2	~~5-9~~ 5-8	2	7-8	2	~~5-11~~ 5-9	2	~~4-11~~ 4-10	2	6-9	2	~~5-3~~ 5-1	2	~~4-5~~ 4-3	2
	2-2 × 12	~~10-7~~ 10-6	2	~~8-1~~ 7-11	2	~~6-10~~ 6-8	2	9-0	2	~~6-11~~ 6-9	2	~~5-10~~ 5-8	2	8-0	2	~~6-2~~ 6-0	2	~~5-2~~ 5-0	3
	3-2 × 8	9-5	1	~~7-3~~ 7-2	1	~~6-1~~ 6-0	1	8-1	1	~~6-3~~ 6-1	1	~~5-3~~ 5-1	2	7-2	1	~~5-6~~ 5-5	2	~~4-8~~ 4-6	2
	3-2 × 10	~~11-3~~ 11-2	1	~~8-7~~ 8-5	1	~~7-3~~ 7-1	2	9-7	1	~~7-4~~ 7-3	2	~~6-2~~ 6-1	2	8-6	1	~~6-7~~ 6-5	2	~~5-6~~ 5-4	2
	3-2 × 12	13-2	1	~~10-1~~ 10-0	2	~~8-6~~ 8-4	2	11-3	2	~~8-8~~ 8-6	2	~~7-4~~ 7-1	2	10-0	2	~~7-9~~ 7-7	2	~~6-6~~ 6-4	2
	4-2 × 8	10-11	1	~~8-4~~ 8-3	1	~~7-0~~ 6-11	1	9-4	1	~~7-2~~ 7-0	1	~~6-0~~ 5-11	1	8-3	1	~~6-4~~ 6-3	1	~~5-4~~ 5-3	2
	4-2 × 10	12-11	1	~~9-11~~ 9-9	1	~~8-4~~ 8-2	1	~~11-1~~ 11-0	1	~~8-6~~ 8-4	1	~~7-2~~ 7-0	2	~~9-10~~ 9-9	1	~~7-7~~ 7-5	2	~~6-4~~ 6-2	2
	4-2 × 12	15-3	1	~~11-8~~ 11-6	1	~~9-10~~ 9-7	2	13-0	1	~~10-0~~ 9-10	2	~~8-5~~ 8-3	2	~~11-7~~ 11-6	1	~~8-11~~ 8-9	2	~~7-6~~ 7-3	2
	1-2 × 6	3-3	1	~~2-7~~ 2-6	2	2-2	2	3-0	2	2-4	2	2-0	2	2-9	2	2-2	2	1-10	2
	1-2 × 8	4-1	2	~~3-3~~ 3-2	2	2-9	2	3-9	2	~~3-0~~ 2-11	2	2-6	3	3-6	2	2-9	2	2-4	3
	1-2 × 10	~~4-11~~ 4-10	2	3-10	2	3-3	3	4-6	2	3-6	3	~~3-0~~ 2-11	3	4-1	2	3-3	3	2-9	3
	1-2 × 12	5-9	2	4-6	3	3-10	3	5-3	2	~~4-2~~ 4-1	3	3-6	3	4-10	3	3-10	3	3-3	4
Roof, ceiling and one center-bearing floor	2-2 × 4	~~3-3~~ 3-2	1	2-6	1	~~2-2~~ 2-1	1	~~3-0~~ 2-11	1	~~2-4~~ 2-3	1	~~2-0~~ 1-11	1	2-8	1	~~2-2~~ 2-1	1	1-10	1
	2-2 × 6	4-10	1	3-9	1	~~3-3~~ 3-2	2	4-5	1	~~3-6~~ 3-5	2	~~3-0~~ 2-11	2	4-1	1	~~3-3~~ 3-2	2	~~2-9~~ 2-8	2
	2-2 × 8	6-1	1	~~4-10~~ 4-9	2	~~4-1~~ 4-0	2	5-7	2	~~4-5~~ 4-4	2	~~3-9~~ 3-8	2	5-2	2	~~4-1~~ 4-0	2	~~3-6~~ 3-5	2
	2-2 × 10	7-3	2	5-8	2	~~4-10~~ 4-9	2	6-8	2	~~5-3~~ 5-2	2	~~4-5~~ 4-4	2	6-1	2	~~4-10~~ 4-9	2	4-1	2
	2-2 × 12	8-6	2	6-8	2	5-8	2	7-10	2	~~6-2~~ 6-1	2	~~5-3~~ 5-2	3	7-2	2	5-8	2	~~4-10~~ 4-9	3
	3-2 × 8	7-8	1	~~6-0~~ 5-11	1	5-1	2	7-0	1	~~5-6~~ 5-5	2	~~4-8~~ 4-7	2	6-5	1	5-1	2	~~4-4~~ 4-3	2
	3-2 × 10	9-1	1	~~7-2~~ 7-1	2	~~6-1~~ 6-0	2	8-4	1	~~6-7~~ 6-6	2	~~5-7~~ 5-6	2	7-8	2	~~6-1~~ 6-0	2	~~5-2~~ 5-1	2
	3-2 × 12	10-8	2	~~8-5~~ 8-4	2	~~7-2~~ 7-1	2	9-10	2	~~7-8~~ 7-7	2	~~6-7~~ 6-5	2	9-0	2	7-1	2	~~6-1~~ 6-0	2
	4-2 × 8	8-10	1	6-11	1	~~5-11~~ 5-10	1	8-1	1	6-4	1	~~5-5~~ 5-4	2	7-5	1	~~5-11~~ 5-10	1	~~5-0~~ 4-11	2
	4-2 × 10	~~10-6~~ 10-5	1	~~8-3~~ 8-2	2	~~7-0~~ 6-11	2	~~9-8~~ 9-7	1	~~7-7~~ 7-6	2	~~6-5~~ 6-4	2	8-10	1	~~7-0~~ 6-11	2	~~6-0~~ 5-10	2
	4-2 × 12	12-4	1	~~9-8~~ 9-7	2	~~8-3~~ 8-2	2	11-4	2	~~8-11~~ 8-10	2	~~7-7~~ 7-5	2	10-4	2	~~8-3~~ 8-2	2	~~7-0~~ 6-11	2
	1-2 × 6	2-11	2	2-3	2	1-11	2	2-9	2	2-1	2	1-9	2	2-7	2	2-0	2	1-8	2
	1-2 × 8	3-9	2	2-10	2	2-5	3	3-6	2	2-8	2	2-3	3	3-3	2	2-6	3	~~2-2~~ 2-1	3
	1-2 × 10	4-5	2	3-5	3	2-10	3	~~4-2~~ 4-1	2	3-2	3	2-8	3	~~3-11~~ 3-10	2	3-0	3	2-6	3
Roof, ceiling and one clear-span floor	1-2 × 12	5-2	2	4-0	3	3-4	3	4-10	3	3-9	3	~~3-2~~ 3-1	4	4-7	3	3-6	3	~~3-0~~ 2-11	4
	2-2 × 4	2-11	1	2-3	1	1-10	1	2-9	1	2-1	1	1-9	1	2-7	1	~~2-0~~ 1-11	1	~~1-8~~ 1-7	1
	2-2 × 6	4-4	1	3-4	2	2-10	2	4-1	1	~~3-2~~ 3-1	2	~~2-8~~ 2-7	2	3-10	1	~~3-0~~ 2-11	2	~~2-6~~ 2-5	2
	2-2 × 8	5-6	2	4-3	2	3-7	2	5-2	2	~~4-0~~ 3-11	2	3-4	2	4-10	2	~~3-9~~ 3-8	2	~~3-2~~ 3-1	2
	2-2 × 10	6-7	2	5-0	2	4-2	2	6-1	2	~~4-9~~ 4-8	2	~~4-0~~ 3-11	2	5-9	2	4-5	2	~~3-9~~ 3-8	3
	2-2 × 12	7-9	2	5-11	2	4-11	3	7-2	2	~~5-7~~ 5-6	2	4-8	3	6-9	2	~~5-3~~ 5-2	3	~~4-5~~ 4-4	3
	3-2 × 8	6-11	1	5-3	2	4-5	2	6-5	1	~~5-0~~ 4-11	2	4-2	2	6-1	1	4-8	2	~~4-0~~ 3-11	2
	3-2 × 10	~~8-3~~ 8-2	2	6-3	2	5-3	2	7-8	2	~~5-11~~ 5-10	2	~~5-0~~ 4-11	2	~~7-3~~ 7-2	2	~~5-7~~ 5-6	2	~~4-8~~ 4-7	2
	3-2 × 12	9-8	2	7-5	2	6-2	2	9-0	2	~~7-0~~ 6-11	2	5-10	2	8-6	2	~~6-7~~ 6-6	2	~~5-6~~ 5-5	3
	4-2 × 8	8-0	1	6-1	1	5-1	2	7-5	1	~~5-9~~ 5-8	2	~~4-10~~ 4-9	2	7-0	1	~~5-5~~ 5-4	2	~~4-7~~ 4-6	2
	4-2 × 10	9-6	1	7-3	2	6-1	2	8-10	1	~~6-10~~ 6-9	2	~~5-9~~ 5-8	2	8-4	1	~~6-5~~ 6-4	2	~~5-5~~ 5-4	2
	4-2 × 12	11-2	2	8-6	2	7-2	2	10-5	2	~~8-0~~ 7-11	2	~~6-9~~ 6-8	2	~~9-10~~ 9-9	2	~~7-7~~ 7-6	2	~~6-5~~ 6-3	2
	1-2 × 6	2-8	2	2-1	2	1-10	2	2-7	2	2-0	2	~~1-9~~ 1-8	2	2-5	2	1-11	2	~~1-8~~ 1-7	2
	1-2 × 8	3-5	2	2-8	2	2-4	3	3-3	2	~~2-7~~ 2-6	2	2-2	3	3-1	2	2-5	3	~~2-1~~ 2-0	3
	1-2 × 10	4-0	2	3-2	3	2-9	3	3-10	2	~~3-1~~ 3-0	3	2-7	3	3-8	2	~~2-11~~ 2-10	3	2-5	3

GIRDERS AND HEADERS SUPPORTING	SIZE	ALLOWABLE STRESS DESIGN GROUND SNOW LOAD, P (psf)																	
		30						50						70					
		Building width (feet)																	
		12		24		36		12		24		36		12		24		36	
		Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ	Span	NJ
Roof, ceiling and two center-bearing floors  ROOF, CEILING AND TWO FLOORS (CENTER BEARING)	1-2 × 12	4-9	3	3-9	3	3-2	4	4-6	3	3-7	3	~~3-1~~ 3-0	4	4-3	3	~~3-5~~ 3-4	3	~~2-11~~ 2-10	4
	2-2 × 4	2-8	1	2-1	1	1-9	1	2-6	1	2-0	1	1-8	1	2-5	1	~~1-11~~ 1-10	1	1-7	1
	2-2 × 6	4-0	1	3-2	2	2-8	2	3-9	1	3-0	2	~~2-7~~ 2-6	2	3-7	1	2-10	2	2-5	2
	2-2 × 8	5-0	2	4-0	2	3-5	2	~~4-10~~ 4-9	2	~~3-10~~ 3-9	2	~~3-3~~ 3-2	2	~~4-7~~ 4-6	2	3-7	2	~~3-1~~ 3-0	2
	2-2 × 10	6-0	2	4-9	2	4-0	2	5-8	2	4-6	2	3-10	3	5-5	2	4-3	2	~~3-8~~ 3-7	3
	2-2 × 12	7-0	2	5-7	2	4-9	3	6-8	2	~~5-4~~ 5-3	3	4-6	3	6-4	2	5-0	3	4-3	3
	3-2 × 8	6-4	1	5-0	2	4-3	2	6-0	1	4-9	2	~~4-1~~ 4-0	2	5-8	2	~~4-6~~ 4-5	2	~~3-10~~ 3-9	2
	3-2 × 10	7-6	2	5-11	2	5-1	2	7-1	2	~~5-8~~ 5-7	2	~~4-10~~ 4-9	2	6-9	2	~~5-4~~ 5-3	2	~~4-7~~ 4-6	2
	3-2 × 12	8-10	2	7-0	2	5-11	2	8-5	2	~~6-8~~ 6-7	2	~~5-8~~ 5-7	3	~~8-0~~ 7-11	2	~~6-4~~ 6-3	2	~~5-4~~ 5-3	3
	4-2 × 8	7-3	1	5-9	1	4-11	2	6-11	1	~~5-6~~ 5-5	2	4-8	2	6-7	1	5-2	2	~~4-5~~ 4-4	2
	4-2 × 10	8-8	1	6-10	2	5-10	2	8-3	2	6-6	2	~~5-7~~ 5-6	2	~~7-10~~ 7-9	2	~~6-2~~ 6-1	2	~~5-3~~ 5-2	2
	4-2 × 12	10-2	2	8-1	2	6-10	2	9-8	2	~~7-8~~ 7-7	2	~~6-7~~ 6-6	2	9-2	2	~~7-3~~ 7-2	2	~~6-2~~ 6-1	2
	1-2 × 6	2-3	2	1-9	2	1-5	2	2-3	2	1-9	2	1-5	3	2-2	2	1-8	2	1-5	3
	1-2 × 8	2-10	2	2-2	3	1-10	3	2-10	2	2-2	3	1-10	3	2-9	2	2-1	3	~~1-10~~ 1-9	3
	1-2 × 10	3-4	2	2-7	3	2-2	3	3-4	3	2-7	3	2-2	4	3-3	3	2-6	3	~~2-2~~ 2-1	4
Roof, ceiling, and two clear-span floors  ROOF, CEILING AND TWO FLOORS (CLEAR SPAN)	1-2 × 12	4-0	3	3-0	3	2-7	4	4-0	3	3-0	4	2-7	4	3-10	3	~~3-0~~ 2-11	4	2-6	4
	2-2 × 4	2-3	1	1-8	1	1-4	1	2-3	1	1-8	1	1-4	1	2-2	1	~~1-8~~ 1-7	1	1-4	2
	2-2 × 6	3-4	1	2-6	2	2-2	2	3-4	2	2-6	2	2-2	2	3-3	2	2-6	2	2-1	2
	2-2 × 8	4-3	2	3-3	2	2-8	2	4-3	2	3-3	2	2-8	2	4-1	2	~~3-2~~ 3-1	2	2-8	3
	2-2 × 10	5-0	2	3-10	2	3-2	3	5-0	2	3-10	2	3-2	3	4-10	2	~~3-9~~ 3-8	3	~~3-2~~ 3-1	3
	2-2 × 12	5-11	2	4-6	3	3-9	3	5-11	2	4-6	3	3-9	3	5-8	2	~~4-5~~ 4-4	3	~~3-9~~ 3-8	3
	3-2 × 8	5-3	1	4-0	2	3-5	2	5-3	2	4-0	2	3-5	2	5-1	2	3-11	2	3-4	2
	3-2 × 10	6-3	2	4-9	2	4-0	2	6-3	2	4-9	2	4-0	2	6-1	2	4-8	2	~~4-0~~ 3-11	3
	3-2 × 12	7-5	2	5-8	2	4-9	3	7-5	2	5-8	2	4-9	3	7-2	2	5-6	3	~~4-8~~ 4-7	3
	4-2 × 8	6-1	1	4-8	2	3-11	2	6-1	1	4-8	2	3-11	2	5-11	1	~~4-7~~ 4-6	2	3-10	2
	4-2 × 10	7-3	2	5-6	2	4-8	2	7-3	2	5-6	2	4-8	2	7-0	2	~~5-5~~ 5-4	2	~~4-7~~ 4-6	2
	4-2 × 12	8-6	2	6-6	2	5-6	2	8-6	2	6-6	2	5-6	2	8-3	2	6-4	2	5-4	3

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.

b. Spans are based on minimum design properties for No. 2 grade lumber of Douglas fir-larch, hem-fir, Southern pine, and spruce-pine-fir.

c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.

d. NJ = Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.

e. Use 30 psf allowable stress design ground snow load for cases in which allowable stress design ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf.

f. Spans are calculated assuming a single span header or girder under uniform load where the top of the header or girder is laterally braced by perpendicular framing. Where the top of the header or girder is not laterally braced (for example, cripple studs bearing on the header), tabulated spans for headers consisting of 2 × 8, 2 × 10, or 2 × 12 sizes shall be multiplied by 0.70 or the header or girder shall be designed.

Reason: This proposal updates the header tables in multiple locations to be aligned with ASCE 7-22. The proposed spans align with those found in the ANSI/AWC *2024 Wood Frame Construction Manual (WFCM).* Additionally, language has been added to footnote f to clarify that all header and girder calculations are based on the assumption that they are single-span headers or girders. This clarification is necessary as multi-span headers are not addressed by the tables. The table heading and footnote e have been revised to reflect that the code now uses allowable stress design ground snow load.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal updates the header tables in multiple locations to be aligned with ASCE 7-22. Updated spans are typically shorter by either 1 or 2 inches. This minor adjustment in span will likely not impact the lumber lengths needed for construction, as some trimming will still be necessary to accommodate the actual header span end use. As the cost impact cannot be a decrease, and any increase is minimal that may not be realized due to typical waste, the cost impact is estimated at an increase of $0.

RB190-25

RB191-25

IRC: R602.7, TABLE R602.7(1), TABLE R602.7(2) (New), TABLE R602.7(2), R602.7(4) (New)

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

Revise as follows:

R602.7 Headers. For header spans, see Tables R602.7(1), R602.7(2), R602.7(3), R602.7(4) and R602.7(~~3~~5).

TABLE R602.7(1) LATERALLY SUPPORTED GIRDER SPANS[a] AND HEADER SPANS[a] FOR EXTERIOR BEARING WALLS (Maximum spans for Douglas fir-larch, hem-fir, Southern pine and spruce-pine-fir[b] and required number of jack studs)

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.

b. Spans are based on minimum design properties for No. 2 grade lumber of Douglas fir-larch, hem-fir, Southern pine, and spruce-pine-fir.

c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.

d. NJ = Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.

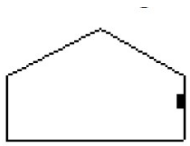
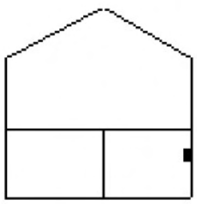
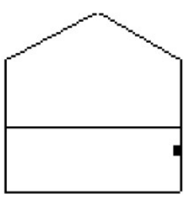
e. Use 30 psf ground snow load for cases in which ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf.

f. Spans are calculated assuming a single span header or girder under uniform load where the top of the header or girder is laterally braced by perpendicular framing. Where the top of the header or girder is not laterally braced (for example, cripple studs bearing on the header), refer to Table R602.7(2). ~~tabulated spans for headers consisting of 2 × 8, 2 × 10, or 2 × 12 sizes shall be multiplied by 0.70 or the header or girder shall be designed.~~

Add new text as follows:

TABLE R602.7(2)
LATERALLY UNSUPPORTED (DROPPED) GIRDER SPANS[a] AND HEADER SPANS[a] FOR EXTERIOR BEARING WALLS (Maximum spans for Douglas Fir-Larch, Hem-Fir, Southern Pine and Spruce-Pine-Fir[b] and required number of jack studs)

		GROUND SNOW LOAD (psf)[e]																	
		30						50						70					
GIRDERS AND HEADERS SUPPORTING	SIZE	Building width[c] (feet)																	
		12		24		36		12		24		36		12		24		36	
		Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]	Span[f]	NJ[d]
	1-2 × 6	3-11	1	3-0	2	2-6	2	3-4	1	2-7	2	2-2	2	3-0	2	2-3	2	1-11	2
	1-2 × 8	4-10	2	3-9	2	3-2	2	4-2	2	3-3	2	2-8	2	3-9	2	2-10	2	2-5	3
	1-2 × 10	5-7	2	4-4	2	3-8	2	4-10	2	3-9	2	3-2	3	4-4	2	3-4	3	2-10	3
	1-2 × 12	6-2	2	4-11	2	4-3	3	5-5	2	4-4	3	3-8	3	4-11	2	3-10	3	3-3	3
	2-2 × 4	3-11	1	3-0	1	2-6	1	3-4	1	2-6	1	2-2	1	3-0	1	2-3	1	1-11	1
Roof and ceiling	2-2 × 6	5-8	1	4-4	1	3-8	1	4-11	1	3-9	1	3-2	2	4-5	1	3-4	2	2-10	2
	2-2 × 8	6-9	1	5-4	1	4-6	2	5-11	1	4-7	2	3-11	2	5-4	1	4-2	2	3-6	2

	2-2 × 10	7-6	1	6-0	2	5-2	2	6-7	2	5-3	2	4-6	2	6-0	2	4-9	2	4-1	2
	2-2 × 12	8-0	2	6-6	2	5-9	2	7-2	2	5-10	2	5-1	2	6-6	2	5-4	2	4-7	3
	3-2 × 8	8-0	1	6-5	1	5-6	1	7-1	1	5-7	1	4-10	2	6-5	1	5-1	2	4-4	2
	3-2 × 10	8-9	1	7-1	1	6-2	2	7-9	1	6-3	2	5-5	2	7-1	1	5-8	2	4-11	2
	3-2 × 12	9-4	1	7-7	2	6-8	2	8-4	2	6-9	2	5-11	2	7-7	2	6-2	2	5-5	2
	4-2 × 8	8-10	1	7-2	1	6-3	1	7-11	1	6-4	1	5-5	1	7-2	1	5-9	1	4-11	2
	4-2 × 10	9-8	1	7-11	1	6-11	1	8-8	1	7-0	1	6-1	2	7-11	1	6-5	2	5-6	2
	4-2 × 12	10-4	1	8-5	1	7-5	2	9-3	1	7-6	2	6-7	2	8-6	1	6-11	2	6-0	2
	1-2 × 6	3-2	1	2-6	2	2-2	2	2-11	2	2-4	2	1-11	2	2-8	2	2-2	2	1-10	2
	1-2 × 8	4-0	2	3-2	2	2-8	2	3-8	2	2-11	2	2-5	3	3-5	2	2-8	2	2-3	3
	1-2 × 10	4-7	2	3-8	2	3-2	3	4-3	2	3-5	3	2-11	3	3-11	2	3-2	3	2-8	3
	1-2 × 12	5-3	2	4-3	3	3-8	3	4-10	2	3-11	3	3-4	3	4-6	3	3-8	3	3-1	4
Roof, ceiling and one center-bearing floor	2-2 × 4	3-2	1	2-6	1	2-1	1	2-11	1	2-3	1	1-11	1	2-8	1	2-1	1	1-9	1
	2-2 × 6	4-8	1	3-8	1	3-2	2	4-4	1	3-4	2	2-10	2	3-11	1	3-2	2	2-8	2
	2-2 × 8	5-8	1	4-6	2	3-11	2	5-3	2	4-2	2	3-7	2	4-10	2	3-11	2	3-4	2
	2-2 × 10	6-4	2	5-2	2	4-6	2	5-11	2	4-10	2	4-2	2	5-6	2	4-6	2	3-10	2
	2-2 × 12	6-10	2	5-9	2	5-0	2	6-5	2	5-4	2	4-8	3	6-1	2	5-0	2	4-5	3
	3-2 × 8	6-9	1	5-6	1	4-9	2	6-4	1	5-1	2	4-5	2	5-11	1	4-9	2	4-1	2
	3-2 × 10	7-5	1	6-2	2	5-5	2	7-0	1	5-9	2	5-0	2	6-6	2	5-5	2	4-8	2
	3-2 × 12	8-0	2	6-8	2	5-11	2	7-6	2	6-3	2	5-6	2	7-0	2	5-11	2	5-2	2
	4-2 × 8	7-7	1	6-3	1	5-5	1	7-1	1	5-9	1	5-0	2	6-7	1	5-5	1	4-8	2
	4-2 × 10	8-4	1	6-11	2	6-1	2	7-9	1	6-5	2	5-7	2	7-4	1	6-1	2	5-3	2
	4-2 × 12	8-11	1	7-5	2	6-7	2	8-4	2	6-11	2	6-2	2	7-10	2	6-7	2	5-10	2
	1-2 × 6	2-11	2	2-3	2	1-10	2	2-8	2	2-1	2	1-9	2	2-7	2	1-11	2	1-8	2
	1-2 × 8	3-8	2	2-10	2	2-4	3	3-5	2	2-7	2	2-2	3	3-2	2	2-6	3	2-1	3
	1-2 × 10	4-3	2	3-4	3	2-9	3	4-0	2	3-1	3	2-7	3	3-9	2	2-11	3	2-5	3
	1-2 × 12	4-10	2	3-10	3	3-3	3	4-6	3	3-7	3	3-0	4	4-4	3	3-4	3	2-10	4
Roof, ceiling and one clear-span floor	2-2 × 4	2-11	1	2-3	1	1-10	1	2-8	1	2-1	1	1-9	1	2-6	1	1-11	1	1-7	1
	2-2 × 6	4-3	1	3-3	2	2-9	2	4-0	1	3-1	2	2-7	2	3-9	1	2-10	2	2-5	2
	2-2 × 8	5-2	2	4-1	2	3-6	2	4-10	2	3-10	2	3-3	2	4-7	2	3-7	2	3-0	2
	2-2 × 10	5-10	2	4-8	2	4-0	2	5-6	2	4-5	2	3-9	2	5-3	2	4-2	2	3-7	3
	2-2 × 12	6-4	2	5-3	2	4-7	3	6-1	2	4-11	2	4-3	3	5-9	2	4-8	3	4-1	3
	3-2 × 8	6-3	1	5-0	2	4-3	2	5-11	1	4-8	2	4-0	2	5-7	1	4-5	2	3-9	2
	3-2 × 10	6-11	2	5-7	2	4-10	2	6-7	2	5-3	2	4-7	2	6-3	2	5-0	2	4-4	2
	3-2 × 12	7-5	2	6-1	2	5-5	2	7-1	2	5-10	2	5-1	2	6-9	2	5-6	2	4-10	3
	4-2 × 8	7-0	1	5-8	1	4-10	2	6-8	1	5-4	2	4-6	2	6-4	1	5-0	2	4-3	2
	4-2 × 10	7-8	1	6-3	2	5-6	2	7-4	1	5-11	2	5-2	2	7-0	1	5-8	2	4-11	2
	4-2 × 12	8-3	2	6-9	2	6-0	2	7-10	2	6-5	2	5-8	2	7-6	2	6-2	2	5-5	2
	1-2 × 6	2-8	2	2-1	2	1-10	2	2-6	2	2-0	2	1-8	2	2-5	2	1-11	2	1-7	2
	1-2 × 8	3-4	2	2-8	2	2-3	3	3-2	2	2-6	2	2-2	3	3-0	2	2-4	3	2-0	3
	1-2 × 10	3-11	2	3-2	3	2-8	3	3-8	2	2-11	3	2-6	3	3-6	2	2-9	3	2-5	3
	1-2 × 12	4-6	3	3-8	3	3-2	4	4-3	3	3-5	3	2-11	4	4-1	3	3-3	3	2-9	4
Roof, ceiling and two center-bearing floors	2-2 × 4	2-8	1	2-1	1	1-9	1	2-6	1	2-0	1	1-8	1	2-4	1	1-10	1	1-7	1
	2-2 × 6	3-11	1	3-1	2	2-8	2	3-8	1	2-11	2	2-6	2	3-6	1	2-9	2	2-4	2
	2-2 × 8	4-10	2	3-11	2	3-4	2	4-7	2	3-8	2	3-2	2	4-4	2	3-5	2	2-11	2
	2-2 × 10	5-6	2	4-6	2	3-11	2	5-2	2	4-3	2	3-8	3	5-0	2	4-0	2	3-6	3
	2-2 × 12	6-0	2	5-0	2	4-5	3	5-9	2	4-9	3	4-2	3	5-6	2	4-7	3	4-0	3
	3-2 × 8	5-10	1	4-9	2	4-1	2	5-6	1	4-6	2	3-10	2	5-3	2	4-3	2	3-8	2
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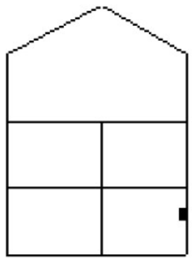
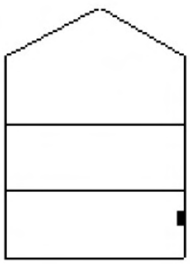


Roof, ceiling, and two clear-span floors



3-2 × 12	7-0	2	5-11	2	5-3	2	6-8	2	5-7	2	5-0	3	6-5	2	5-5	2	4-9	3
4-2 × 8	6-7	1	5-5	1	4-8	2	6-3	1	5-1	2	4-5	2	6-0	1	4-10	2	4-2	2
4-2 × 10	7-3	1	6-0	2	5-4	2	6-11	2	5-9	2	5-0	2	6-8	2	5-6	2	4-9	2
4-2 × 12	7-9	2	6-6	2	5-10	2	7-5	2	6-3	2	5-6	2	7-2	2	6-0	2	5-4	2
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1-2 × 8	2-10	2	2-2	3	1-10	3	2-10	2	2-2	3	1-10	3	2-8	2	2-1	3	1-9	3
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2-2 × 8	4-1	2	3-2	2	2-8	2	4-1	2	3-2	2	2-8	2	3-11	2	3-1	2	2-7	3
2-2 × 10	4-9	2	3-8	2	3-2	3	4-8	2	3-8	2	3-2	3	4-6	2	3-7	3	3-0	3
2-2 × 12	5-4	2	4-3	3	3-8	3	5-3	2	4-3	3	3-8	3	5-1	2	4-1	3	3-6	3
3-2 × 8	5-0	1	3-11	2	3-4	2	5-0	2	3-11	2	3-4	2	4-10	2	3-9	2	3-2	2
3-2 × 10	5-9	2	4-7	2	3-10	2	5-7	2	4-6	2	3-10	2	5-5	2	4-4	2	3-9	3
3-2 × 12	6-4	2	5-2	2	4-5	3	6-2	2	5-0	2	4-5	3	5-11	2	4-10	3	4-3	3
4-2 × 8	5-9	1	4-6	2	3-10	2	5-8	1	4-6	2	3-10	2	5-5	1	4-4	2	3-8	2
4-2 × 10	6-6	2	5-2	2	4-5	2	6-4	2	5-1	2	4-5	2	6-1	2	4-11	2	4-3	2
4-2 × 12	7-1	2	5-9	2	5-0	2	6-10	2	5-7	2	4-11	2	6-7	2	5-5	2	4-9	3

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Spans are given in feet and inches.

b. Spans are based on minimum design properties for No. 2 grade lumber of Douglas Fir-Larch, Hem-Fir, Southern Pine, and Spruce-Pine-Fir.

c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.

d. NJ = Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.

e. Use 30 psf ground snow load for cases in which ground snow load is less than 30 psf and the roof live load is equal to or less than 20 psf.

f. Spans are calculated assuming a single span header or girder under uniform load where the top of the header or girder is not laterally braced by perpendicular framing.

Revise as follows:

~~TABLE R602.7(2)~~ TABLE R602.7(3) LATERALLY SUPPORTED GIRDER SPANS[a] AND HEADER SPANS[a] FOR INTERIOR BEARING WALLS (Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir[b] and required number of jack studs)

Portions of table not shown remain unchanged.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

e. Spans are calculated assuming a single span header or girder under uniform load where the top of the header or girder is laterally braced by perpendicular framing. Where the top of the header or girder is not laterally braced (for example, cripple studs bearing on the header), refer to Table R602.7(4). ~~tabulated spans for headers consisting of 2 × 8, 2 × 10, or 2 × 12 sizes shall be multiplied by 0.70 or the header or girder shall be designed~~.

Add new text as follows:

R602.7(4)

TABLE R602.7(4)

LATERALLY UNSUPPORTED (DROPPED) GIRDER SPANS[a] AND HEADER SPANS[a] FOR INTERIOR BEARING WALLS (Maximum spans for Douglas Fir-Larch, Hem-Fir, Southern Pine and Spruce-Pine-Fir[b] and required number of jack studs)

GIRDERS AND HEADERS SUPPORTING	SIZE	Building Width[c] (feet)					
		12		24		36	
		Span[e]	NJ[d]	Span[e]	NJ[d]	Span[e]	NJ[d]
One floor only	2-2 × 4	4-0	1	2-10	1	2-4	1
	2-2 × 6	5-11	1	4-3	1	3-5	1
	2-2 × 8	7-1	1	5-2	1	4-4	2
	2-2 × 10	7-11	1	5-11	2	5-0	2
	2-2 × 12	8-6	1	6-7	2	5-7	2
	3-2 × 8	8-5	1	6-4	1	5-3	1
	3-2 × 10	9-3	1	7-1	1	6-0	2
	3-2 × 12	9-11	1	7-8	2	6-7	2
	4-2 × 8	9-5	1	7-2	1	6-0	1
	4-2 × 10	10-3	1	7-11	1	6-9	1
	4-2 × 12	11-0	1	8-7	1	7-4	2
Two floors	2-2 × 4	2-7	1	1-11	1	1-7	1
	2-2 × 6	3-10	1	2-10	2	2-5	2
	2-2 × 8	4-9	1	3-7	2	3-0	2
	2-2 × 10	5-6	2	4-2	2	3-6	2
	2-2 × 12	6-1	2	4-9	2	4-1	3
	3-2 × 8	5-10	1	4-5	2	3-9	2
	3-2 × 10	6-7	1	5-1	2	4-4	2
	3-2 × 12	7-2	2	5-8	2	4-11	2
	4-2 × 8	6-7	1	5-4	1	4-5	2
	4-2 × 10	7-5	1	5-9	2	4-11	2
	4-2 × 12	8-0	1	6-4	2	5-6	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Spans are given in feet and inches.

b. Spans are based on minimum design properties for No. 2 grade lumber of Douglas Fir-Larch, Hem-Fir, Southern Pine, and Spruce-Pine-Fir.

c. Building width is measured perpendicular to the ridge. For widths between those shown, spans are permitted to be interpolated.

d. NJ = Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an approved framing anchor attached to the full-height wall stud and to the header.

e. Spans are calculated assuming a single span header or girder under uniform load where the top of the header or girder is not laterally braced by perpendicular framing.

Reason: Laterally unsupported header and girder spans are currently addressed by a conservative adjustment in footnote f of the existing header/girder span tables. Spans for laterally unsupported headers and girders are added consistent with ANSI/AWC 2024 Wood Frame Construction Manual to show appropriate spans, avoiding the unnecessary conservatism. With this proposal, the laterally unsupported header and girder condition is now addressed by stand-alone tables and no longer needs to be addressed through an adjustment factor footnote. Existing tables have been renumbered and titles have been revised to reflect that they are applicable to laterally supported headers and girders.

Additionally, language has been added to the footnotes to clarify that all header and girder calculations are based on the assumption that they are single-span headers or girders. This clarification is necessary as multi-span headers are not addressed by the tables.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal revises the code for laterally unsupported (dropped) header and girder spans. The new tables remove unnecessary conservatism, therefore this proposal could potentially decrease construction costs where the tables are used. The decrease in cost is conservatively estimated as $0.

RB191-25

RB192-25

IRC: TABLE R602.7(2)

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

TABLE R602.7(2) GIRDER SPANS[a] AND HEADER SPANS[a] FOR INTERIOR BEARING WALLS (Maximum spans for Douglas fir-larch, hem-fir, southern pine and spruce-pine-fir[b] and required number of jack studs)

HEADERS AND GIRDERS SUPPORTING	SIZE	BUILDING Width[c] (feet) 12		24		36	
		Span[e]	NJ[d]	Span[e]	NJ[d]	Span[e]	NJ[d]
One floor only	2-2 × 4	4-1	1	2-10	1	2-4	1
	2-2 × 6	6-1	1	4-4	1	3-6	1
	2-2 × 8	7-9	1	5-5	1	4-5	2
	2-2 × 10	9-2	1	6-6	2	5-3	2
	2-2 × 12	10-9	1	7-7	2	6-3	2
	3-2 × 8	9-8	1	6-10	1	5-7	1
	3-2 × 10	11-5	1	8-1	1	6-7	2
	3-2 × 12	13-6	1	9-6	2	7-9	2
	4-2 × 8	11-2	1	7-11	1	6-5	1
	4-2 × 10	13-3	1	9-4	1	7-8	1
	4-2 × 12	15-7	1	11-0	1	9-0	2
Two floors	2-2 × 4	2-7	1	1-11	1	1-7	1
	2-2 × 6	3-11	1	2-11	2	2-5	2
	2-2 × 8	5-0	1	3-8	2	3-1	2
	2-2 × 10	5-11	2	4-4	2	3-7	2
	2-2 × 12	6-11	2	5-2	2	4-3	3
	3-2 × 8	6-3	1	4-7	2	3-10	2
	3-2 × 10	7-5	1	5-6	2	4-6	2
	3-2 × 12	8-8	2	6-5	2	5-4	2
	4-2 × 8	7-2	1	5-4	1	4-5	2
	4-2 × 10	8-6	1	6-4	2	5-3	2
	4-2 × 12	10-1	1	7-5	2	6-2	2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. Spans are given in feet and inches.

b. Spans are based on minimum design properties for No. 2 grade lumber of Douglas fir-larch, hem-fir, Southern pine, and spruce-pine-fir.

c. Building width is measured perpendicular to the girder or header ~~ridge~~. For widths between those shown, spans are permitted to be interpolated.

d. NJ = Number of jack studs required to support each end. Where the number of required jack studs equals one, the header is permitted to be supported by an *approved* framing anchor attached to the full-height wall stud and to the header.

e. Spans are calculated assuming the top of the header or girder is laterally braced by perpendicular framing. Where the top of the header or girder is not laterally braced (for example, cripple studs bearing on the header), tabulated spans for headers consisting of 2 × 8, 2 × 10, or 2 × 12 sizes shall be multiplied by 0.70 or the header or girder shall be designed.

Reason: "Building width" is just a way for the IRC to figure out the rafter or joist span for the sake of sizing beams and headers. Measuring the building width needs to be in the direction parallel to the rafter or joist being supported. When sizing headers in exterior walls, rafters are being supported, and thus "building width" is perpendicular to the ridge supporting those rafters. However, for this table, girders and headers for interior walls are being sized. Under the prescriptive design method of "conventional wood frame construction" the roof is clear span and not supported by interior bearing walls. Yes... the use of purlins to support rafters mid span do transfer those loads to interior walls, but this table is appears to be based on the floor loads only. With that in mind, it seems that "building width" for use of this table would not care about the roof orientation, but rather the joist orientation. Thus the description of "building width" should be in reference to the direction of the joists and exterior walls and not the roof ridge. It is not uncommon for a building to have joists running in a direction different from the roof rafters.

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

Justification for no cost impact:

This proposal only clarifies the existing intent of the IRC and does not affect the cost of construction.

RB192-25

RB193-25

IRC: R602.10.1.2, FIGURE R602.10.1.1

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

Revise as follows:

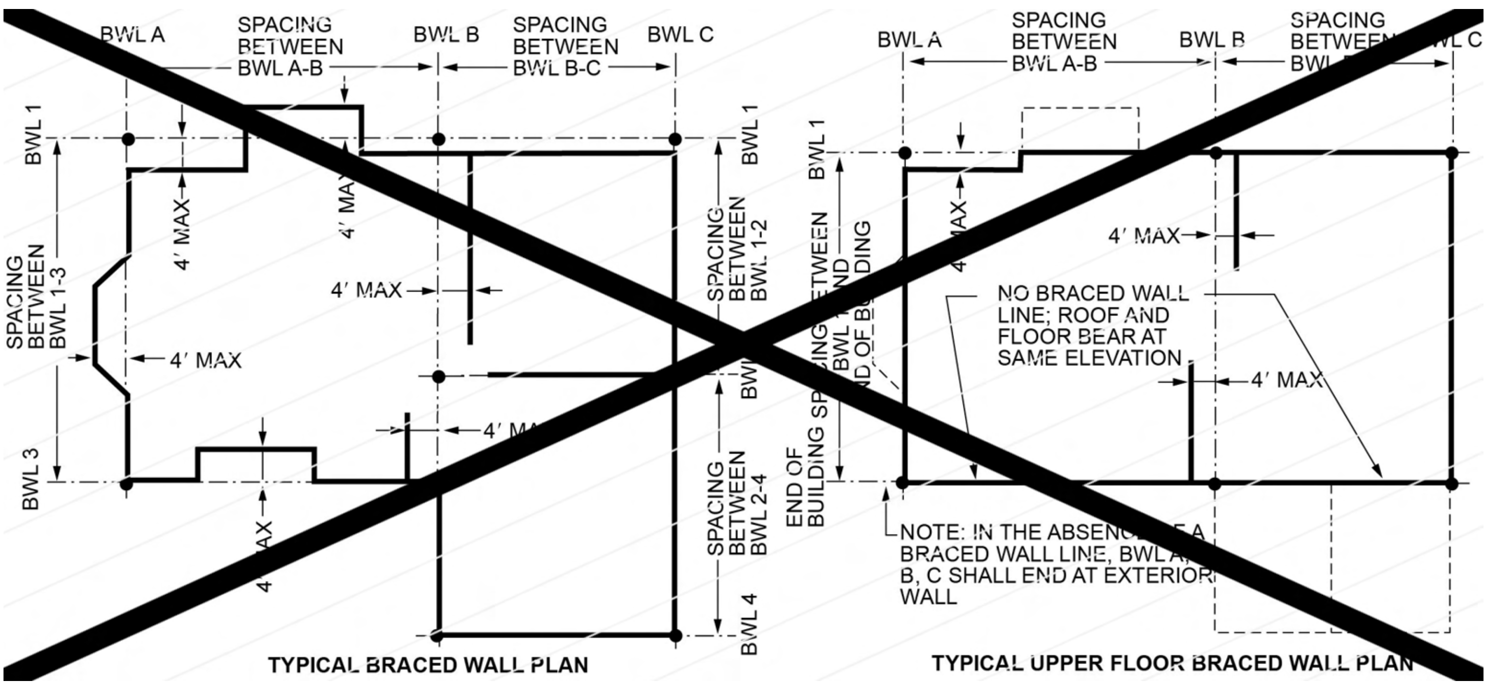
R602.10.1.2 Location of braced wall lines and permitted offsets. A braced wall line shall be provided at each exterior wall, as illustrated in Figure R602.10.1.1.

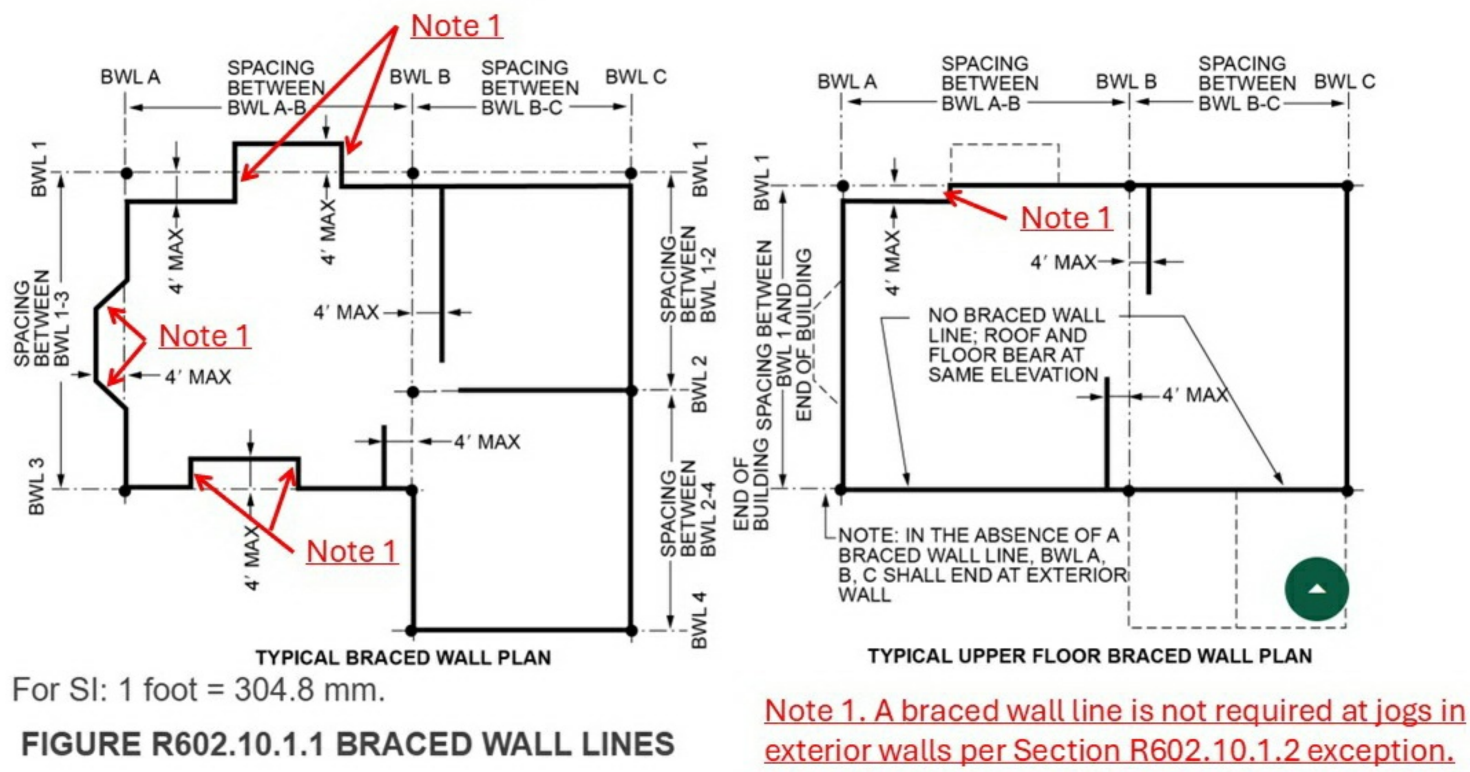
Exception: A braced wall line is not required at jogs within exterior walls, as illustrated in Figure R602.10.1.1, provided that the jogs are less than eight feet long and oriented perpendicular to or at an angle to the exterior braced wall line.

In addition, interior braced wall lines shall be provided as required to meet the braced wall line spacing requirements of Section R602.10.1.13. Each *braced wall line* shall be located such that no more than two-thirds of the required *braced wall panel* length is located to one side of the *braced wall line*. *Braced wall panels* shall be permitted to be offset up to 4 feet (1219 mm) from the designated *braced wall line*. *Braced wall panels* parallel to a *braced wall line* shall be offset not more than 4 feet (1219 mm) from the designated *braced wall line* location as shown in Figure R602.10.1.1.

~~Exterior walls parallel to a *braced wall line* shall be offset not more than 4 feet (1219 mm) from the designated *braced wall line* location as shown in Figure R602.10.1.1.~~

~~Interior walls used as bracing shall be offset not more than 4 feet (1219 mm) from a *braced wall line* through the interior of the *building* as shown in Figure R602.10.1.1.~~





For SI: 1 foot = 304.8 mm.

FIGURE R602.10.1.1 BRACED WALL LINES

Reason: This code change proposal is restoring the explicit statement of a design provision that was inadvertently lost in the 2009 IRC provisions. The earlier IRC provisions were based on conventional construction provisions from the UBC which initially only required bracing at exterior walls and in 1994 added interior braced wall line requirements. 2006 IRC Section R602.10 wall bracing required "All exterior walls shall be braced in accordance with this section. In addition, interior braced wall lines shall be provided in accordance with Section R602.10.1.1…." Braced wall lines at exterior walls are illustrated in Figure R602.10.1.1, but they are no longer explicitly required by the code text. This code change proposal corrects this significant error by reestablishing text requiring braced wall lines at exterior walls.

The exception allows for jogging of the exterior wall, as is common in modern floor plans. Until the length of a jog exceeds eight feet, no bracing will be required within the jog.

Once the basic provisions make clear that braced wall lines are required at exterior walls and additional interior braced wall lines are required to meet spacing requirements, the final two sentences, which imply this in a more indirect fashion, become redundant and can be deleted.

From a technical standpoint, the wind and seismic bracing requirements of the IRC are intended to provide design and performance consistent with that provided for buildings engineered in accordance with the IBC. This has been achieved in the current and prior IRC bracing provisions by using pre-engineered example buildings to derive the wind and seismic bracing tables. Inherent in the pre-engineering is the assumption that exterior walls serve as braced wall lines. If this is not achieved, then the resulting dwellings are not likely to meet the performance targets that are intended. This is a very basic and important aspect of the wind and seismic bracing provisions that needs to be corrected. If this cannot be corrected then the IRC wind and seismic bracing provisions can no longer be relied on to be equivalent to the requirements of the IBC.

Further, spacing between braced wall lines is both regulated by the IRC and used in looking up the amount of bracing required in each braced wall line. The starting point for measuring braced wall line spacing is intended to be the exterior walls. If these are not set as the origin for braced wall line spacing, then braced wall line layout can no longer be consistently established, leading to inconsistent implementation and resulting inconsistent performance.

Note that where the IRC seismic provisions apply, this section is further restricted by Section R301.2.2.6, Item 2 would designate as irregular a dwelling that does not have wall bracing at all edges of the floor and roof, meaning that it is beyond the scope of the IRC. An exception allows a floor or roof cantilever of up to six feet past the braced wall line. For these dwellings the Section R602.10.1.2.1 are reiterating requirements that are already in place.

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

Justification for no cost impact:

Proposal is entirely clarification and editorial to maintain past practice, with no substantive effect.

RB193-25

RB194-25

IRC: R602.10.2.2.1, R602.10.2.2.1 (New), FIGURE R602.10.7

Proponents: Chris Wong, SE, City of Hillsboro, representing Oregon Building Officials Association Codes Committee (chris.wong@hillsboro-oregon.gov); Paul Vinje, City of Hillsboro, representing Oregon Building Officials Codes Committee (paul.vinje@hillsboro-oregon.gov)

2024 International Residential Code

Revise as follows:

R602.10.2.2.1 Location of braced wall panels in Seismic Design Categories D_0, D_1 and D_2. *Braced wall panels* shall be located at each end of a *braced wall line*.

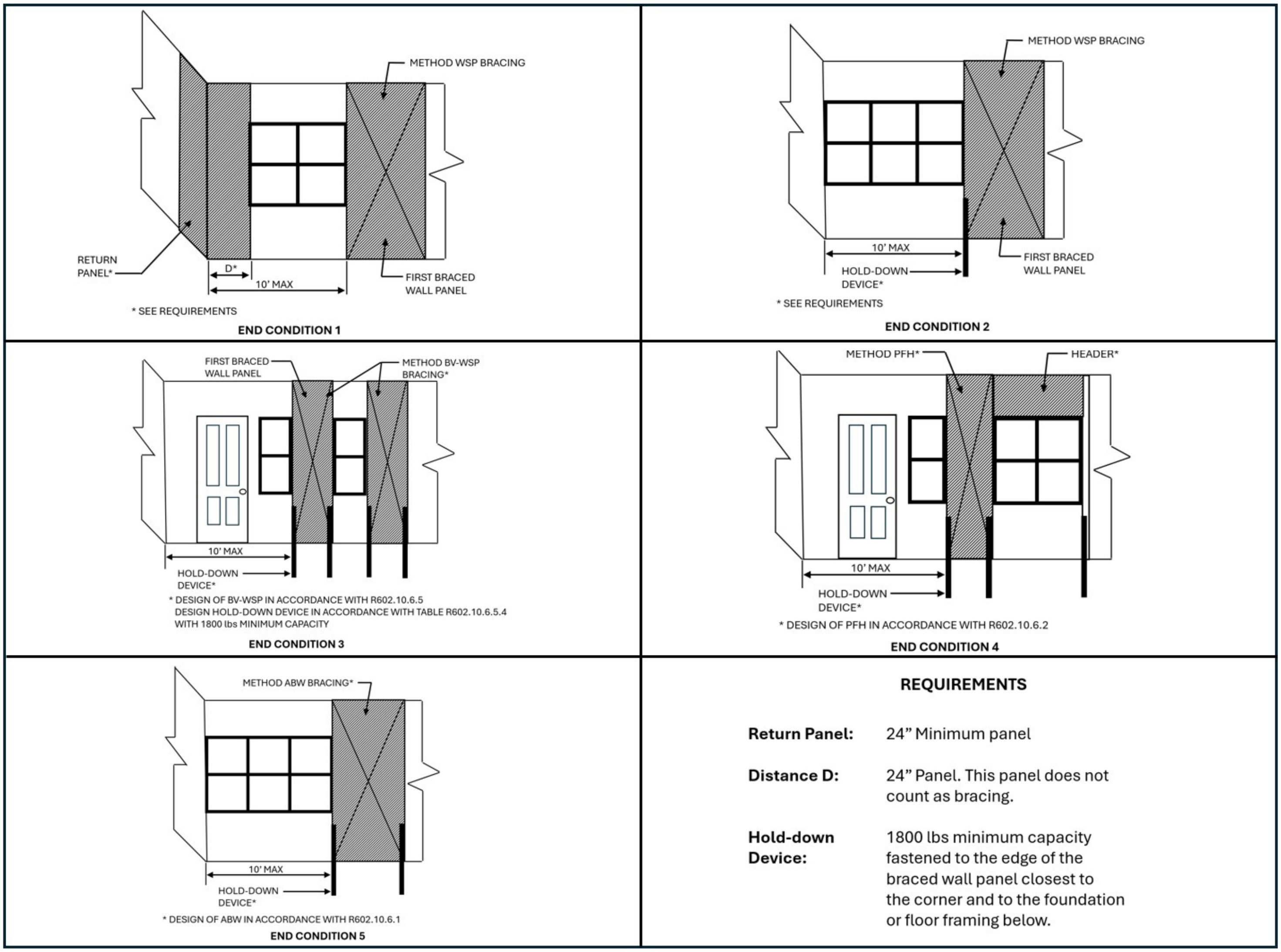
Exceptions~~s~~:

~~1.~~ *Braced wall panels* ~~constructed of Method WSP or BV-WSP and continuous sheathing methods as specified in Section R602.10.4~~ shall be permitted to begin not more than 10 feet (3048 mm) from each end of a *braced wall line* ~~provided that each end complies~~ in accordance with one of the following:

- ~~1.~~1. ~~A minimum 24-inch-wide (610 mm) panel for~~ Intermittent Braced Wall Method ~~s WSP, CS-WSP, CS-G and CS-PF is applied to each side of the building corner~~ shall have one of the conditions ~~as~~ shown in ~~End Condition 4 of~~ Figure ~~R602.10.7~~ R602.10.2.2.1.
- ~~1.~~2. ~~The end of each *braced wall panel* closest to the end of the *braced wall line* shall have an 1,800-pound (8 kN) hold-down device fastened to the stud at the edge of the *braced wall panel* closest to the corner and to the foundation or framing below as shown in End Condition 5 of Figure~~ R602.10.7 Continuous sheathing methods in accordance with Section R602.10.4.2.

~~2. *Braced wall panels* constructed of Method PFH or ABW, or of Method BV-WSP where a hold-down is provided in accordance with Table R602.10.6.5.4, shall be permitted to begin not more than 10 feet (3048 mm) from each end of a *braced wall line*.~~

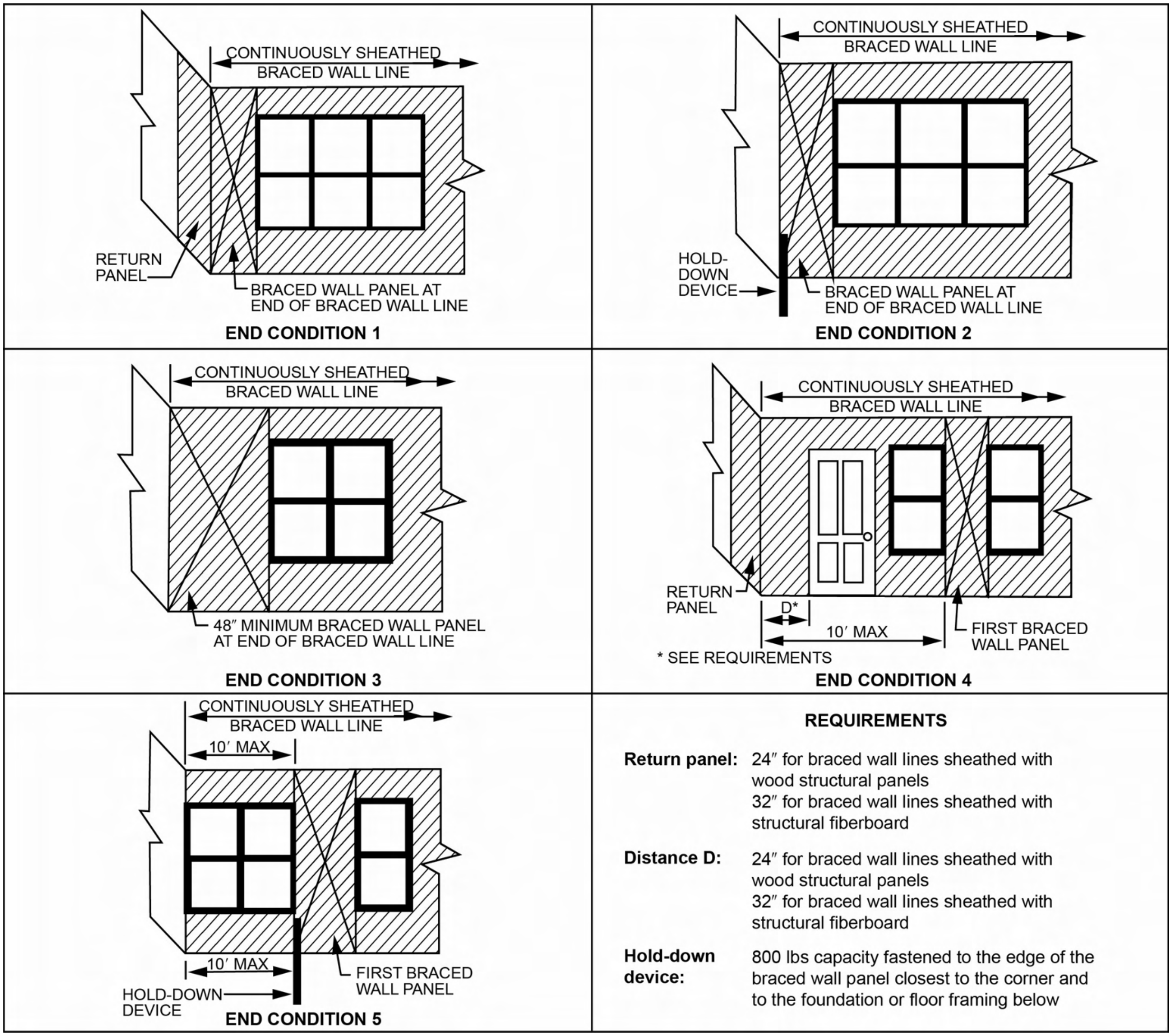
Add new text as follows:



R602.10.2.2.1

END CONDITIONS FOR BRACED WALL LINES FOR INTERMITTENT BRACED WALL METHODS IN SEISMIC DESIGN CATEGORIES D0, D1, AND D2

Revise as follows:



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 4.45 N.

a. In Seismic Design Categories D_0, D_1 and D_2, End Condition 4 applies to Methods CS-WSP, CS-G and CS-PF.

b. In Seismic Design Categories D_0, D_1 and D_2, the hold-down device for End Condition 5 shall have a 1,800lb minimum capacity.

FIGURE R602.10.7 END CONDITIONS FOR BRACED WALL LINES WITH CONTINUOUS SHEATHING a, b

Reason: The proposal is to help clarify the exceptions of Section R602.10.2.2.1. As currently written the exception allows for the location of the first braced wall panel of intermittent braced wall methods WSP and BV-WSP to be not more than 10 feet from each end of the braced wall line provided they comply with either End Condition 4 or End Condition 5 of Figure R602.10.7. This reference back to a figure that is specifically specified in the continuous sheathed braced wall method has caused a great deal of confusion to some designers and developers. To help clarify the use of the exception of Section R602.10.2.2.1 for intermittent braced wall methods, it is being proposed that a new figure be introduce to capture these exceptions similar to how the continuous sheathed braced wall methods are depicted in a figure and not specified in text. By providing this new figure, it helps to clearly identify how to achieve the end of braced wall line, braced wall panel offset for the intermittent braced wall methods, and making this more consistent with how the end of braced wall conditions are shown for the continuous sheathed method.

Lastly, because this code section applied to all braced wall methods in seismic design categories D0, D1, and D2, the requirements for the continuous sheathed braced wall methods are directed back to the appropriate section, Section R602.10.4.2, and the additional requirement of allowing the use of end condition 4 for CS-WSP, CS-G, and CS-PF; and the additional requirement of 1800 lb tie-down device for end condition 5 of Figure R602.10.7 has been added as a footnotes to the figure continuous sheathing end condition figure R602.10.7.

Bibliography: International Code Council, "A Guide to the 2018 IRC Wood Wall Bracing Provisions" , June 2018. [Online]. Available: ICC Digital Codes Premium Complete.

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

Justification for no cost impact:

The code change proposal is to simplify and graphically depict the requirements of R602.10.2.2.1.

RB194-25

RB195-25

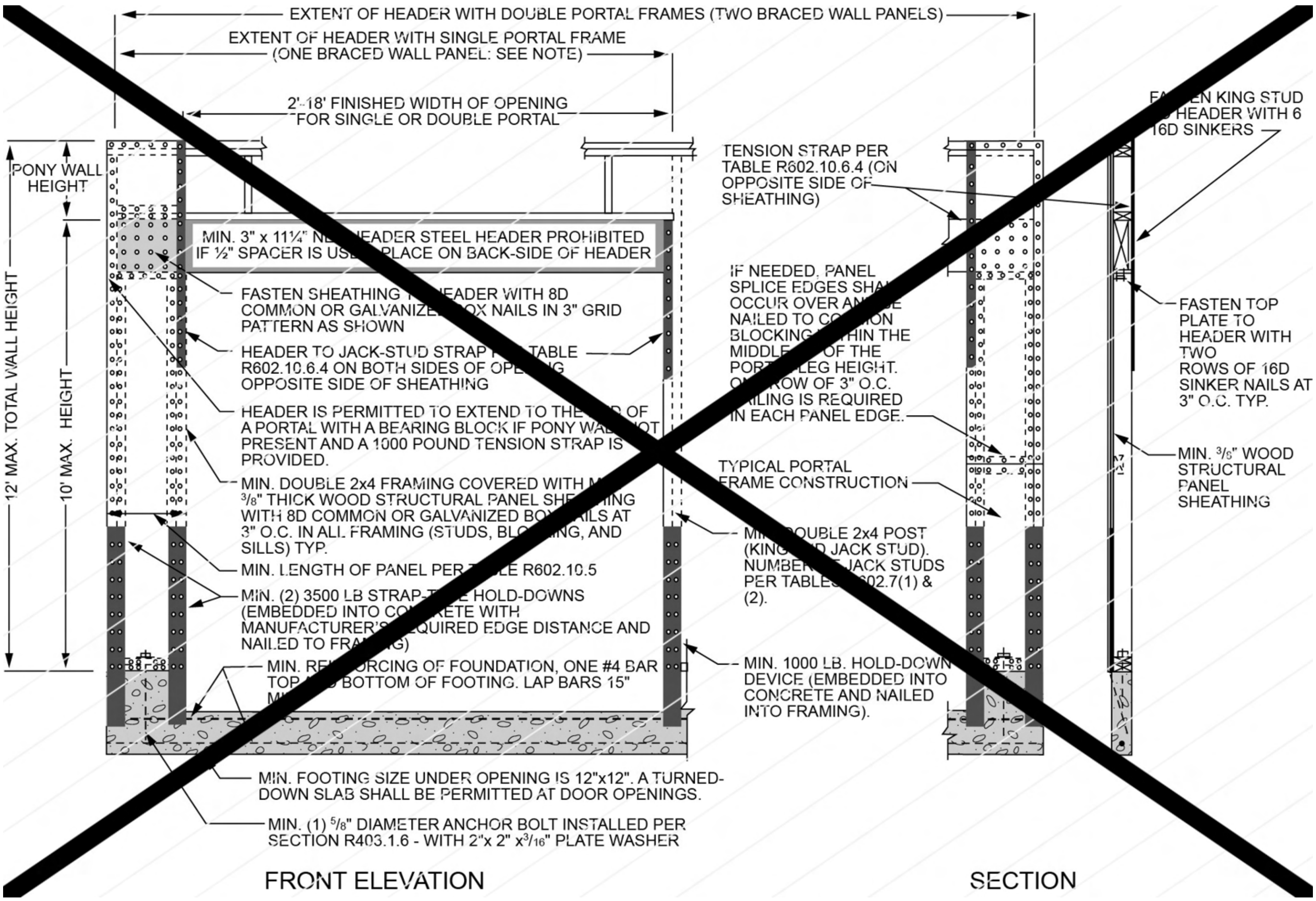
IRC: R602.10.6.2, FIGURE R602.10.6.2, R602.10.6.3, FIGURE R602.10.6.3, R602.10.6.4, FIGURE R602.10.6.4

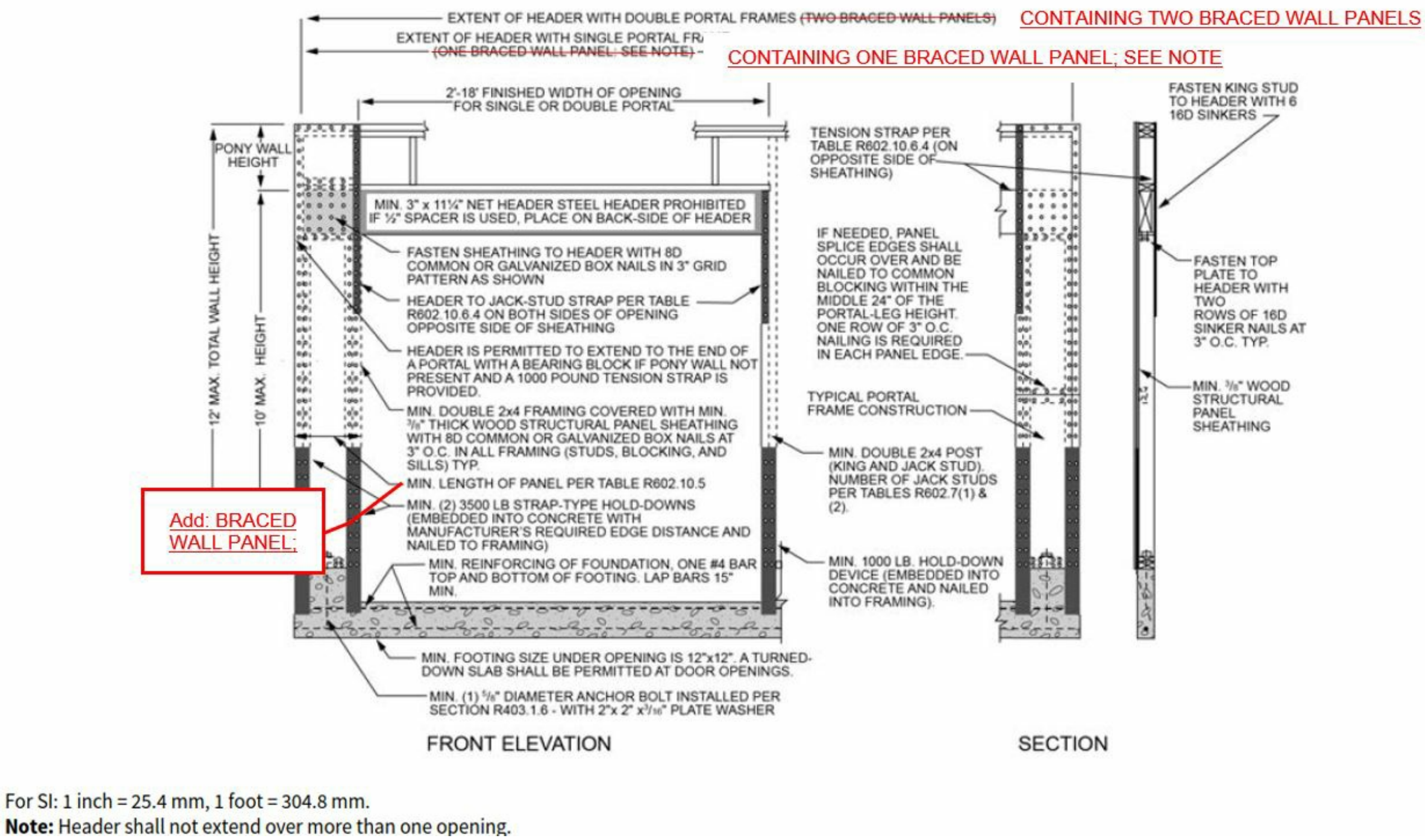
Proponents: Borjen Yeh, representing APA - The Engineered Wood Association (borjen.yeh@apawood.org)

2024 International Residential Code

R602.10.6.2 Method PFH: Portal frame with hold-downs. Method PFH *braced wall panels* shall be constructed in accordance with Figure R602.10.6.2.

Revise as follows:



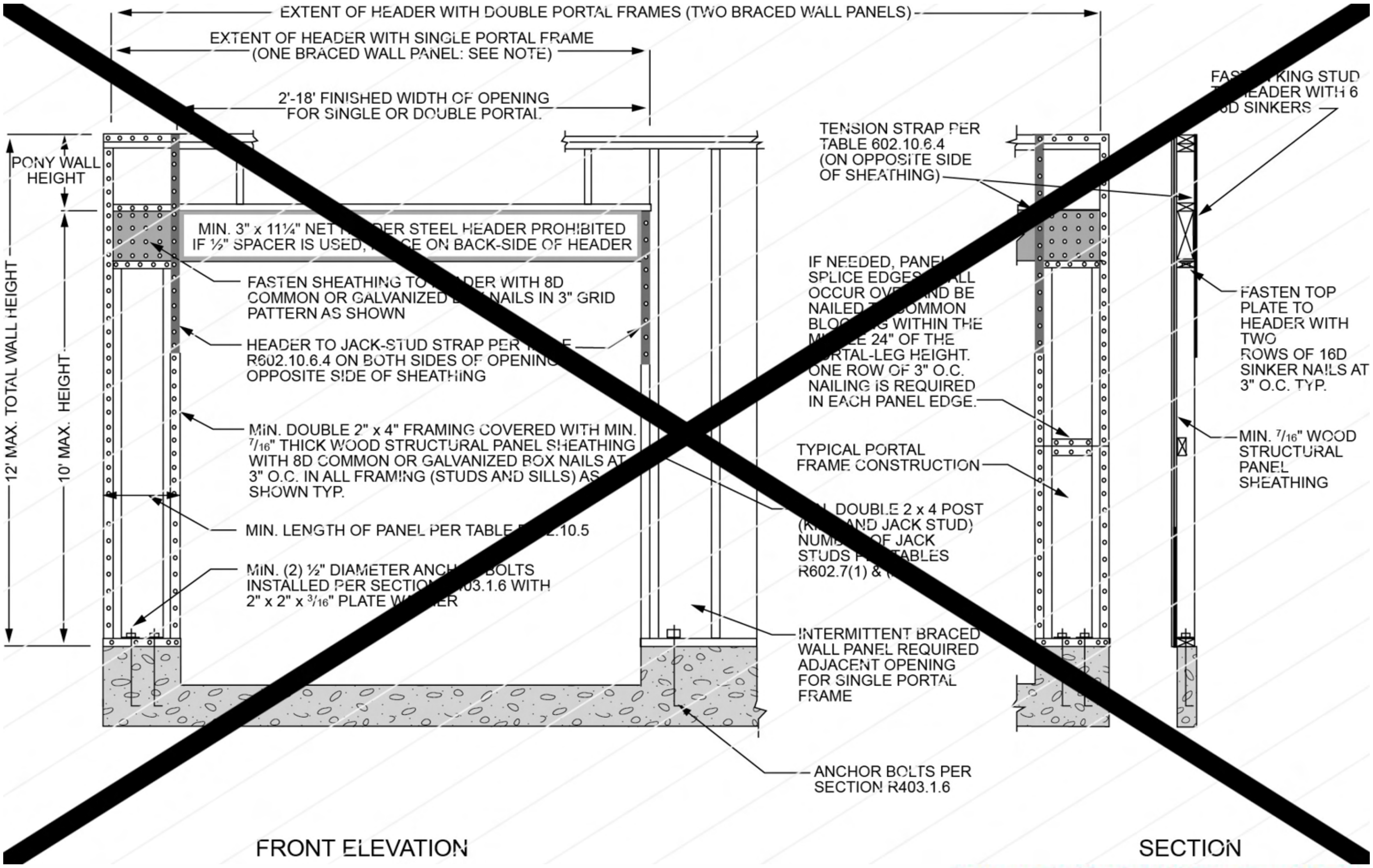


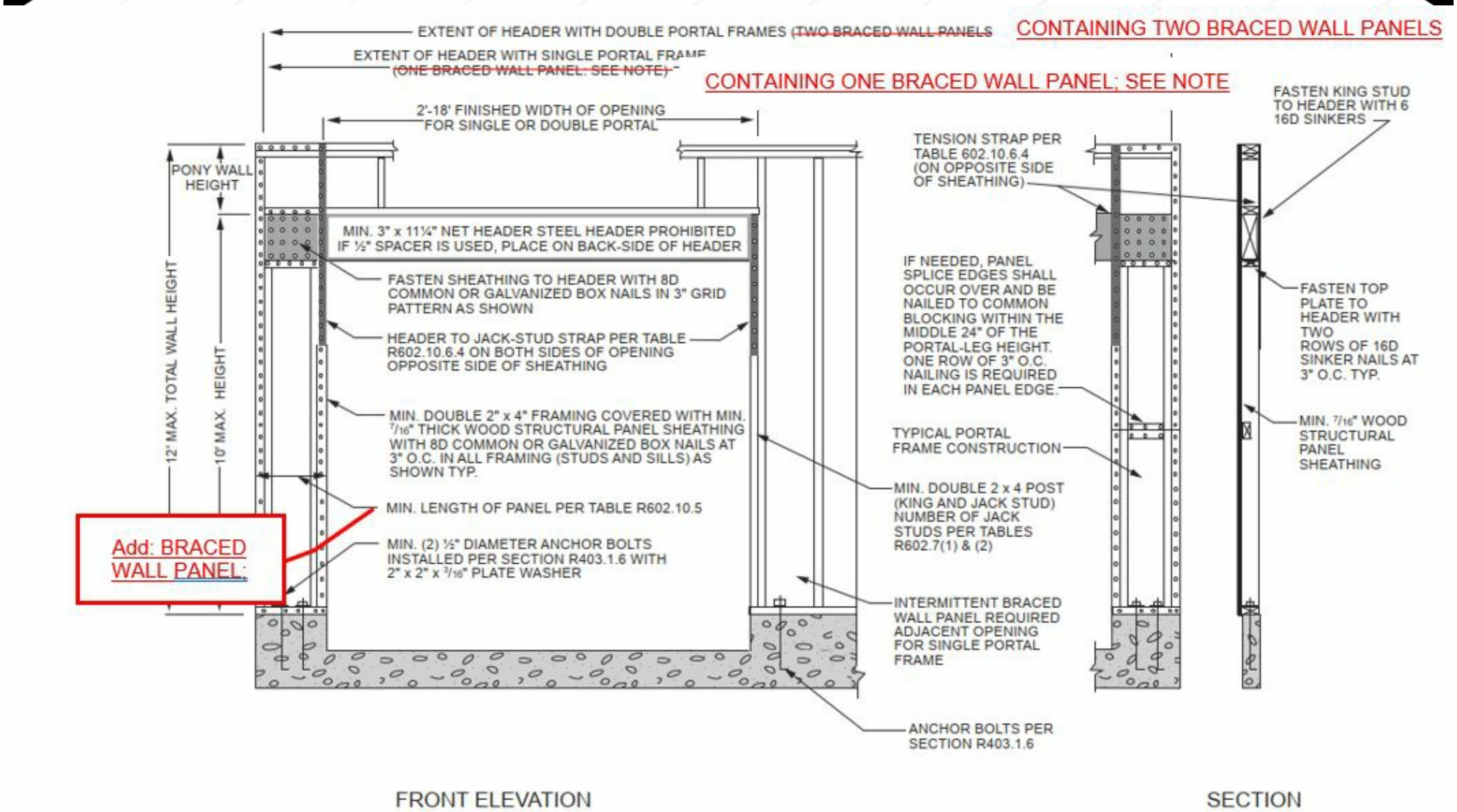
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Note: Header shall not extend over more than one opening.

FIGURE R602.10.6.2 METHOD PFH—PORTAL FRAME WITH HOLD-DOWNS

R602.10.6.3 Method PFG: Portal frame at garage door openings in Seismic Design Categories A, B and C. Where supporting a roof or one *story* and a roof, a Method PFG *braced wall panel* constructed in accordance with Figure R602.10.6.3 shall be permitted on either side of garage door openings.





For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

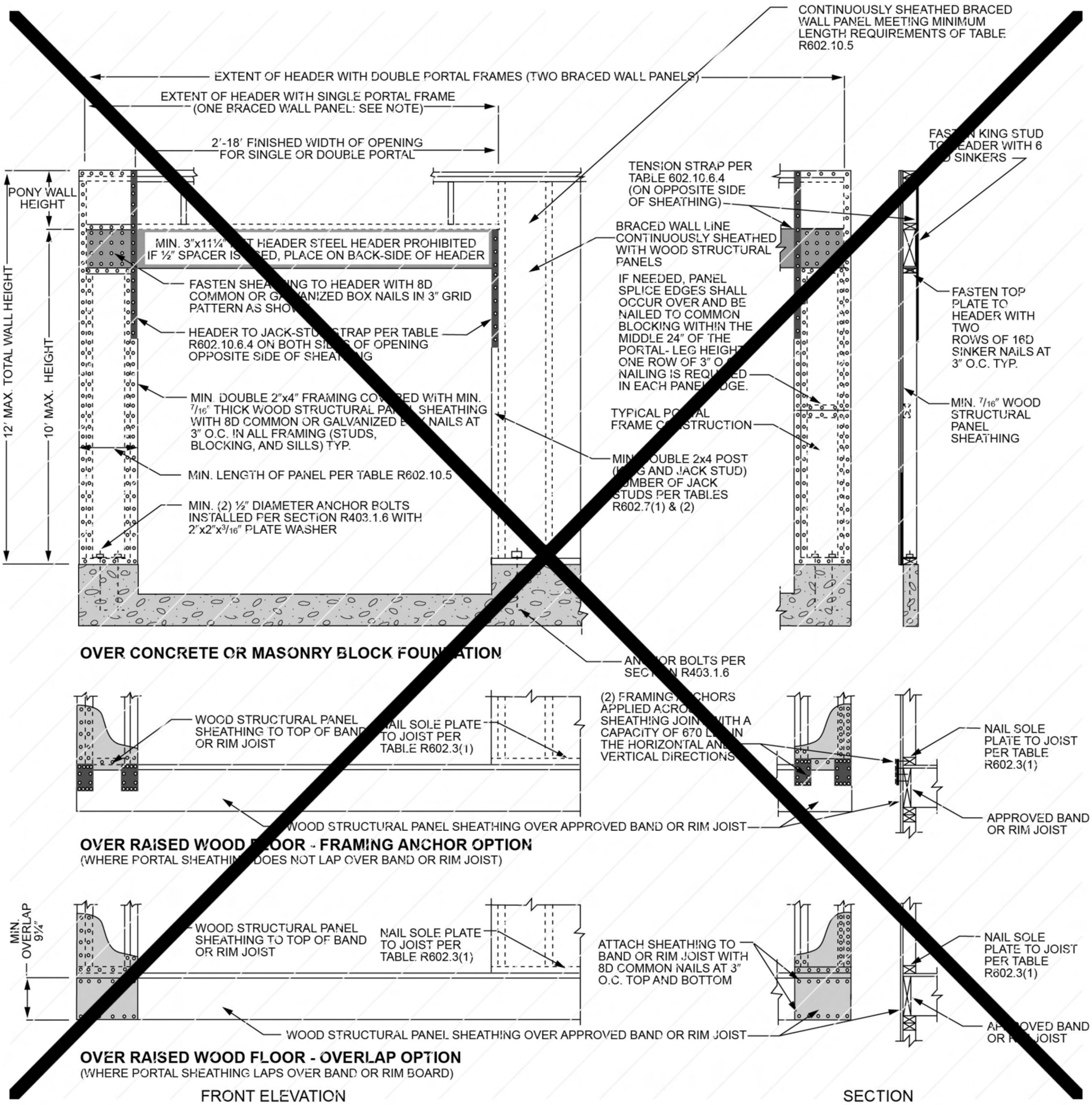
Note: Header shall not extend over more than one opening.

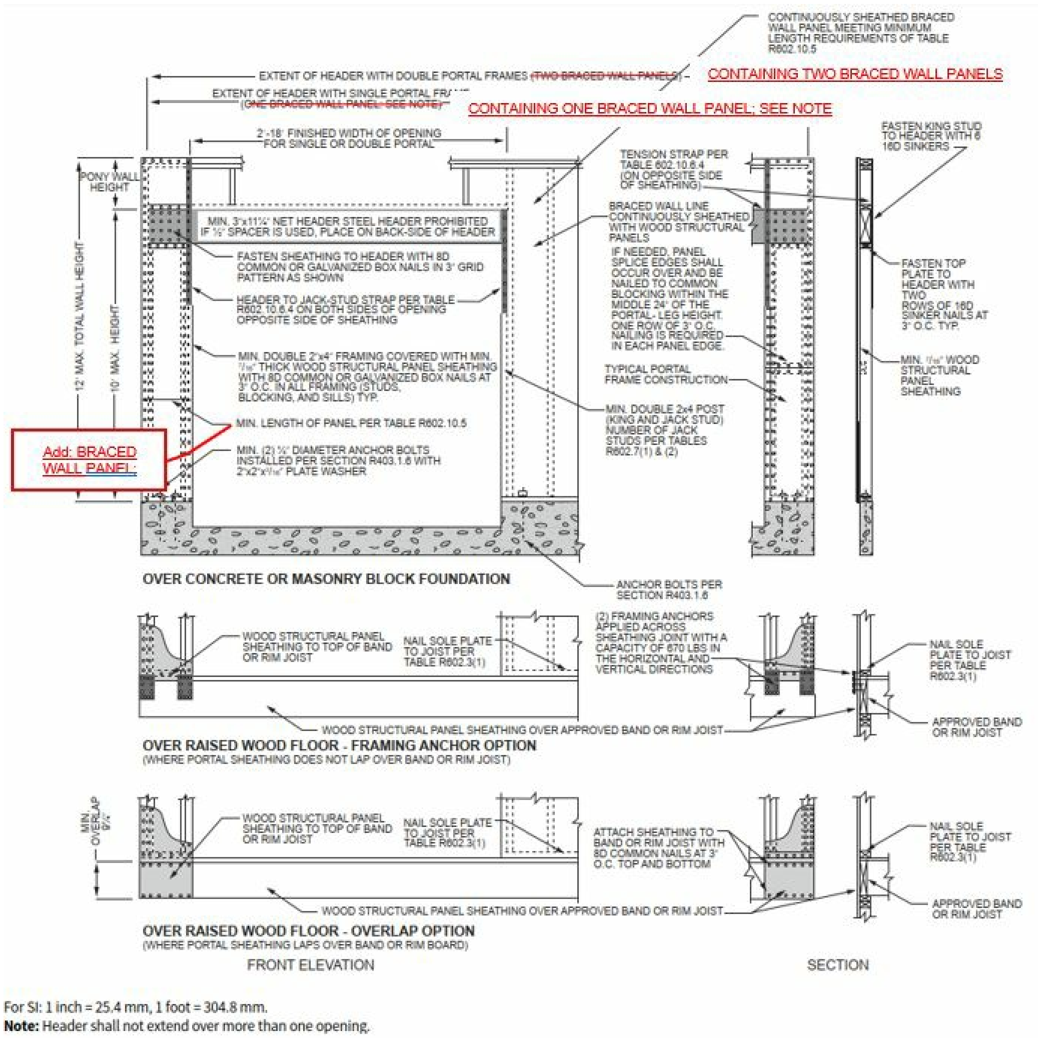
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Note: Header shall not extend over more than one opening.

FIGURE R602.10.6.3 METHOD PFG—PORTAL FRAME AT GARAGE DOOR OPENINGS IN SEISMIC DESIGN CATEGORIES A, B AND C

R602.10.6.4 Method CS-PF: Continuously sheathed portal frame. Continuously sheathed portal frame *braced wall panels* shall be constructed in accordance with Figure R602.10.6.4 and Table R602.10.6.4.





For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

Note: Header shall not extend over more than one opening.

FIGURE R602.10.6.4 METHOD CS-PF—CONTINUOUSLY SHEATHED PORTAL FRAME PANEL CONSTRUCTION

Reason: The intent of this change proposal is to clarify the "braced wall panel" in a portal frame. There has been misunderstanding in the field that the braced wall panel length in a portal frame is the length of the entire portal frame, which could affect the determination of the spacing between braced wall panels, especially for the portal frame containing only one leg segment (braced wall panel). This proposal is editorial in nature and is not intended for any technical changes.

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

Justification for no cost impact:

This code change proposal will not increase or decrease the cost of construction because the proposal is editorial to clarify the braced wall panel in a portal frame.

RB195-25

RB196-25

IRC: R602.10.10, R602.10.10.2

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

Revise as follows:

R602.10.10 Cripple wall bracing. *Cripple walls* shall be constructed in accordance with Section R602.9 and braced in accordance with this section. *Cripple walls* shall be braced with the length and method of bracing used for the wall above in accordance with Tables R602.10.3(1) and R602.10.3(3), and the applicable adjustment factors in Table R602.10.3(2) or R602.10.3(4), respectively, except that the length of *cripple wall* bracing shall be multiplied by a factor of 1.15. Where gypsum wall board is not used on the inside of the *cripple wall* bracing, the length adjustments for the elimination of the *gypsum wallboard*, or equivalent, shall be applied as directed in Tables R602.10.3(2) and R602.10.3(4) to the length of *cripple wall* bracing required. This adjustment shall be taken in addition to the 1.15 increase.

> **Exception:** Where the cripple walls use wood structural panel bracing methods, the method of bracing for the cripple walls is not required to match the method of bracing for the wall above.

R602.10.10.2 Cripple wall bracing for Seismic Design Category D_2. In *Seismic Design Category* D_2, the length of *cripple* *wall* ~~walls~~ bracing shall ~~be braced in accordance~~ comply with Table ~~Tables~~ R602.10.3(3) and be adjusted in accordance with Table R602.10.3(4).

Reason: This proposal includes two changes that are being provided for clarification purposes. The first is to add an exception to the main section on cripple walls noting that, if they choose to brace the cripple walls using wood structural panel methods, regardless of the Seismic Design Category, the cripple wall bracing does not have to match the method used above the cripple walls. IRC Section R602.10.4.1 allows the mixing of braced wall methods story-to-story, however cripple walls are most often not considered their own story. This exception recognizes the benefit of using wood structural panels to brace cripple walls and therefore allows a different bracing method to be used above.

The second change that is proposed is to clarify what is required for cripple walls in Seismic Design Category D2. The code intent is to require cripple walls in these seismic regions to only be checked for seismic wall bracing rather than both wind and seismic. The seismic tables for Seismic Design Category D2 note that only wood structural panel methods can be used for cripple walls. The proposed changes make the requirements for cripple walls in Seismic Design category D2 a bit clearer.

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

Justification for no cost impact:

The changes proposed are for clarification purposes only.

RB196-25

RB197-25

IRC: R606.2, R606.3, R606.3.4, R606.3.4.1, TABLE R606.3.4.1

Proponents: Nicholas Lang, Concrete Masonry & Hardscapes Association, representing Masonry Alliance for Codes & Standards (nlang@masonryandhardscapes.org); Charles Clark Jr, Brick Industry Association, representing Masonry Alliance for Codes and Standards (cclark@bia.org)

2024 International Residential Code

Revise as follows:

R606.2 Masonry construction materials. Masonry construction materials shall conform to the requirements of this section.

R606.3 Construction requirements. Masonry construction shall conform to the requirements of this section.

R606.3.4 Protection for reinforcement. Bars shall be completely embedded in mortar or grout. Joint reinforcement and deformed wire embedded in horizontal mortar joints shall ~~not~~ have a minimum cover of ~~less than~~ 5/8-inch (15.9 mm) where exposed to earth or weather and 1/2-inch (12.7 mm) where not exposed to earth or weather. ~~mortar coverage from the exposed face. Other reinforcement shall have a minimum coverage of one bar diameter over all bars, but not less than 3/4 inch (19 mm), except where exposed to weather or soil, in which case the minimum coverage shall be 2 inches (51 mm).~~ Reinforcement placed in grout shall have a masonry cover not less than the following:

1. Where the masonry face is exposed to earth or weather: minimum 2 inches (50.8 mm) for bars larger than No. 5 (M#16); and 1.5 inches (38.1 mm) for deformed wire, welded wire reinforcement, and No. 5 bars (M#16) or smaller.
2. Where the masonry is not exposed to earth or weather: minimum 1.5 inches (38.1 mm).

R606.3.4.1 Corrosion protection. Minimum corrosion protection of joint reinforcement, anchor ties and wire fabric for use in masonry wall construction shall conform to TMS 602 Article 2.4L. ~~Table R606.3.4.1.~~

Delete without substitution:

~~TABLE R606.3.4.1 MINIMUM CORROSION PROTECTION~~

~~MASONRY METAL ACCESSORY~~	~~STANDARD~~
~~Joint reinforcement, interior walls~~	~~ASTM A641, Class 1~~
~~Wire ties or anchors in exterior walls completely embedded in mortar or grout~~	~~ASTM A641, Class 3~~
~~Wire ties or anchors in exterior walls not completely embedded in mortar or grout~~	~~ASTM A153, Class B-2~~
~~Joint reinforcement in exterior walls or interior walls exposed to moist environment~~	~~ASTM A153, Class B-2~~
~~Sheet metal ties or anchors exposed to weather~~	~~ASTM A153, Class B-2~~
~~Sheet metal ties or anchors completely embedded in mortar or grout~~	~~ASTM A653, Coating Designation G60~~
~~Stainless-steel hardware for any exposure~~	~~ASTM A167, Type 304~~

Reason: Section R606.2.13 requires that metal reinforcement and accessories conform to Article 2.4 of The Masonry Society (TMS) 602. That article contains requirements for corrosion protection. Section R606.3.4 contains both requirements for cover of metal reinforcement an accessories, as well as a table for corrosion protection. **R606.2.13 Metal reinforcement and accessories.** Metal reinforcement and accessories shall conform to Article 2.4 of TMS 602.
The cover requirements and the corrosion protection requirements in the IRC are not consistent with that required in TMS 602. This change proposes to modify masonry reinforcement cover requirements to be consistent with TMS 602. It further proposes to remove the corrosion protection table, and replace it with a reference to the specific sub-section of TMS 602 that has corrosion protection requirements. Since that is a sub-section of Article 2.4 (already referenced in the IRC), this would make these sections consistent.

Cost Impact: The 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 simply aligns the requirements in two sections of the IRC for consistency.

RB197-25

RB198-25

IRC: R606.2.1, ASTM Chapter 44 (New)

Proponents: Nicholas Lang, Concrete Masonry & Hardscapes Association, representing Masonry Alliance for Codes & Standards (nlang@masonryandhardscapes.org)

2024 International Residential Code

Revise as follows:

R606.2.1 Concrete masonry units. *Concrete masonry units* shall conform to the following standards: ASTM C55 for concrete brick; ASTM C73 for calcium silicate face brick; ASTM C90 for load-bearing *concrete masonry units*; ASTM C744 for prefaced concrete and calcium silicate *masonry units*; ~~or~~ ASTM C1634 for concrete facing brick <u>and other concrete facing units; or ASTM C1877 for adhered concrete *masonry units*.</u>

Add new standard(s) as follows:

ASTM

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

<u>C1877-24</u>	<u>Standard Specification for Adhered Concrete Masonry Units</u>

Reason: R606.2.1 lists acceptable concrete masonry units for masonry construction. This proposal includes two changes:

1. Modify the name of units covered by ASTM C1634 to 'concrete facing brick and other concrete masonry facing units'. The title of that standard was changed so that should be reflected in this section. Note that in Chapter 44 the reference to this standard already includes the updated nomenclature.

2. Add reference to units that comply with ASTM C1877 for adhered concrete masonry units. This standard was originally published in 2018, but has not been referenced in the IRC before now. These units are used commonly in adhered masonry applications, and should be on the list of allowable materials.

Adding ASTM C1877 to the list of reference standards is also included.

Cost Impact: The 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 will not increase or decrease cost. It is clarifying nomenclature for concrete masonry units and adding a new option for units based on a recently published ASTM specification.

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
ASTMC1877-24 Standard Specification for Adhered Concrete Masonry Units

RB198-25

RB199-25

IRC: R606.2.8, TABLE R606.2.8

Proponents: Shamim Rashid-Sumar, representing National Ready Mixed Concrete Association (ssumar@nrmca.org); Dr. Julian Mills-Beale, representing National Ready Mixed Concrete Association (jmills-beale@nrmca.org); James Farny, Portland Cement Association, representing US cement manufacturers (jfarny@cement.org)

2024 International Residential Code

R606.2.8 Mortar. Except for mortars listed in Sections R606.2.9, R606.2.10 and R606.2.11, mortar for use in masonry construction shall meet the proportion specifications of Table R606.2.8 or the property specifications of ASTM C270. The type of mortar shall be in accordance with Sections R606.2.8.1, R606.2.8.2 and R606.2.8.3.

Revise as follows:

TABLE R606.2.8 MORTAR PROPORTIONS[a, b]

MORTAR	TYPE	PROPORTIONS BY VOLUME (cementitious materials) Portland cement or blended cement	Mortar cement M	Mortar cement S	Mortar cement N	Masonry cement M	Masonry cement S	Masonry cement N	Hydrated lime[c] or lime putty	Aggregate ratio (measured in damp, loose conditions)
Cement-lime	M	1	—	—	—	—	—	—	1/4	Not less than 2 1/4 and not more than 3 times the sum of separate volumes of lime, if used, and cement
	S	1	—	—	—	—	—	—	over 1/4 to 1/2	
	N	1	—	—	—	—	—	—	over 1/2 to 1 1/4	
	O	1	—	—	—	—	—	—	over 1 1/4 to 2 1/2	
Mortar cement	M	1	—	—	1	—	—	—	—	
	M	—	1	—	—	—	—	—		
	S	1/2	—	—	1	—	—	—		
	S	—	—	1	—	—	—	—		
	N	—	—	—	1	—	—	—		
	O	—	—	—	1	—	—	—		
Masonry cement	M	1	—	—	—	—	—	1	—	
	M	—	—	—	—	1	—	—		
	S	1/2	—	—	—	—	—	1		
	S	—	—	—	—	—	1	—		
	N	—	—	—	—	—	—	1		
	O	—	—	—	—	—	—	1		

For SI: 1 cubic foot = 0.0283 m^3, 1 pound = 0.454 kg.

a. For the purpose of these specifications, the weight of 1 cubic foot of the respective materials shall be considered to be as follows:

   Hydrated lime = 40 pounds

   Lime putty (Quicklime) = 80 pounds

   Blended cement = Weight printed on bag

   Masonry cement = Weight printed on bag

   Mortar cement = Weight printed on bag

   Portland cement = 94 pounds

   Sand, damp and loose = 80 pounds of dry sand

b. Two air-entraining materials shall not be combined in mortar.

c. Hydrated lime conforming to the requirements of ASTM C207.

Reason: This proposal is part of a series of proposals to the IBC and IRC to update cement terminology in the building codes.
The proposed revisions reflect current cement technology and market conditions, which can vary across regions. Nationally, the market is

no longer dominated by portland cement. More than sixty percent of the current cement market consists of blended cements , including portland-limestone cement (PLC) and other blended cements that meet the requirements of ASTM C595/C595M, Specification for Blended Hydraulic Cements (Portland Cement Association, 2025). ASTM C595/C595M is referenced in the International Building Code/ International Residential Code.

Bibliography: Portland Cement Association, 2025. Reducing Carbon at the Cement Plant. https://cementprogress.com/reducing-carbon-at-the-cement-plant/

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

Justification for no cost impact:

The proposed change is editorial and will not impact the cost of construction.

RB199-25

RB200-25

IRC: R606.2.11, TCNA (New), TCN (New)

Proponents: Nicholas Lang, Concrete Masonry & Hardscapes Association, representing Masonry Alliance for Codes & Standards (nlang@masonryandhardscapes.org); Charles Clark Jr, Brick Industry Association, representing Masonry Alliance for Codes and Standards (cclark@bia.org); Ryan Marino, representing Tile Council of North America (rmarino@tileusa.com)

2024 International Residential Code

Revise as follows:

R606.2.11 Mortar for adhered masonry veneer. Mortar for use with *adhered masonry veneer* shall conform to ~~ASTM C270 Type S or Type N or shall comply with~~ ANSI A118.4 (See TCNA) for ~~latex-modified Portland~~ modified dry-set cement mortar or ANSI A118.15 (See TCNA) for improved modified dry-set cement mortar.

Add new standard(s) as follows:

TCNA

Tile Council-North America Inc
100 Clemson Research Blvd
Anderson, SC 29625
USA

A118.15-23 American National Standard Specifications for Improved Modified Dry-Set Cement Mortar

Reason: In the 2022 version of The Masonry Society 402 (Building Code Requirements for Masonry Structures) and TMS 602 (Specification for Masonry Structures) prescriptive design, construction, and installation of adhered masonry veneer requires the use of two types of mortar for applying units - ANSI A118.4 or ANSI A118.15. Mortar complying with ASTM C270 Type N or S is no longer permitted for prescriptive design.

ANSI A118.4 is already included in R606.2.11 for mortars used for adhered masonry veneers, although the name of those mortars needs to be updated to reflect how they are referred to in that standard. This proposal updates that name, as well as adds reference to ANSI A118.15 mortars.

This change aligns R606.2.11 with the installation requirements in R703.12, which in turn provides reference to the 2022 TMS 402/602.

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

Justification for no cost impact:

Clarification only and adding a new standard as an option.

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:

ANSI /TCNA A118.15-23 American National Standard Specifications for Improved Modified Dry-Set Cement Mortar

RB200-25

RB201-25

IRC: R606.3.5, TABLE R606.3.5.1

Proponents: Nicholas Lang, Concrete Masonry & Hardscapes Association, representing Masonry Alliance for Codes & Standards (nlang@masonryandhardscapes.org); Charles Clark Jr, Brick Industry Association, representing Masonry Alliance for Codes and Standards (cclark@bia.org)

2024 International Residential Code

Revise as follows:

R606.3.5 Grouting requirements. <u>Grouted masonry construction shall conform to the requirements of this section.</u>

TABLE R606.3.5.1 GROUT SPACE DIMENSIONS AND POUR HEIGHTS

GROUT TYPE	GROUT POUR MAXIMUM HEIGHT (feet)	MINIMUM WIDTH OF GROUT SPACES[a, b] (inches)	MINIMUM GROUT[b, c] SPACE DIMENSIONS FOR GROUTING CELLS OF HOLLOW UNITS (inches × inches)
Fine	1	0.75	1.5 × 2
	~~5~~ <u>5.33</u>	2	2 × 3
	~~12~~ <u>12.67</u>	2.5	2.5 × 3
	24	3	3 × 3
Coarse	1	1.5	1.5 × 3
	~~5~~ <u>5.33</u>	2	2.5 × 3
	~~12~~ <u>12.67</u>	2.5	3 × 3
	24	3	3 × 4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

a. For grouting between masonry wythes.

b. Grout space dimension is the clear dimension between any masonry protrusion and shall be increased by the horizontal projection of the diameters of the horizontal bars within the cross section of the grout space.

c. Area of vertical reinforcement shall not exceed 6 percent of the area of the grout space.

Reason: Table R606.3.5.1 lists grout pour heights and the required width and grout space dimensions for masonry construction. The included pour heights are not aligned with typical masonry modular dimensions (8 inches). In the 2022 version of TMS 602, *Specification for Masonry Structures*, a similar table was updated to provide modular dimension for the pour heights of 5 feet (changed to 5.33 feet) and 12 feet (changed to 12.67 feet). This proposal aligns Table R606.3.5.1 with that in TMS 602.

Cost Impact: The 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 aligning the current IRC table with provisions in the *Specification for Masonry Structures*. It has the potential to marginally increase allowable grout pour heights, which could lead to some economy in construction, but it expected to not be significant.

RB201-25

RB202-25

IRC: R606.11, FIGURE R606.11(1)

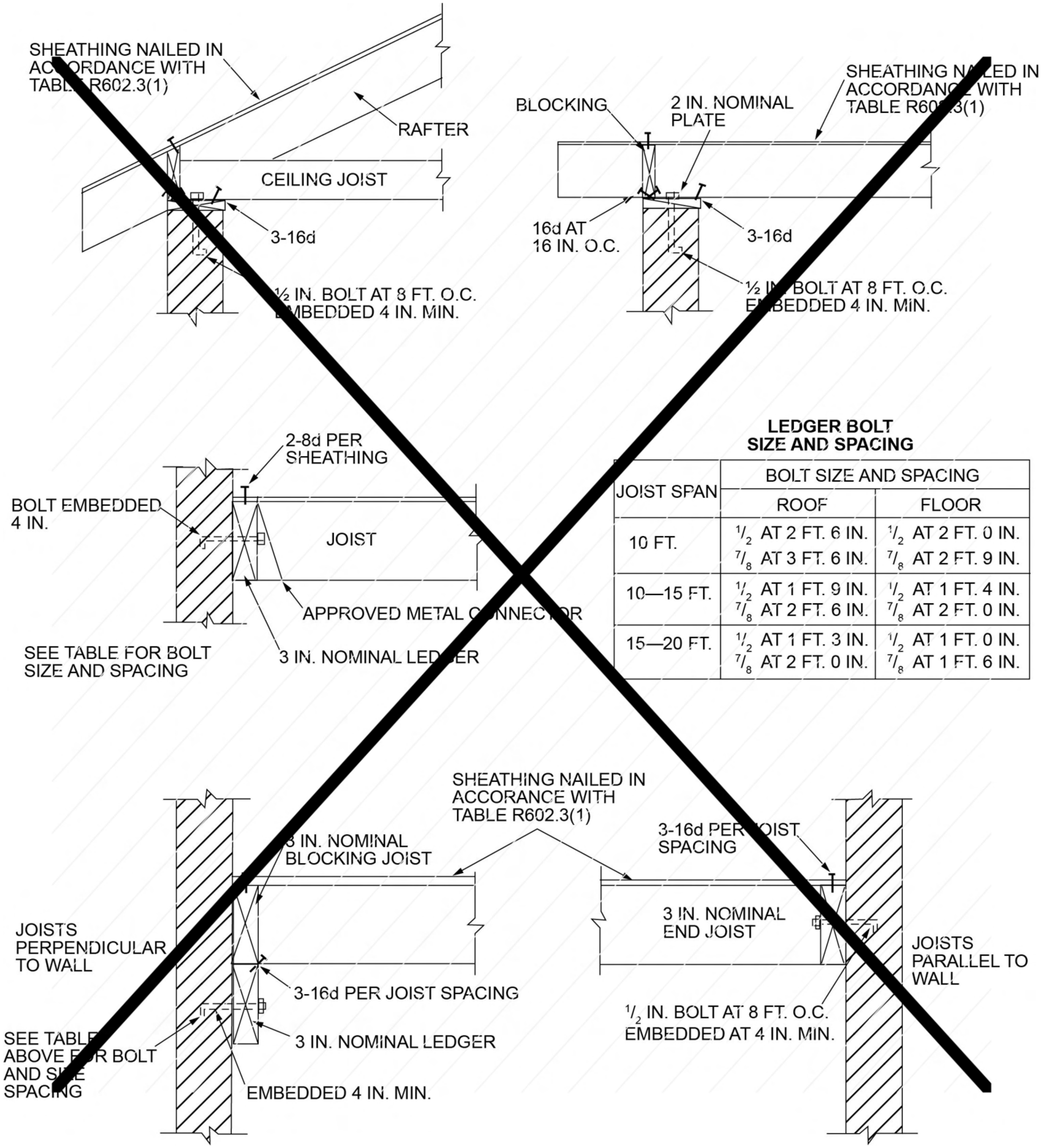
Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

R606.11 Anchorage. Masonry walls shall be anchored to floor and roof systems in accordance with the details shown in Figure R606.11(1), R606.11(2) or R606.11(3). Footings shall be permitted to be considered as points of lateral support. Wood structural panel sheathing and wood framing shall be fastened in accordance with Figure R606.11(1). Wood to wood connections shall be fastened in accordance with the more restrictive requirements of Table R602.3(1), Figure R606.11(1), Section R602, or Section R802. Roof tie uplift resistance shall be in accordance with Section R802.11.

Delete and substitute as follows:



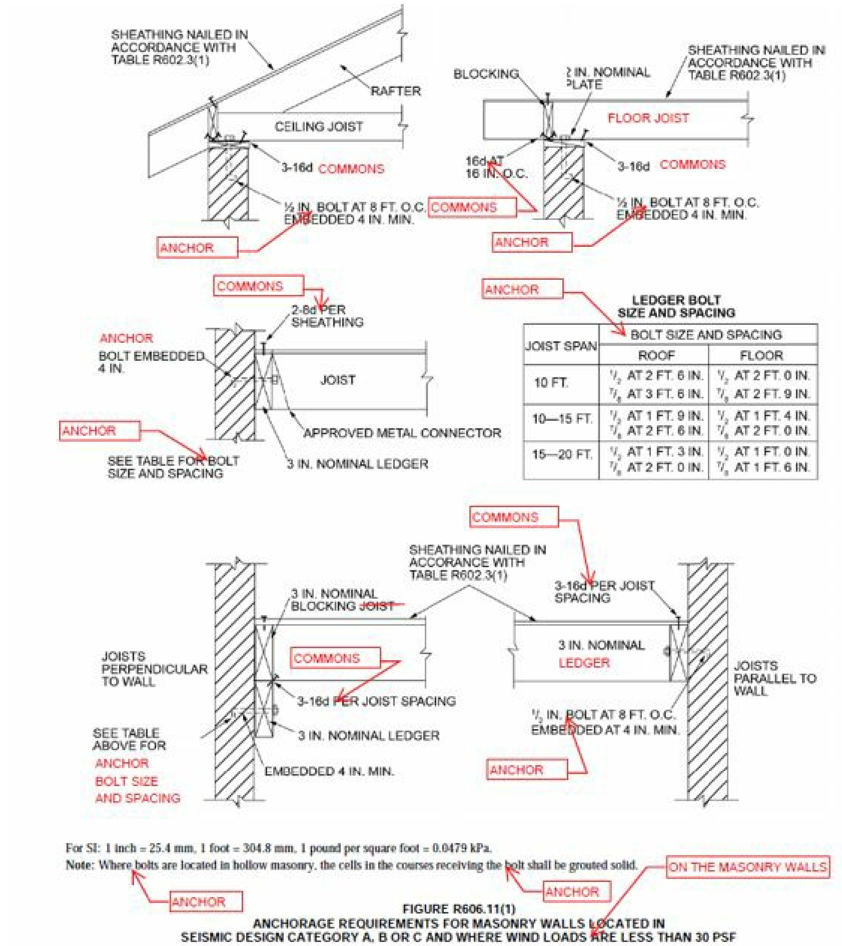
LEDGER BOLT SIZE AND SPACING

JOIST SPAN	BOLT SIZE AND SPACING	
	ROOF	FLOOR
10 FT.	1/2 AT 2 FT. 6 IN. 7/8 AT 3 FT. 6 IN.	1/2 AT 2 FT. 0 IN. 7/8 AT 2 FT. 9 IN.
10—15 FT.	1/2 AT 1 FT. 9 IN. 7/8 AT 2 FT. 6 IN.	1/2 AT 1 FT. 4 IN. 7/8 AT 2 FT. 0 IN.
15—20 FT.	1/2 AT 1 FT. 3 IN. 7/8 AT 2 FT. 0 IN.	1/2 AT 1 FT. 0 IN. 7/8 AT 1 FT. 6 IN.

~~For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.~~

~~**Note:** Where bolts are located in hollow masonry, the cells in the courses receiving the bolt shall be grouted solid.~~

~~**FIGURE R606.11(1) ANCHORAGE REQUIREMENTS FOR MASONRY WALLS LOCATED IN SEISMIC DESIGN CATEGORY A, B OR C AND WHERE WIND LOADS ARE LESS THAN 30 PSF**~~



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

Note: Where bolts are located in hollow masonry, the cells in the courses receiving the bolt shall be grouted solid.

FIGURE R606.11(1) ANCHORAGE REQUIREMENTS FOR MASONRY WALLS LOCATED IN SEISMIC DESIGN CATEGORY A, B OR C AND WHERE WIND LOADS ARE LESS THAN 30 PSF

Reason: The intent of this proposal is to clarify construction details for anchorage of masonry walls in SDC A, B or C to wood frame roofs and floors. As noted in the IRC Commentary, the intent of these provisions is as follows:

Masonry walls depend on floors and roofs for out-of-plane lateral support. Inadequate anchorage of masonry walls in areas of high, and even moderate, seismicity can be problematic. The referenced figures show anchorage requirements that vary based on seismic design category. They illustrate details that provide adequate load transfer under lateral loads.

The proposed revisions to Figure R606.11(1) do not change the lateral connection detailing. However, reference to Table R602.3(1) and Section R802.1,R602, or R802 _are to ensure that adequate detailing. Editorial changes to Figure R606.11(1) clarify that specified nails are “commons,” bolts embedded in masonry are “anchor bolts,”. The change to the figure title clarifies that the 30 psf wind load limit is the wind load on the masonry walls.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and 2024 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

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

Justification for no cost impact:

This proposal clarifies the existing code requirements for roofs without effecting the cost of construction.

RB203-25

IRC: R609.3.1, FGIA Chapter 44 (New)

Proponents: Jennifer Hatfield, J. Hatfield & Associates, representing Fenestration & Glazing Industry Alliance (formerly AAMA) (jen@jhatfieldandassociates.com)

2024 International Residential Code

Revise as follows:

R609.3.1 Comparative analysis. Structural wind load design pressures for window and door units different than the size tested in accordance with Section R609.3 shall be permitted to be different than the design value of the tested unit where determined in accordance with ~~one of~~ the following comparative analysis method~~s~~:

1. Structural wind load design pressures for window or door assemblies other ~~and door units smaller~~ than the size tested in accordance with Section R609.3 shall be permitted to be different ~~higher~~ than the design value of the tested assembly ~~unit~~ provided such ~~higher~~ pressures are determined by accepted engineering analysis or validated by an additional test of the window or door assembly to the alternative allowable design pressure in accordance with Section R609.3. Components of the alternate size assembly ~~smaller unit~~ shall be the same as ~~those of~~ the tested or labeled assembly ~~unit~~. Where engineering analysis is used, it shall be performed in accordance with the analysis procedures of AAMA 2502 or WDMA I.S.11 ~~such calculated design pressures are used, they shall be validated by an additional test of the window or door unit having the highest allowable design pressure~~.
2. ~~In accordance with WDMA I.S.11.~~

Add new standard(s) as follows:

FGIA

Fenestration & Glazing Industry Alliance
1900 E. Golf Road, Suite 1250
Schaumburg, IL 60173

AAMA 2502-24 Comparative Analysis Procedure for Window and Door Products

Reason: In 2019, proposal S108-19 was adopted As Submitted into what became the 2021 IBC. That proposal cleaned up the existing exception language in the corresponding IBC section and added in what at the time was the new AAMA 2502 Comparative Analysis Procedure for Window and Door Products as another option to use. This proposal seeks to align the IRC with those IBC changes.

The proposal cleans up the language for how to address comparative analysis and adds in the AAMA 2502, as one of two standards that can be used to perform the engineering analysis. The AAMA 2502 is not a new standard to the I-codes, as the 2019 edition is in the IBC, but this proposal adds it in as a new standard for the IRC using the latest 2024 edition. It is important to note the omnibus ADM standard update proposal updates to the 2024 edition in the IBC as well.

Bibliography: Proposal S108-19 by Jennifer Hatfield, American Architectural Manufacturers Association (now known as FGIA) that was adopted AS for the 2021 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:

This proposal is clarifying the current requirements by aligning language with the corresponding IBC language. By doing so, it provides an additional way to comply, but with a standard that is already being used in the IBC and compares with the current standard already listed in the IRC.

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
AAMA 2502-24 Comparative Analysis Procedure for Window and Door Products

RB204-25

IRC: TABLE R702.7(3)

Proponents: Theresa Weston, The Holt Weston Consultancy, representing Rainscreen Association in North America (holtweston88@gmail.com)

2024 International Residential Code

Revise as follows:

TABLE R702.7(3) CLASS III VAPOR RETARDERS

CLIMATE ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
Marine 4	Vented or ventilated cladding over wood structural panels.
	Vented or ventilated cladding over fiberboard.
	Vented or ventilated cladding over gypsum.
	Continuous insulation with *R*-value ≥ 2.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 3.75 over 2 × 6 wall.
5	Vented or ventilated cladding over wood structural panels.
	Vented or ventilated cladding over fiberboard.
	Vented or ventilated cladding over gypsum.
	Continuous insulation with *R*-value ≥ 5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 7.5 over 2 × 6 wall.
6	Vented or ventilated cladding over fiberboard.
	Vented or ventilated cladding over gypsum.
	Continuous insulation with *R*-value ≥ 7.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 11.25 over 2 × 6 wall.
7	Continuous insulation with *R*-value ≥ 10 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 15 over 2 × 6 wall.
8	Continuous insulation with *R*-value ≥ 12.5 over 2 × 4 wall.
	Continuous insulation with *R*-value ≥ 20 over 2 × 6 wall.

a. Vented cladding shall include vinyl, polypropylene, or horizontal aluminum siding, brick veneer with a clear airspace as specified in Table R703.8.4(1), rainscreen systems and other approved vented claddings.

b. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11.

Reason: This proposal adds "ventilated cladding" as an option along the current "vented cladding". Standardized industry definitions to distinguish between "vented" and "ventilated" are still under development but revolve around the number of vents the level of uniformity of the airflow behind the cladding. Both vented and ventilated claddings provide the moisture vapor transfer which allow for the use of vapor retarders as specified in this table. This change will allow for all claddings along the vented - ventilation spectrum to be used under these code provisions.

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

Justification for no cost impact:

This proposal provides clarification but does not change any technical requirements.

RB204-25

RB205-25

IRC: R609.3.2 (New), FIGURE R609.3.2 (New)

Proponents: Craig Drumheller, representing WDMA (cdrumheller@wdma.com)

2024 International Residential Code

Add new text as follows:

R609.3.2 Door systems with a Limited Water (LW) Rating.. Door systems *labeled* with a Limited Water (LW) rating as specified in AAMA/WDMA/CSA 101/I.S.2/A440 shall require additional water exposure protection by an overhang with an OH Ratio greater than or equal to 1.0, approval by a *registered design professional*, or by other *approved* methods. The OH Ratio, as depicted in Figure R609.3, shall be determined in accordance with the following equation:

$$\text{OH Ratio} = \text{OH Length}/\text{OH Height} \qquad \textbf{(Equation 1)}$$

where:OH Length = The minimum horizontal projection of the permanent overhang measured from the nearest portion of the door face.
OH Height = The maximum vertical distance from the elevation of the bottom of the door to the underside of the outer edge of the permanent overhang over the door.

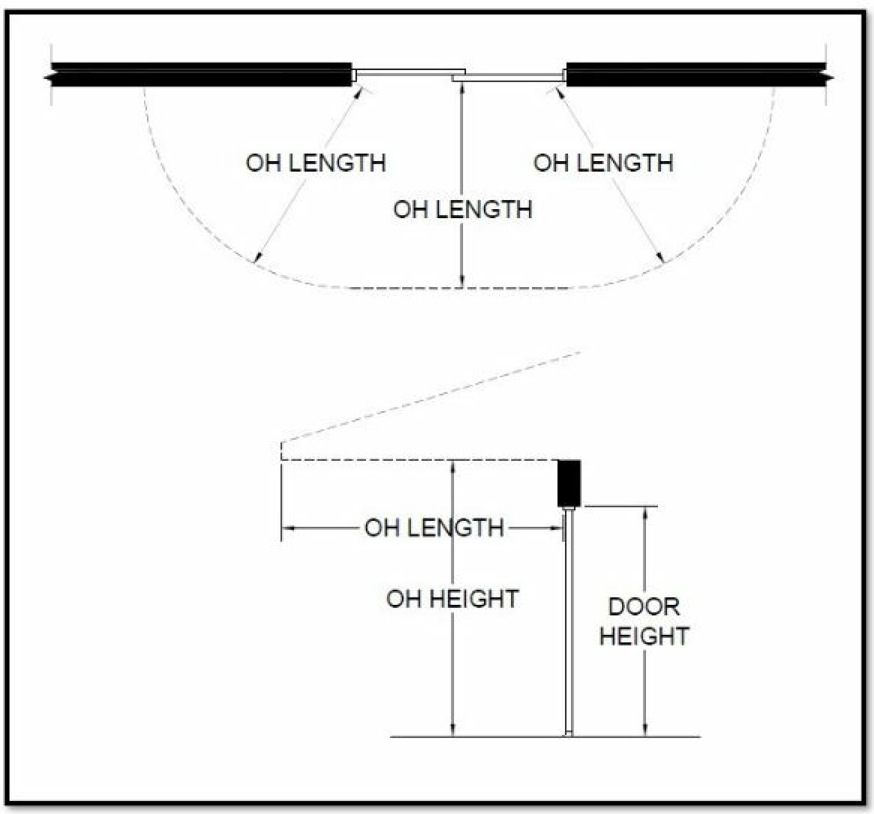


FIGURE R609.3.2 OVERHANG RATIO

Reason: The proposed code change introduces a requirement for doors labeled with a Limited Water (LW) rating under standard AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS). The Limited Water (LW) designation specifies products intended for use in locations where adequate protection from water exposure is provided. Currently, the code has no additional requirements for LW-rated windows as the NAFS standard recommends. This proposal seeks to integrate this designation into the building code with clear door overhang criteria, thereby reducing the ambiguity of the LW designation and ensuring consistency with industry intent.

WDMA members have determined that an overhang-to-height ratio of 1.0 offers adequate protection against wind-driven rain for LW-rated doors. This criterion is practical and measurable, ensuring that doors installed in such configurations meet the LW designation's intent without requiring additional water infiltration testing or increasing the exposure risk. By adopting this requirement, the building code will reflect current industry standards, support effective design practices, and streamline compliance for projects with adequate water infiltration protection for doors. A provision for a registered design professional and other approved methods is included to allow for alternate solutions that provide adequate water 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:

Using overhangs for additional weather protection is already a compliance approach intended for LW-rated doors in the referenced standard. This proposal may reduce the cost of construction for doors installed over large overhangs.

RB205-25

RB206-25

IRC: R609.3.2 (New)

Proponents: Cesar Lujan, representing Window & Door Manufacturers Association (clujan@wdma.com)

2024 International Residential Code

Add new text as follows:

R609.3.2 Door systems with a Limited Water (LW) Rating. Door systems labeled with a Limited Water (LW) rating as specified in AAMA/WDMA/CSA 101/I.S.2/A440 shall be adequately protected from water exposure as determined by a *registered design professional* or other *approved* method.

Reason: The proposed code change introduces a requirement for doors labeled with a Limited Water (LW) rating, as defined under the AAMA/WDMA/CSA 101/I.S.2/A440 (NAFS) standard. This requirement aligns with the referenced NAFS standard and will help ensure that the LW designation is applied appropriately. The LW designation identifies products intended for use in locations where adequate protection from water exposure is provided.

Currently, the building code does not include any reference or requirements for LW-rated doors, as recommended by the NAFS standard. This lack of oversight could result in improper installations that fail to meet the intended water protection criteria. By requiring additional review and approval by a registered design professional or code official, this proposal will help prevent the misapplication of products with an LW designation.

Cost Impact: The 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 the NAFS standard already requires additional protection for LW-rated doors, this proposal does not increase the cost of construction for doors conforming to the NAFS standard.

RB206-25

RB207-25

IRC: R702.2.2, R703.7, R703.7.1, R703.7.2.1, ASTM Chapter 44 (New)

Proponents: Jeff Bowlsby, representing Self

2024 International Residential Code

Revise as follows:

R702.2.2 Cement plaster. *Cement plaster* materials shall conform to ASTM C91 (Type M, S or N), C150 (Types I, II and III), C595 [Types IP, I (PM), IS and I (SM)], C847, C897, C933, C1032, C1047, ~~and~~ C1328, and C1861 and shall be installed or applied in compliance with ASTM C926 and C1063. Gypsum lath shall conform to ASTM C1396. Plaster shall be not less than three coats where applied over metal lath and not less than two coats where applied over other bases permitted by this section.

R703.7 Exterior plaster (stucco). Installation of exterior plaster shall be in compliance with ASTM C926, ASTM C1063, ASTM C1861 and the provisions of this code.

R703.7.1 Lath. Lath and lath attachments shall be of corrosion-resistant materials in accordance with ASTM C1063 and C1861 . Expanded metal, welded wire, or woven wire lath shall be attached to wood framing members or furring. Where the exterior plaster is serving as wall bracing in accordance with Table R602.10.4, the lath shall be attached directly to framing. The lath shall be attached with $1^1/_2$-inch-long (38 mm), 0.120-inch-diameter (3 mm), 11-gage nails having a $^7/_{16}$-inch (11.1 mm) head, or $^7/_8$-inch-long (22.2 mm), 16-gage staples, spaced not more than 7 inches (178 mm) on center along framing members or furring and not more than 24 inches (610 mm) on center between framing members or furring, or as otherwise *approved*. Additional fastening between wood framing members shall not be prohibited. Lath attachments to cold-formed steel framing or to masonry, stone, or concrete substrates shall be in accordance with ASTM C1063. Where lath is installed directly over foam sheathing, lath connections shall also be in accordance with Section R703.15, R703.16 or R703.17. Where lath is attached to furring installed over foam sheathing, the furring connections shall be in accordance with Section R703.15, R703.16 or R703.17.

> **Exception:** Lath is not required over masonry, cast-in-place concrete, *precast concrete* or stone substrates prepared in accordance with ASTM C1063.

R703.7.2.1 Weep screeds. A minimum 0.019-inch (0.5 mm) (No. 26 galvanized sheet gage), corrosion-resistant weep screed or plastic weep screed, with a minimum vertical attachment flange of $3^1/_2$ inches (89 mm), shall be provided at or below the foundation plate line on exterior stud walls in accordance with ASTM C926 and C1861. The weep screed shall be placed not less than 4 inches (102 mm) above the earth or 2 inches (51 mm) above paved areas and shall be of a type that will allow trapped water to drain to the exterior of the *building*. The weather-resistant barrier shall lap the attachment flange. The exterior lath shall cover and terminate on the attachment flange of the weep screed.

Add new standard(s) as follows:

ASTM

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

C1861-23a	Standard Specification for Lathing and Furring Accessories, and Fasteners, for Interior and Exterior Portland Cement-Based Plaster

Reason:

1. ASTM C1861 has been a reference standard in ASTM C1063, the metal lathing installation standard, since 2017. ASTM C1861 is a product standard for lathing accessories, furring accessories and fasteners where their installation is specified in ASTM C1063.
2. Lathing accessory product manufacturers and project architectural specifications have been referencing ASTM C1861 for several years.
3. ASTM C1861 meets CP-28-05, Sections 4.4 and 4.6 requirements. 4
4. ASTM C1861 meets the requirements in the ICC References Standards Guide as a second tier reference standard and as such is currently enforceable by building code officials.

5. The ASTM C1861 task group members have expressed full support of an application to ICC for IRC for considering ASTM C1861 as a reference standard.
6. ASTM C1861 has been balloted for inclusion as a reference standard into ASTM E2128 Standard Guide for Evaluating Water Leakage of Buildings

Cost Impact: The 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 referenced standard is already being used in industry for many years.

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
ASTMC1861-23a Standard Specification for Lathing and Furring Accessories, and Fasteners, for Interior and Exterior Portland Cement-Based Plaster

RB207-25

RB208-25

IRC: R702.3.1

Proponents: Tim Earl, GBH International, representing the Gypsum Association (tearl@gbhint.com)

2024 International Residential Code

Revise as follows:

R702.3.1 Materials. *Gypsum board* and *gypsum panel product* materials and accessories shall conform to ASTM C22, C475, C514, <u>C954,</u> C1002, C1047, C1177, C1178, C1278, C1396, C1658 or C1766 and shall be installed in accordance with the provisions of this section. Adhesives for the installation of *gypsum board* and *gypsum panel products* shall conform to ASTM C557.

Reason: ASTM C954 (Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in (0.84 mm) or to 0.112 in. (2.84 mm) in Thickness) should also be part of this list. It is already referenced elsewhere 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:

None. This adds an additional ASTM specification which was missing from the list.

RB208-25

RB209-25

IRC: R702.3.3, ASTM Chapter 44 (New)

Proponents: Tim Earl, GBH International, representing the Gypsum Association (tearl@gbhint.com)

2024 International Residential Code

Revise as follows:

R702.3.3 Cold-formed steel framing. Cold-formed steel framing supporting *gypsum board* and *gypsum panel products* shall be not less than $1^1/_4$ inches (32 mm) wide in the least dimension. Nonload-bearing cold-formed steel framing shall comply with AISI S220 or ASTM C645. Load-bearing cold-formed steel framing shall comply with AISI S240 or ASTM C955.

Add new standard(s) as follows:

ASTM

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

C955-24	Standard Specification for Cold-Formed Steel Structural Framing Members

Reason: This change adds the equivalent ASTM standards, which were removed from this section in the 2018 codes. Some users prefer to use ASTM standards. C955 was removed from Chapter 44 in the 2018 codes, so this proposal brings it back. C645 was not removed from Chapter 44.

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

Justification for no cost impact:

This simply adds another option for a standard, with no cost impact.

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
ASTMC955-24 Standard Specification for Cold-Formed Steel Structural Framing Members

RB209-25

RB210-25

IRC: TABLE R702.3.5

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

TABLE R702.3.5 MINIMUM THICKNESS AND APPLICATION OF GYPSUM BOARD AND GYPSUM PANEL PRODUCTS
Portions of table not shown remain unchanged.

THICKNESS OF GYPSUM BOARD OR GYPSUM PANEL PRODUCTS (inches)	APPLICATION	ORIENTATION OF GYPSUM BOARD OR GYPSUM PANEL PRODUCTS TO FRAMING	MAXIMUM SPACING OF FRAMING MEMBERS (inches o.c.)	MAXIMUM SPACING OF FASTENERS (inches)		SIZE OF NAILS FOR APPLICATION TO WOOD FRAMING[c]
				Nails[a]	Screws[b]	
Application without adhesive						
$^{3}/_{8}$	Ceiling[d]	Perpendicular	16	7	12	13 gage, $1^{1}/_{4}''$ long, $^{19}/_{64}''$ head; 0.098″ diameter, $1^{1}/_{4}''$ long, ring shank; or 4d cooler nail, 0.080″ diameter, $1^{3}/_{8}''$ long, $^{7}/_{32}''$ head.
	Wall	Either direction	16	8	16	
$^{1}/_{2}$	Ceiling	Either direction	16	7	12	13 gage, $1^{3}/_{8}''$ long, $^{19}/_{64}''$ head; 0.098″ diameter, $1^{1}/_{4}''$ long, ring shank; 5d cooler nail, 0.086″ diameter, $1^{5}/_{8}''$ long, $^{15}/_{64}''$ head; or gypsum board nail, 0.086″ diameter, $1\ ^{5}/_{8}''$ long, $^{9}/_{32}''$ head.
	Ceiling[d]	Perpendicular	24	7	12	
	Wall	Either direction	24	8	12	
	Wall	Either direction	16	8	16	
$^{5}/_{8}$	Ceiling	Either direction	16	7	12	13 gage, $1^{5}/_{8}''$ long, $^{19}/_{64}''$ head; 0.098″ diameter, $1^{3}/_{8}''$ long, ring shank; 6d cooler nail, 0.092″ diameter, $1^{7}/_{8}''$ long, $^{1}/_{4}''$ head; or gypsum board nail, 0.0915″ diameter, $1^{7}/_{8}''$ long, $^{19}/_{64}''$ head.
	Ceiling	Perpendicular	24	7	12	
	Type X at garage ceiling beneath habitable rooms	Perpendicular	24	6	6	$1^{7}/_{8}''$ long 0.099″ diameter galvanized nails ~~or equivalent drywall screws~~ or drywall screws with corrosion resistance in accordance with ASTM C1002 . Screws shall comply with Section R702.3.5.1.
	Wall	Either direction	24	8	12	13 gage, $1^{5}/_{8}''$ long, $^{19}/_{64}''$ head; 0.098″ diameter, $1^{3}/_{8}''$ long, ring shank; 6d cooler nail, 0.092″ diameter, $1^{7}/_{8}''$ long, $^{1}/_{4}''$ head; or gypsum board nail, 0.0915″ diameter, $1^{7}/_{8}''$ long, $^{19}/_{64}''$ head.
	Wall	Either direction	16	8	16	
Application with adhesive						
$^{3}/_{8}$	Ceiling[d]	Perpendicular	16	16	16	Same as above for $^{3}/_{8}''$ gypsum board and gypsum panel products.
	Wall	Either direction	16	16	24	
$^{1}/_{2}$ or $^{5}/_{8}$	Ceiling	Either direction	16	16	16	Same as above for $^{1}/_{2}''$ and $^{5}/_{8}''$ gypsum board and gypsum panel products, respectively.
	Ceiling[d]	Perpendicular	24	12	16	
	Wall	Either direction	24	16	24	
Two $^{3}/_{8}$ layers	Ceiling	Perpendicular	16	16	16	Base ply nailed as above for $^{1}/_{2}''$ gypsum board and gypsum panel products; face ply installed with adhesive.
	Wall	Either direction	24	24	24	

For SI: 1 inch = 25.4 mm.

a. For application without adhesive, a pair of nails spaced not less than 2 inches apart or more than $2^{1}/_{2}$ inches apart shall be permitted to be used with the pair of nails spaced 12 inches on center.

b. Screws shall be in accordance with Section R702.3.5.1. Screws for attaching gypsum board or gypsum panel products to structural insulated panels shall penetrate the wood structural panel facing not less than $^{7}/_{16}$ inch.

c. Where cold-formed steel framing is used with a clinching design to receive nails by two edges of metal, the nails shall be not less than $^{5}/_{8}$ inch longer than the gypsum board or gypsum panel product thickness and shall have ringed shanks. Where the cold-formed steel framing has a nailing groove formed to receive the nails, the nails shall have barbed shanks or be 0.086-inch diameter, $1^{5}/_{8}$ inches long, $^{15}/_{64}$-inch head for $^{1}/_{2}$-inch gypsum board or gypsum panel product; and 0.099-inch diameter, $1^{7}/_{8}$ inches long, $^{15}/_{64}$-inch head for $^{5}/_{8}$-inch gypsum board or gypsum panel product.

d. Three-eighths-inch-thick single-ply gypsum board or gypsum panel product shall not be used on a ceiling where a water-based textured finish is to be applied, or where it will be required to support insulation above a ceiling. On ceiling applications to receive a water-based texture material, either hand or spray applied, the gypsum board or gypsum panel product shall be applied perpendicular to framing. Where applying a water-based texture material, the minimum gypsum board thickness shall be increased from $^{3}/_{8}$ inch to $^{1}/_{2}$ inch for 16-inch on center framing, and from $^{1}/_{2}$ inch to $^{5}/_{8}$ inch for 24-inch on center framing or $^{1}/_{2}$-inch sag-resistant gypsum ceiling board shall be used.

Reason: This proposal clarifies the use of "galvanized nails or equivalent drywall screws" in the table since regular black drywall screws are not galvanized. This proposal resolves the confusion of when the table says galvanized nails or equivalent, does that mean the screws are also required to be galvanized. Regular black drywall screws have a rust-resistant oily coating and use a different requirement to comply with corrosion-resistant drywall screws in accordance with ASTM C1002.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

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

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

Justification for no cost impact:

This proposal clarifies the existing requirements only.

RB210-25

RB211-25

IRC: R702.7

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

R702.7 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table R702.7(1). A vapor retarder shall be provided on the interior side of frame walls of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or R702.7(4) where applicable. An *approved* design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative. Vapor retarders shall be installed in accordance with Section R702.7.2.

The *climate zone* shall be determined in accordance with Section N1101.7.

Exceptions:

~~1.~~ ~~*Basement walls.*~~

~~2.~~ 1. Below-grade portion of any wall.

~~3.~~ 2. Construction where accumulation, condensation or freezing of moisture will not damage the materials.

~~4.~~ 3. A vapor retarder shall not be required in *Climate Zones* 1, 2 and 3.

~~5.~~ 4. In *Climate Zones* 4 through 8, a vapor retarder shall not be required where the assembly complies with Table R702.7(5).

Reason: Use of the term "basement walls" for the sake of vapor management in framed walls is not appropriate in the IRC as currently written. A basement wall could be below grade, above grade, or both. A basement wall could be a full-height wood framed wall identical to a first floor wall directly above it. There is no difference in vapor movement or condensation in those two walls, yet one of them is currently an exception for vapor retarders. A basement wall could have earth on the exterior side or it could have open air. These differences greatly affect the vapor management design approach. There are currently two definitions in the IRC for "basement wall". One is in chapter two and is specifically for the purpose of interpreting a story above grade plane for egress fire safety. The second is in the energy code and related to how much insulation R-value is required in the assembly for the purpose of energy code compliance. Neither of these definitions are intended or appropriate for the subject of vapor management. Note, this section is only in regard to "framed walls". This makes the reference to "basement walls" more confusing than useful.

For reference, the current definitions for "basement" and "basement wall" are provided:

Chapter 2: BASEMENT. A story that is not a story above grade plane (see Story above grade plane)

Chapter 2: BASEMENT WALL. For the definition applicable to Chapter 11, see Section N1101.6

Chapter 11: BASEMENT WALL. A wall 50 percent or more below grade and enclosing conditioned space.

Cost Impact: The 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 attempts to clarify a section for more consistent interpretation. Depending on the different users of the code and how they interpret this section, this change could decrease or increase the cost of construction. In general, this is not a proposed change that directly increases or decreases the cost of construction.

RB211-25

RB212-25

IRC: R702.7

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Residential Code

Revise as follows:

R702.7 Vapor retarders. Vapor retarder materials shall be classified in accordance with Table R702.7(1). A vapor retarder shall be provided on the interior side of frame walls of the class indicated in Table R702.7(2), including compliance with Table R702.7(3) or R702.7(4) where applicable. An *approved* design using accepted engineering practice for hygrothermal analysis shall be permitted as an alternative. Vapor retarders shall be installed in accordance with Section R702.7.2.

The *climate zone* shall be determined in accordance with Section N1101.7.

Exceptions:

1. *Basement walls*.
2. Below-grade portion of any wall.
3. Construction where accumulation, condensation or freezing of moisture will not damage the materials.
4. A vapor retarder shall not be required in *Climate Zones* 1, 2 and 3.
5. In *Climate Zones* 4 through 8, a vapor retarder shall not be required where the assembly complies with Table R702.7(5).
6. <u>Vapor control design in accordance with ANSI/ABTG FS200.1.</u>

Reason: This proposal adds a reference to the ANSI/ABTG FS200.1 standard (see Bibliography) as an option for complying with the intent of Section R702.7. Sections 3.4 and 3.5 of the ANSI/ABTG FS200.1 standard provide more complete criteria and options for evaluating moisture control and vapor retarder requirements than are included in Section R702.7. The criteria in FS200.1 are based on the same research (see Bibliography) and rely on the same criteria used as the basis for development of the limited prescriptive solutions now included in Section R702.7 for walls with foam plastic insulating sheathing on the exterior. Finally, this proposal coordinates with an identical proposal, FS114-24, that in Group A was approved for the 2027 IBC and is on the consent agenda for public hearing in 2026.

Bibliography: ANSI/ABTG FS200.1 – 2022, Standard for the Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls, Applied Building Technology Group, LLC, Madison, WI. https://www.appliedbuildingtech.com/standards

ABTG (2015). Assessment of Water Vapor Control Methods for Modern Insulated Light-Frame Wall Assemblies, ABTG Research Report No. 1410-03, Applied Building Technology Group, LLC, Madison, WI. https://www.appliedbuildingtech.com/rr/1410-03

Crandell, J. H., "Assessment of Hygrothermal Performance and Design Guidance for Modern Light-Frame Wall Assemblies," Advances in Hygrothermal Performance of Building Envelopes: Materials, Systems and Simulations, ASTM STP1599, P. Mukhopadhyaya and D. Fisler, Eds., ASTM International, West Conshohocken, PA, 2017, pp. 362–394, http://dx.doi.org/10.1520/STP159920160097

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

Justification for no cost impact:

This proposal adds a reference standard that provides additional solution options that are equivalent to current code. Therefore, there are no cost impacts. However, the added flexibility could result in cost reductions in some cases particularly in coordinating with energy code requirements that may differ from the limited vapor control prescriptive solutions currently provided in Section R702.7

Staff Analysis: FS115-24 was AS and is now on the consent agenda. That proposal included the new standard ANSI/ABTG FS200.1 –

2022

RB212-25

RB213-25

IRC: TABLE R702.7(1), TABLE R702.7(3), TABLE R702.7(4), TABLE R702.7(5), R702.7.1, R702.7.2

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

TABLE R702.7(1) VAPOR RETARDER MATERIALS AND CLASSES

CLASS	ACCEPTABLE MATERIALS
I	Sheet polyethylene, nonperforated aluminum foil or other approved materials installed in accordance with the *manufacturer's installation instructions* for ~~with~~ a perm rating less than or equal to 0.1.
II	Kraft-faced fiberglass batts, vapor retarder paint or other approved materials installed ~~applied~~ in accordance with the manufacturer's installation instructions for a perm rating greater than 0.1 and less than or equal to 1.0.
III	Latex paint, enamel paint or other approved materials installed ~~applied~~ in accordance with the manufacturer's installation instructions for a perm rating greater than 1.0 and less than or equal to 10.0.

TABLE R702.7(3) CLASS III VAPOR RETARDERS

CLIMATE ZONE	CLASS III VAPOR RETARDERS PERMITTED FOR:[a, b]
Marine 4	Vented cladding over exterior *wood structural panel* sheathing ~~wood structural panels~~.
	Vented cladding over exterior fiberboard sheathing.
	Vented cladding over exterior *gypsum sheathing* ~~gypsum~~.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 2.5 over 2 × 4 wall.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 3.75 over 2 × 6 wall.
5	Vented cladding over exterior wood structural panel sheathing ~~wood structural panels~~.
	Vented cladding over exterior fiberboard sheathing.
	Vented cladding over exterior gypsum sheathing ~~gypsum~~.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 5 over 2 × 4 wall.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 7.5 over 2 × 6 wall.
6	Vented cladding over exterior fiberboard sheathing.
	Vented cladding over exterior *gypsum sheathing* ~~gypsum~~.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 7.5 over 2 × 4 wall.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 11.25 over 2 × 6 wall.
7	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 10 over 2 × 4 wall.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 15 over 2 × 6 wall.
8	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 12.5 over 2 × 4 wall.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 20 over 2 × 6 wall.

a. Vented cladding shall include vinyl, polypropylene, or horizontal aluminum siding, anchored stone or masonry veneer ~~brick veneer~~ with a clear airspace in accordance with ~~as specified in~~ Table R703.8.4(1), rainscreen systems and other approved vented claddings.

b. The requirements in this table ~~apply only to~~ applicable to exterior continuous insulation are ~~insulation~~ used to control moisture in order to permit the use of interior Class III vapor retarders. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11.

TABLE R702.7(4) EXTERIOR CONTINUOUS INSULATION WITH INTERIOR CLASS I OR II RESPONSIVE VAPOR RETARDER

CLIMATE ZONE	PERMITTED CONDITIONS[a]
3	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 2.
4, 5 and 6	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 3 over 2 × 4 wall.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 5 over 2 × 6 wall.
7	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 5 over 2 × 4 wall.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 7.5 over 2 × 6 wall.
8	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 7.5 over 2 × 4 wall.
	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 10 over 2 × 6 wall.

a. The requirements in this table apply only to exterior continuous insulation used to control moisture in order to permit the use of interior Class I, or II responsive vapor retarders ~~Class II vapor retarders~~. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11.

TABLE R702.7(5) EXTERIOR CONTINUOUS INSULATION ON WALLS WITHOUT A CLASS I, II OR III INTERIOR VAPOR RETARDER[a]

CLIMATE ZONE	PERMITTED CONDITIONS[b, c]
4	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 4.5
5	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 6.5
6	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 8.5
7	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 11.5
8	Exterior ~~Continuous~~ continuous insulation with *R*-value ≥ 14

a. The total insulating value of materials to the interior side of the exterior continuous insulation, including any cavity insulation, shall not exceed R-5. Where the *R*-value of materials to the interior side of the exterior continuous insulation exceeds R-5, an approved design shall be required.

b. ~~A water vapor control material layer having a permeance not greater than 1 perm in accordance with ASTM E96 Procedure A (dry cup)~~ A Class I or II vapor retarder shall be placed on the exterior side of the wall and to the interior side of the exterior continuous insulation. The exterior continuous insulation shall be permitted to serve as the vapor retarder ~~control layer~~ where, at its installed thickness or with a facer on its interior face, the exterior continuous insulation is a

Class I or II vapor retarder.

c. The requirements in this table apply only to exterior continuous insulation ~~insulation~~ used to control moisture in order to ~~allow~~ permit walls without an interior

Class I, II, or III vapor retarder.
~~a Class I, II or III interior vapor retarder.~~ The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11 ~~the *International Energy Conservation Code*.~~

R702.7.1 Spray foam plastic insulation for moisture control with Class II and III vapor retarders. For purposes of compliance with Tables R702.7(3) and R702.7(4), spray ~~foam~~ *foam plastic insulation* with a maximum permeance of 1.5 perms at the installed thickness applied to the interior side of *wood structural panels*, fiberboard, *insulating sheathing* or ~~gypsum~~ *gypsum sheathing* shall be deemed to meet the *continuous insulation* moisture control requirement in accordance with one of the following conditions:

1. The spray *foam plastic insulation* ~~foam~~ *R-value* is equal to or greater than the specified *continuous insulation* ~~continuous insulation~~ *R-value*.
2. The combined *R*-value of the spray ~~foam~~ *foam plastic insulation* and *continuous insulation* is equal to or greater than the specified *continuous insulation R-value*.

R702.7.2 Vapor retarder installation. Vapor retarders shall be installed in accordance with the *manufacturer's installation instructions* ~~manufacturer's instructions~~, ~~accepted~~ *approved* installation methods or an *approved* design. Where a vapor retarder also functions as a component of a *continuous air barrier*, the vapor retarder shall be installed as an *air barrier* in accordance with Section N1102.5.1.1.

Reason: Vapor management provisions for walls have been heavily developed over the last few code cycles, thanks to the work of others. In teaching these new provisions, I noticed some things from an outside perspective that I think could be cleaned up a little.

1) I have replaced defined terms with the same terms but in italics to signify to the reader that they are defined.

2) I added the term "exterior" to the continuous insulation. By definition, the IRC allows continuous insulation on the inside or outside of the wall. There are many different wall assembly designs and the IRC supports many of them. For that reason it seems worthwhile to clarify that the condensation control use of continuous insulation is only for exterior installations.

3) In table R702.7(1) only class II and III make reference to installation instructions. Why not class I also?

4) I replaced "gypsum" with "gypsum sheathing". We have a definition for gypsum sheathing, so why not use the term.

5) Table R702.7(4) is for using a Class I or II responsive vapor retarder (see table title). However, footnote a only refers to a Class II vapor retarder.

6) In table R702.7(5) footnote b refers to the description of a "responsive vapor retarder" in the manner prior to having a definition. With a definition, we can now use the defined term.

7) In Table R702.7(5) footnote c there is no need to reference the IECC when we have Chapter 11. Keep people in the IRC when building under 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:

This proposal only aims to clarify the existing intent of these provisions.

RB213-25

RB214-25

IRC: TABLE R702.7(4)

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Residential Code

Revise as follows:

TABLE R702.7(4) CONTINUOUS INSULATION WITH CLASS I OR II RESPONSIVE VAPOR RETARDER

CLIMATE ZONE	PERMITTED CONDITIONS [a]
3	Continuous insulation with *R*-value ≥ 2.
4, 5 and 6	Continuous insulation with *R*-value ≥ 3 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 5 over 2 × 6 wall.
7	Continuous insulation with *R*-value ≥ 5 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 7.5 over 2 × 6 wall.
8	Continuous insulation with *R*-value ≥ 7.5 over 2 × 4 wall. Continuous insulation with *R*-value ≥ 10 over 2 × 6 wall.

a. The requirements in this table apply only to insulation used to control moisture in order to permit the use of Class I or II *responsive vapor retarders* ~~vapor retarders~~. The insulation materials used to satisfy this option also contribute to but do not supersede the thermal envelope requirements of Chapter 11.

Reason: This change is proposed to correct a missed change to footnote ‘a’ of Table R702.7(4) as a result of proposal RB209-22 which added responsive vapor retarders to Section R702.7 and the inclusion of Class I and II responsive vapor retarders in Table R702.7(4). Responsive vapor retarders is also now a defined term so it is italicized in this proposal.

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

Justification for no cost impact:

This proposal clarifies and footnote and makes a correction to align it with the title and intent of the table. So, there is no cost impact.

RB214-25

RB215-25

IRC: R703.1.2

Proponents: Matthew Dobson, representing Polymeric Exterior Products Association (mdobson@vinylsiding.org)

2024 International Residential Code

Revise as follows:

R703.1.2 Wind resistance. Wall coverings, backing materials and their attachments shall be capable of resisting wind loads in accordance with Tables R301.2.1(1) and R301.2.1(2). Wind-pressure resistance of the siding~~, exterior soffit~~ and backing materials shall be determined by ASTM E330 or other applicable standard test methods. Where wind-pressure resistance is determined by design analysis, data from *approved* design standards and analysis conforming to generally accepted engineering practice shall be used to evaluate the siding, *exterior soffit* and backing material and its fastening. All applicable failure modes including bending rupture of siding, fastener withdrawal and fastener head pull-through shall be considered in the testing or design analysis. Where the wall covering~~,~~ ~~*exterior soffit*~~ and backing material resist wind load as an assembly, use of the design capacity of the assembly shall be permitted.

Reason: This is an editorial change since R704 now covers exterior soffits and not R703.

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

Justification for no cost impact:

It is removing legacy references before the addition of R704, requirements are already in place in this section.

RB215-25

RB216-25

IRC: R703.2

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Residential Code

Revise as follows:

R703.2 Water-resistive barrier. Not fewer than one layer of *water-resistive barrier* shall be applied over studs or sheathing of all exterior walls with flashing as indicated in Section R703.4, in such a manner as to provide a continuous *water-resistive barrier* behind the exterior wall veneer and behind deck ledgers. The *water-resistive barrier* material shall be continuous to the top of walls and terminated at penetrations and building appendages in a manner to meet the requirements of the exterior wall envelope as described in Section R703.1. Where the *water-resistive barrier* also functions as a component of a continuous *air barrier,* the *water-resistive barrier* shall be installed as an *air barrier* in accordance with Section N1102.5.1.1. *Water-resistive barrier* materials shall comply with one of the following:

1. No. 15 felt complying with ASTM D226, Type 1.
2. ASTM E2556, Type 1 or 2.
3. Foam plastic *insulating sheathing* water-resistive barrier systems complying with <u>ANSI/ABTG FS200.1 or</u> Section R703.1.1 and installed in accordance with the manufacturer's installation instructions.
4. ASTM E331 in accordance with Section R703.1.1.
5. Other *approved* materials in accordance with the manufacturer's installation instructions.

No.15 asphalt felt and *water-resistive barriers* complying with ASTM E2556 shall be applied horizontally, with the upper layer lapped over the lower layer not less than 2 inches (51 mm), and where joints occur, shall be lapped not less than 6 inches (152 mm).

Exception: A *water-resistive barrier* shall not be required in unconditioned detached tool sheds, storage sheds, playhouses, and other similar *accessory structures* provided all of the following requirements are met:

1. *Exterior wall covering* is limited to siding that is attached direct to studs.
2. Exterior walls are uninsulated.
3. Interior side of exterior walls has no wall covering or wall finishes.

Reason: The ANSI/ABTG FS200.1 standard (see Bibliography) provides a complete set of performance testing requirements and criteria for FPIS WRB systems. The water-resistance testing and criteria of R703.1.1 are consistent with that required by the FS200.1 standard. In addition to installed system water-resistance testing, the FS200.1 standard addresses material properties and durability for various WRB system components, requires installation instructions to be consistent with the systems as tested, and also addresses manufacturer and third-party quality control and labeling. Finally, the proposal coordinates with an identical proposal, FS109-24, that in Group A was approved for the 2027 IBC and is on the consent agenda for public hearing in 2026.

Bibliography: ANSI/ABTG FS200.1 – 2022, Standard for the Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade Walls, Applied Building Technology Group, LLC, Madison, WI. https://www.appliedbuildingtech.com/standards

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

Justification for no cost impact:

This proposal adds a code-reference standard for FPIS WRB systems that is consistent with evaluation and performance criteria currently applied by the industry. Thus, there is no cost impact.

Staff Analysis: FS115-24 was AS and is now on the consent agenda. That proposal included the new standard ANSI/ABTG FS200.1 –

2022

RB216-25

RB217-25

IRC: R703.3, TABLE R703.3(1)

Proponents: Sara Krompholz, representing Polymeric Exterior Products Association (skrompholz@vinylsiding.org)

2024 International Residential Code

Revise as follows:

R703.3 Wall covering nominal thickness and attachments. The nominal thickness and attachment of *exterior wall coverings* shall be in accordance ~~with Table R703.3(1),~~ the wall covering material requirements of this section, and the wall covering manufacturer's installation instructions. Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Sections R703.15 through R703.17. ~~Nominal material thicknesses in Table R703.3(1) are based on a maximum stud spacing of 16 inches (406 mm) on center.~~ Where specified by the siding manufacturer's instructions and supported by a test report or other documentation, attachment to studs with greater spacing is permitted. Fasteners for *exterior wall coverings* attached to wood framing shall be in accordance with Section R703.3.3~~ and Table R703.3(1)~~. *Exterior wall coverings* shall be attached to cold-formed steel *light frame construction* in accordance with the cladding manufacturer's installation instructions~~, the requirements of Table R703.3(1) using screw fasteners substituted for the nails specified in accordance with Table R703.3(2),~~ or an *approved* design.

Delete without substitution:

~~TABLE R703.3(1) SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESS~~

~~SIDING MATERIAL~~		~~NOMINAL THICKNESS (inches)~~	~~JOINT TREATMENT~~	~~TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS~~					
				~~Wood or wood structural panel sheathing into stud~~	~~Fiberboard sheathing into stud~~	~~Gypsum sheathing into stud~~	~~Foam plastic sheathing into stud~~[l]	~~Direct to studs~~	~~Number or spacing of fasteners~~
~~Anchored veneer: brick, concrete, masonry or stone (see Section R703.8)~~		~~2~~	~~Section R703.8~~	~~Section R703.8~~					
~~Adhered veneer: concrete, stone or masonry (see Section R703.12)~~		~~—~~	~~Section R703.12~~	~~Section R703.12~~					
~~Fiber cement siding~~	~~Panel siding (see Section R703.10.1)~~	~~$^{5}/_{16}$~~	~~Section R703.10.1~~	~~6d common (2″ × 0.113″)~~	~~6d common (2″ × 0.113″)~~	~~6d common (2″ × 0.113″)~~	~~6d common (2″ × 0.113″)~~	~~4d common (1$^{1}/_{2}$″ × 0.099″)~~	~~6″ panel edges 12″ inter. sup.~~
	~~Lap siding (see Section R703.10.2)~~	~~$^{5}/_{16}$~~	~~Section R703.10.2~~	~~6d common (2″ × 0.113″)~~	~~6d common (2″ × 0.113″)~~	~~6d common (2″ × 0.113″)~~	~~6d common (2″ × 0.113″)~~	~~6d common (2″ × 0.113″) or 0.120″ dia. (11 gage) roofing nail~~	~~Note f~~
~~Hardboard panel siding (see Section R703.5)~~		~~$^{7}/_{16}$~~	~~—~~	~~0.120″ nail (shank) with 0.225″ head~~	~~0.120″ nail (shank) with 0.225″ head~~	~~0.120″ nail (shank) with 0.225″ head~~	~~0.120″ nail (shank) with 0.225″ head~~	~~0.120″ nail (shank) with 0.225″ head~~	~~6″ panel edges 12″ inter. sup.~~[d]
~~Hardboard lap siding (see Section R703.5)~~		~~$^{7}/_{16}$~~	~~Note e~~	~~0.099″ nail (shank) with 0.240″ head~~	~~0.099″ nail (shank) with 0.240″ head~~	~~0.099″ nail (shank) with 0.240″ head~~	~~0.099″ nail (shank) with 0.240″ head~~	~~0.099″ nail (shank) with 0.240″ head~~	~~Same as stud spacing 2 per bearing~~
~~Horizontal aluminum~~[a]	~~Without insulation~~	~~0.019~~[b]	~~Lap~~	~~Siding nail 1$^{1}/_{2}$″ × 0.120″~~	~~Siding nail 2″ × 0.120″~~	~~Siding nail 2″ × 0.120″~~	~~Siding nail~~[h] ~~1$^{1}/_{2}$″ × 0.120″~~	~~Not allowed~~	~~Same as stud spacing~~
		~~0.024~~	~~Lap~~	~~Siding nail 1$^{1}/_{2}$″ × 0.120″~~	~~Siding nail 2″ × 0.120″~~	~~Siding nail 2″ × 0.120″~~	~~Siding nail~~[h] ~~1$^{1}/_{2}$″ × 0.120″~~	~~Not allowed~~	
	~~With insulation~~	~~0.019~~	~~Lap~~	~~Siding nail 1$^{1}/_{2}$″ × 0.120″~~	~~Siding nail 2$^{1}/_{2}$″ × 0.120″~~	~~Siding nail 2$^{1}/_{2}$″ × 0.120″~~	~~Siding nail~~[h] ~~1$^{1}/_{2}$″ × 0.120″~~	~~Siding nail 1$^{1}/_{2}$″ × 0.120″~~	
~~Insulated vinyl siding~~[j]		~~0.035 (vinyl siding layer only)~~	~~Lap~~	~~0.120″ nail (shank) with a 0.313″ head or 16 gage staple with $^{3}/_{8}$″ to $^{1}/_{2}$″ crown~~[h, i]	~~0.120" nail (shank) with a 0.313″ head or 16 gage staple with $^{3}/_{8}$″ to $^{1}/_{2}$″ crown~~[h]	~~0.120" nail (shank) with a 0.313″ head or 16 gage staple with $^{3}/_{8}$″ to $^{1}/_{2}$″ crown~~[h]	~~0.120" nail (shank) with a 0.313" head Section R703.11.2~~	~~Not allowed~~	~~16 inches on center or specified by manufacturer instructions, test report or other sections of this code~~
~~Particleboard panels~~		~~$^{3}/_{8}$~~	~~—~~	~~6d box nail (2″ × 0.099″)~~	~~6d box nail (2″ × 0.099″)~~	~~6d box nail (2″ × 0.099″)~~	~~6d box nail (2″ × 0.099″)~~	~~Not allowed~~	~~6″ panel edges 12″ inter. sup.~~
		~~$^{1}/_{2}$~~	~~—~~	~~6d box nail (2″ × 0.099″)~~	~~6d box nail (2″ × 0.099″)~~	~~6d box nail (2″ × 0.099″)~~	~~6d box nail (2″ × 0.099″)~~	~~6d box nail (2″ × 0.099″)~~	
		~~$^{5}/_{8}$~~	~~—~~	~~6d box nail (2″ × 0.099″)~~	~~8d box nail (2$^{1}/_{2}$″ × 0.113″)~~	~~8d box nail (2$^{1}/_{2}$″ × 0.113″)~~	~~6d box nail (2″ × 0.099″)~~	~~6d box nail (2″ × 0.099″)~~	
~~Polypropylene siding~~[k]		~~Not applicable~~	~~Lap~~	~~Section R703.14.1~~	~~Section R703.14.1~~	~~Section R703.14.1~~	~~Section R703.14.1~~	~~Not allowed~~	~~As specified by the manufacturer instructions, test report or other sections of this code~~

~~SIDING MATERIAL~~		~~NOMINAL THICKNESS (inches)~~	~~JOINT TREATMENT~~	~~TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS~~					
				~~Wood or wood structural panel sheathing into stud~~	~~Fiberboard sheathing into stud~~	~~Gypsum sheathing into stud~~	~~Foam plastic sheathing into stud~~	~~Direct to studs~~	~~Number or spacing of fasteners~~
~~Steel[e]~~		~~29 ga.~~	~~Lap~~	~~Siding nail (1 3/4″ × 0.113″) Staple–1 3/4~~	~~Siding nail (2 3/4″ × 0.113″) Staple–2 1/2~~	~~Siding nail (2 1/2″ × 0.113″) Staple–2 1/4~~	~~Siding nail (1 3/4″ × 0.113″) Staple–1 3/4~~	~~Not allowed~~	~~Same as stud spacing~~
~~Vinyl siding (see Section R703.11)~~		~~0.035~~	~~Lap~~	~~0.120″ nail (shank) with a 0.313″ head or 16-gage staple with 3/8- to 1/2-inch crown[h, i]~~	~~0.120″ nail (shank) with a 0.313″ head or 16-gage staple with 3/8″ to 1/2″ crown[h]~~	~~0.120″ nail (shank) with a 0.313″ head or 16- gage staple with 3/8″ to 1/2″ crown[h]~~	~~0.120″ nail (shank) with a 0.313" head Section R703.11.2~~	~~Not allowed~~	~~16 inches on center or as specified by the manufacturer instructions or test report~~
~~Wood siding (see Section R703.5)~~	~~Wood rustic, drop~~	~~3/8 min.~~	~~Lap~~						
	~~Shiplap~~	~~19/32 average~~	~~Lap~~	~~6d box or siding nail (2″ × 0.099″)~~	~~6d box or siding nail (2″ × 0.099″)~~	~~6d box or siding nail (2″ × 0.099″)~~	~~6d box or siding nail (2″ × 0.099″)~~	~~8d box or siding nail (2 1/2″ × 0.113″) Staple–2″~~	~~Face nailing up to 6″ widths, 1 nail per bearing; 8″ width sand over, 2 nails per bearing~~
	~~Bevel~~	~~7/16~~							
	~~Butt tip~~	~~3/16~~	~~Lap~~						
~~Wood structural panel ANSI/APA PRP-210 siding (exterior grade) (see Section R703.5)~~		~~3/8—1/2~~	~~Note e~~	~~2″ × 0.099″ siding nail~~	~~2 1/2″ × 0.113″ siding nail~~	~~2 1/2″ × 0.113″ siding nail~~	~~2 1/2″ × 0.113″ siding nail~~	~~2″ × 0.099″ siding nail~~	~~6″ panel edges 12″ inter. sup.~~
~~Wood structural panel lap siding (see Section R703.5)~~		~~3/8—1/2~~	~~Note e Note g~~	~~2″ × 0.099″ siding nail~~	~~2 1/2″ × 0.113″ siding nail~~	~~2 1/2″ × 0.113″ siding nail~~	~~2 1/2″ × 0.113″ siding nail~~	~~2″ × 0.099″ siding nail~~	~~8″ along bottom edge~~

~~For SI: 1 inch = 25.4 mm.~~

~~l. Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Sections R703.15, R703.16 and R703.17.~~

~~k. Polypropylene siding shall comply with ASTM D7254.~~

~~j. Insulated vinyl siding shall comply with ASTM D7793.~~

~~i. Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other nailable substrate of minimum thickness specified by the instructions or test report, without penetrating into framing.~~

~~h. Minimum fastener length must be sufficient to penetrate sheathing other nailable substrate and framing a total of a minimum of 1 1/4 inches or in accordance with the manufacturer's installation instructions.~~

~~g. Vertical joints, if staggered, shall be permitted to be away from studs if applied over wood structural panel sheathing.~~

~~f. Face nailing: one 6d common nail through the overlapping planks at each stud. Concealed nailing: one 0.120-inch diameter (11-gage) 1 1/2-inch-long galvanized roofing nail through the top edge of each plank at each stud in accordance with the manufacturer's installation instructions.~~

~~e. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.~~

~~d. Where used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.~~

~~c. Shall be of approved type.~~

~~b. Aluminum (0.019 inch) shall be unbacked only where the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.~~

~~a. Aluminum nails shall be used to attach aluminum siding.~~

Reason: This change is largely editorial as this table is replicated in specific material sections of the code. The Table is not used typically for regulatory purposes based on educational seminar surveys at building official events.

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

Justification for no cost impact:

This change removes a table that is redundant and make no changes to the current code requirements.

RB217-25

RB218-25

IRC: TABLE R703.3(1)

Proponents: Matthew Dobson, representing Polymeric Exterior Products Association (mdobson@vinylsiding.org)

2024 International Residential Code

Revise as follows:

TABLE R703.3(1) SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL		NOMINAL THICKNESS (inches)	JOINT TREATMENT	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud[l]	Direct to studs	Number or spacing of fasteners
Anchored veneer: brick, concrete, masonry or stone (see Section R703.8)		2	Section R703.8	Section R703.8					
Adhered veneer: concrete, stone or masonry (see Section R703.12)		—	Section R703.12	Section R703.12					
Fiber cement siding	Panel siding (see Section R703.10.1)	$^{5}/_{16}$	Section R703.10.1	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	4d common ($1^{1}/_{2}$″ × 0.099″)	6″ panel edges 12″ inter. sup.
	Lap siding (see Section R703.10.2)	$^{5}/_{16}$	Section R703.10.2	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″) or 0.120″ dia. (11 gage) roofing nail	Note f
Hardboard panel siding (see Section R703.5)		$^{7}/_{16}$	—	0.120″ nail (shank) with 0.225″ head	0.120″ nail (shank) with 0.225″ head	0.120″ nail (shank) with 0.225″ head	0.120″ nail (shank) with 0.225″ head	0.120″ nail (shank) with 0.225″ head	6″ panel edges 12″ inter. sup.[d]
Hardboard lap siding (see Section R703.5)		$^{7}/_{16}$	Note e	0.099″ nail (shank) with 0.240″ head	0.099″ nail (shank) with 0.240″ head	0.099″ nail (shank) with 0.240″ head	0.099″ nail (shank) with 0.240″ head	0.099″ nail (shank) with 0.240″ head	Same as stud spacing 2 per bearing
Horizontal aluminum[a]	Without insulation	0.019[b]	Lap	Siding nail $1^{1}/_{2}$″ × 0.120″	Siding nail 2″ × 0.120″	Siding nail 2″ × 0.120″	Siding nail[h] $1^{1}/_{2}$″ × 0.120″	Not allowed	Same as stud spacing
		0.024	Lap	Siding nail $1^{1}/_{2}$″ × 0.120″	Siding nail 2″ × 0.120″	Siding nail 2″ × 0.120″	Siding nail[h] $1^{1}/_{2}$″ × 0.120″	Not allowed	
	With insulation	0.019	Lap	Siding nail $1^{1}/_{2}$″ × 0.120″	Siding nail $2^{1}/_{2}$″ × 0.120″	Siding nail $2^{1}/_{2}$″ × 0.120″	Siding nail[h] $1^{1}/_{2}$″ × 0.120″	Siding nail $1^{1}/_{2}$″ × 0.120″	
~~Insulated vinyl siding~~[j]		~~0.035 (vinyl siding layer only)~~	~~Lap~~	~~0.120″ nail (shank) with a 0.313″ head or 16 gage staple with $^{3}/_{8}$″ to $^{1}/_{2}$″ crown~~[h, i]	~~0.120" nail (shank) with a 0.313″ head or 16 gage staple with $^{3}/_{8}$″ to $^{1}/_{2}$″ crown~~[h]	~~0.120" nail (shank) with a 0.313″ head or 16 gage staple with $^{3}/_{8}$″ to $^{1}/_{2}$″ crown~~[h]	~~0.120" nail (shank) with a 0.313" head Section R703.11.2~~	~~Not allowed~~	~~16 inches on center or specified by manufacturer instructions, test report or other sections of this code~~
Particleboard panels		$^{3}/_{8}$	—	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	Not allowed	6″ panel edges 12″ inter. sup.
		$^{1}/_{2}$	—	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	
		$^{5}/_{8}$	—	6d box nail (2″ × 0.099″)	8d box nail ($2^{1}/_{2}$″ × 0.113″)	8d box nail ($2^{1}/_{2}$″ × 0.113″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	
~~Polypropylene siding~~[k]		~~Not applicable~~	~~Lap~~	~~Section R703.14.1~~	~~Section R703.14.1~~	~~Section R703.14.1~~	~~Section R703.14.1~~	~~Not allowed~~	~~As specified by the manufacturer instructions, test report or other sections of this code~~
Steel[c]		29 ga.	Lap	Siding nail ($1^{3}/_{4}$″ × 0.113″) Staple–$1^{3}/_{4}$	Siding nail ($2^{3}/_{4}$″ × 0.113″) Staple–$2^{1}/_{2}$	Siding nail ($2^{1}/_{2}$″ × 0.113″) Staple–$2^{1}/_{4}$	Siding nail ($1^{3}/_{4}$″ × 0.113″) Staple–$1^{3}/_{4}$	Not allowed	Same as stud spacing
~~Vinyl siding (see Section R703.11)~~		~~0.035~~	~~Lap~~	~~0.120″ nail (shank) with a 0.313″ head or 16 gage staple with $^{3}/_{8}$ to $^{1}/_{2}$ inch crown~~[h, i]	~~0.120″ nail (shank) with a 0.313″ head or 16 gage staple with $^{3}/_{8}$″ to $^{1}/_{2}$″ crown~~[h]	~~0.120″ nail (shank) with a 0.313″ head or 16 gage staple with $^{3}/_{8}$″ to $^{1}/_{2}$″ crown~~[h]	~~0.120″ nail (shank) with a 0.313" head Section R703.11.2~~	~~Not allowed~~	~~16 inches on center or as specified by the manufacturer instructions or test report~~
Wood siding (see Section R703.5)	Wood rustic, drop	$^{3}/_{8}$ min.	Lap	6d box or siding nail (2″ × 0.099″)	6d box or siding nail (2″ ×0.099″)	6d box or siding nail (2″ × 0.099″)	6d box or siding nail (2″ × 0.099″)	8d box or siding nail ($2^{1}/_{2}$″ × 0.113″) Staple–2″	Face nailing up to 6″ widths, 1 nail per bearing; 8″ width sand over, 2 nails per bearing
	Shiplap	$^{19}/_{32}$ average	Lap						
	Bevel	$^{7}/_{16}$							
	Butt tip	$^{3}/_{16}$	Lap						
Wood structural panel ANSI/APA PRP-210 siding (exterior grade) (see Section R703.5)		$^{3}/_{8}$ – $^{1}/_{2}$	Note e	2″ × 0.099″ siding nail	$2^{1}/_{2}$″ × 0.113″ siding nail	$2^{1}/_{2}$″ × 0.113″ siding nail	$2^{1}/_{2}$″ × 0.113″ siding nail	2″ × 0.099″ siding nail	6″ panel edges 12″ inter. sup.
Wood structural panel lap siding (see Section R703.5)		$^{3}/_{8}$ – $^{1}/_{2}$	Note e Note g	2″ × 0.099″ siding nail	$2^{1}/_{2}$″ × 0.113″ siding nail	$2^{1}/_{2}$″ × 0.113″ siding nail	$2^{1}/_{2}$″ × 0.113″ siding nail	2″ × 0.099″ siding nail	8″ along bottom edge

For SI: 1 inch = 25.4 mm.

a. Aluminum nails shall be used to attach aluminum siding.

b. Aluminum (0.019 inch) shall be unbacked only where the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.

c. Shall be of approved type.

d. Where used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.

e. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.

f. Face nailing: one 6d common nail through the overlapping planks at each stud. Concealed nailing: one 0.120-inch diameter (11-gage) $1^{1}/_{2}$-inch-long galvanized roofing nail through the top edge of each plank at each stud in accordance with the manufacturer's installation instructions.

g. Vertical joints, if staggered, shall be permitted to be away from studs if applied over wood structural panel sheathing.

~~h. Minimum fastener length must be sufficient to penetrate sheathing other nailable substrate and framing a total of a minimum of~~ $\cancel{1^{1}/_{4}}$ ~~inches or in accordance with the manufacturer's installation instructions.~~

i. ~~Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other nailable substrate of minimum thickness specified by the instructions or test report, without penetrating into framing.~~

j. ~~Insulated vinyl siding shall comply with ASTM D7793.~~

k. ~~Polypropylene siding shall comply with ASTM D7254.~~

l. Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Sections R703.15, R703.16 and R703.17.

Reason: This change removes redundant information that is contained in the specific material section of the code. It is partially complimentary to a companion code change for vinyl siding and insulated vinyl siding. In addition the change removes the provisions for polypropylene siding which are largely dependent on the manufacturer's installation instructions anyway, so the prescriptive table has no utility anyway it's simply a pointer.

It is worth noting in trainings provided to building officials, there have been no building officials who have indicated they even reference this table, it's entire deletion may be worth considering, which is offered in another 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:

We are removing redundant information especially related to the creation of a material specific table vs. the elimination of a broad unused table in the code.

RB218-25

RB219-25

IRC: TABLE R703.3(1)

Proponents: Alexander Haldeman, representing James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Residential Code

Revise as follows:

TABLE R703.3(1) SIDING MINIMUM ATTACHMENT AND MINIMUM THICKNESS

SIDING MATERIAL		NOMINAL THICKNESS (inches)	JOINT TREATMENT	TYPE OF SUPPORTS FOR THE SIDING MATERIAL AND FASTENERS					
				Wood or wood structural panel sheathing into stud	Fiberboard sheathing into stud	Gypsum sheathing into stud	Foam plastic sheathing into stud[l]	Direct to studs	Number or spacing of fasteners
Anchored veneer: brick, concrete, masonry or stone (see Section R703.8)		2	Section R703.8	Section R703.8					
Adhered veneer: concrete, stone or masonry (see Section R703.12)		—	Section R703.12	Section R703.12					
Fiber cement siding	Panel siding (see Section R703.10.1)	5/16[m]	Section R703.10.1	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	4d common (1 1/2″ × 0.099″)	6″ panel edges 12″ inter. sup.
	Lap siding (see Section R703.10.2)	5/16[m]	Section R703.10.2	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″)	6d common (2″ × 0.113″) or 0.120″ dia. (11 gage) roofing nail	Note f
Hardboard panel siding (see Section R703.5)		7/16	—	0.120″ nail (shank) with 0.225″ head	0.120″ nail (shank) with 0.225″ head	0.120″ nail (shank) with 0.225″ head	0.120″ nail (shank) with 0.225″ head	0.120″ nail (shank) with 0.225″ head	6″ panel edges 12″ inter. sup.[d]
Hardboard lap siding (see Section R703.5)		7/16	Note e	0.099″ nail (shank) with 0.240″ head	0.099″ nail (shank) with 0.240″ head	0.099″ nail (shank) with 0.240″ head	0.099″ nail (shank) with 0.240″ head	0.099″ nail (shank) with 0.240″ head	Same as stud spacing 2 per bearing
Horizontal aluminum[a]	Without insulation	0.019[b]	Lap	Siding nail 1 1/2″ × 0.120″	Siding nail 2″ × 0.120″	Siding nail 2″ × 0.120″	Siding nail[h] 1 1/2″ × 0.120″	Not allowed	
		0.024	Lap	Siding nail 1 1/2″ × 0.120″	Siding nail 2″ × 0.120″	Siding nail 2″ × 0.120″	Siding nail[h] 1 1/2″ × 0.120″	Not allowed	Same as stud spacing
	With insulation	0.019	Lap	Siding nail 1 1/2″ × 0.120″	Siding nail 2 1/2″ × 0.120″	Siding nail 2 1/2″ × 0.120″	Siding nail[h] 1 1/2″ × 0.120″	Siding nail 1 1/2″ × 0.120″	
Insulated vinyl siding[j]		0.035 (vinyl siding layer only)	Lap	0.120″ nail (shank) with a 0.313″ head or 16-gage staple with 3/8″ to 1/2″ crown[h, i]	0.120" nail (shank) with a 0.313″ head or 16-gage staple with 3/8″ to 1/2″ crown[h]	0.120" nail (shank) with a 0.313″ head or 16-gage staple with 3/8″ to 1/2″ crown[h]	0.120" nail (shank) with a 0.313" head Section R703.11.2	Not allowed	16 inches on center or specified by manufacturer instructions, test report or other sections of this code
Particleboard panels		3/8	—	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	Not allowed	
		1/2	—	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	6″ panel edges 12″ inter. sup.
		5/8	—	6d box nail (2″ × 0.099″)	8d box nail (2 1/2″ × 0.113″)	8d box nail (2 1/2″ × 0.113″)	6d box nail (2″ × 0.099″)	6d box nail (2″ × 0.099″)	
Polypropylene siding[k]		Not applicable	Lap	Section R703.14.1	Section R703.14.1	Section R703.14.1	Section R703.14.1	Not allowed	As specified by the manufacturer instructions, test report or other sections of this code
Steel[c]		29 ga.	Lap	Siding nail (1 3/4″ × 0.113″) Staple–1 3/4	Siding nail (2 3/4″ × 0.113″) Staple–2 1/2	Siding nail (2 1/2″ × 0.113″) Staple–2 1/4	Siding nail (1 3/4″ × 0.113″) Staple–1 3/4	Not allowed	Same as stud spacing
Vinyl siding (see Section R703.11)		0.035	Lap	0.120″ nail (shank) with a 0.313″ head or 16-gage staple with 3/8- to 1/2-inch crown[h, i]	0.120″ nail (shank) with a 0.313″ head or 16-gage staple with 3/8″ to 1/2″ crown[h]	0.120″ nail (shank) with a 0.313″ head or 16- gage staple with 3/8″ to 1/2″ crown[h]	0.120″ nail (shank) with a 0.313" head Section R703.11.2	Not allowed	16 inches on center or as specified by the manufacturer instructions or test report
Wood siding (see Section R703.5)	Wood rustic, drop	3/8 min.	Lap	6d box or siding nail (2″ × 0.099″)	6d box or siding nail (2″ ×0.099″)	6d box or siding nail (2″ × 0.099″)	6d box or siding nail (2″ × 0.099″)	8d box or siding nail (2 1/2″ × 0.113″) Staple–2″	Face nailing up to 6″ widths, 1 nail per bearing; 8″ width sand over, 2 nails per bearing
	Shiplap	19/32 average	Lap						
	Bevel	7/16							
	Butt tip	3/16	Lap						
Wood structural panel ANSI/APA PRP-210 siding (exterior grade) (see Section R703.5)		3/8 – 1/2	Note e	2″ × 0.099″ siding nail	2 1/2″ × 0.113″ siding nail	2 1/2″ × 0.113″ siding nail	2 1/2″ × 0.113″ siding nail	2″ × 0.099″ siding nail	6″ panel edges 12″ inter. sup.
Wood structural panel lap siding (see Section R703.5)		3/8 – 1/2	Note e Note g	2″ × 0.099″ siding nail	2 1/2″ × 0.113″ siding nail	2 1/2″ × 0.113″ siding nail	2 1/2″ × 0.113″ siding nail	2″ × 0.099″ siding nail	8″ along bottom edge

For SI: 1 inch = 25.4 mm.

a. Aluminum nails shall be used to attach aluminum siding.

b. Aluminum (0.019 inch) shall be unbacked only where the maximum panel width is 10 inches and the maximum flat area is 8 inches. The tolerance for aluminum siding shall be +0.002 inch of the nominal dimension.

c. Shall be of approved type.

d. Where used to resist shear forces, the spacing must be 4 inches at panel edges and 8 inches on interior supports.

e. Vertical end joints shall occur at studs and shall be covered with a joint cover or shall be caulked.

f. Face nailing: one 6d common nail through the overlapping planks at each stud. Concealed nailing: one 0.120-inch diameter (11-gage) $1^{1}/_{2}$-inch-long galvanized roofing nail through the top edge of each plank at each stud in accordance with the manufacturer's installation instructions.

g. Vertical joints, if staggered, shall be permitted to be away from studs if applied over wood structural panel sheathing.

h. Minimum fastener length must be sufficient to penetrate sheathing other nailable substrate and framing a total of a minimum of $1^{1}/_{4}$ inches or in accordance with the manufacturer's installation instructions.

i. Where specified by the manufacturer's instructions and supported by a test report, fasteners are permitted to penetrate into or fully through nailable sheathing or other nailable substrate of minimum thickness specified by the instructions or test report, without penetrating into framing.

j. Insulated vinyl siding shall comply with ASTM D7793.

k. Polypropylene siding shall comply with ASTM D7254.

l. Cladding attachment over foam sheathing shall comply with the additional requirements and limitations of Sections R703.15, R703.16 and R703.17.

m. Nominal thickness less than 5/16" is permitted when installed in accordance with the manufacturer's instructions and is supported by a test report or other documentation showing compliant performance.

Reason: Nominal thickness of fiber-cement less than 5/16" (e.g. minimum 1/4") is not uncommon for these products and is already mentioned in codes (see IRC Section R704.2.2 - Fiber-cement exterior soffit panels, and IBC Table 1404.2 - Minimum Thickness of Weather Coverings.)

While R703.3 allows for stud spacing greater than 16 inches (e.g. 24 inches) where "*specified by the siding manufacturer's instructions and supported by a test report or other documentation*", similarly, highlighting that minimum allowable material thickness using performance-based evidence to show compliance with this code should be included so as to not stifle innovation and increase choices for consumers.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0. Dependent on material availability.
The cost differences between 5/16" panel and 1/4" panel (for example) would be a cost savings of approximately 10-20% .

The decrease in material thickness equates to less raw-materials required (reducing cost to some degree) and also allows for additional sqft per truckload (reducing shipping costs per sqft)

Estimated Immediate Cost Impact Justification (methodology and variables):

performance-based allowance of thinner materials allows innovation of products compliant with this code, and generally (usually) less material used costs less overall.

RB220-25

IRC: SECTION 202 (New), R703.3.1, R703.3.4, R703.11.1, R703.11.2, R703.13, R703.13.1

Proponents: Matthew Dobson, representing Polymeric Exterior Products Association (mdobson@vinylsiding.org)

2024 International Residential Code

Add new definition as follows:

BACKED VINYL SIDING. A cladding product with manufacturer-installed foam plastic backing material as an integral part of the cladding product, where used as insulation refer to *insulated vinyl siding.*

Revise as follows:

R703.3.1 Siding clearance at wall and adjacent surfaces. Unless otherwise specified by the cladding manufacturer or this code, polypropylene, insulated vinyl, backed vinyl, and vinyl *claddings* shall have clearance of not less than 6 inches (152 mm) from the ground and not less than $^{1}/_{2}$ inch (13 mm) from other adjacent surfaces (decks, roofs, slabs).

R703.3.4 Minimum fastener length and penetration. Fasteners shall have the greater of the minimum length specified in Table R703.3(1) or as required to provide a minimum penetration into framing as follows:

6. Fasteners for siding material installed over foam plastic sheathing shall have sufficient length to accommodate foam plastic sheathing thickness and to penetrate framing or sheathing and framing combined, as specified in Items 1 through 5.
5. Fasteners for vertical or horizontal wood siding shall penetrate not less than $1^{1}/_{2}$ inches (38 mm) into studs, studs and wood sheathing combined, or blocking.
4. Fasteners for *polypropylene siding* shall be installed in accordance with Section R703.14.
3. Fasteners for *vinyl siding,* *backed vinyl siding,* and *insulated vinyl siding* shall be installed in accordance with Section R703.11 or R703.13.
2. Fasteners for hardboard panel and lap siding shall penetrate not less than $1^{1}/_{2}$ inches (38 mm) into framing.
1. Fasteners for horizontal aluminum siding, steel siding, particleboard panel siding, *wood structural panel* siding in accordance with ANSI/APA-PRP 210, *fiber-cement* panel siding and *fiber-cement* lap siding installed over foam plastic sheathing shall penetrate not less than $1^{1}/_{2}$ inches (38 mm) into framing or shall be in accordance with the manufacturer's installation instructions.

R703.11.1 Installation. *Vinyl siding,* *backed vinyl siding,* *insulated vinyl siding* and compatible accessories shall be installed in accordance with the manufacturer's installation instructions.

R703.11.2 Installation over foam plastic sheathing. Where *vinyl siding,* *backed vinyl siding,* or *insulated vinyl siding* is installed over foam plastic sheathing, the ~~*vinyl*~~ siding shall comply with Section R703.11 and shall have a wind load design pressure rating in accordance with Table R703.11.2.

Exceptions:

3. Where the foam plastic sheathing and its attachment have a design wind pressure resistance complying with Sections R303.8 and R301.2.1, the ~~vinyl~~ siding shall be installed in accordance with Sections R703.3.3 and R703.11.1.
2. Where the ~~*vinyl*~~ *siding* manufacturer's product specifications provide an *approved* wind load design pressure rating for installation over foam plastic sheathing, use of this wind load design pressure rating shall be permitted and the siding shall be installed in accordance with the *manufacturer's installation instructions*.
1. Where the foam plastic sheathing is applied directly over *wood structural panels*, fiberboard, *gypsum sheathing* or other *approved* backing capable of independently resisting the design wind pressure, the ~~vinyl~~ siding shall be installed in accordance with Sections R703.3.3 and R703.11.1.

R703.13 Insulated vinyl siding <u>and backed vinyl siding</u>. *Insulated vinyl siding* <u>and *backed vinyl siding*</u> shall be certified and *labeled* as conforming to the requirements of ASTM D7793 <u>and D7445, respectively,</u> by an *approved* agency.

R703.13.1 Insulated vinyl siding, <u>backed vinyl siding,</u> and accessories. *Insulated vinyl siding, <u>backed vinyl siding,</u>*
and compatible accessories shall be installed in accordance with Sections R703.11.1 and R703.11.2 ~~and the~~ <u>or shall be installed in in accordance with</u>
manufacturer's installation instructions.

Reason: This change brings in a new product category, backed siding. This product, which has been standardized, is essentially a laminated board product, vinyl and EPS foam. The foam is required to meet the requirements of the IRC.

This change has been accepted into the International Building Code during Group A cycle.

It's a product which claims no R-value but still offers a rigid product that enhance performance including higher impact resistance.

Products are being commercialize and certified by a third party at this point.

Cost Impact: Increase

Estimated Immediate Cost Impact:

On an average single family home, if you installed this product instead of standard vinyl siding, you could expect to see an increase of $500 - $1500 dollars. This is based on industry information. Although this product is an option not a requirement, if it were chosen instead of vinyl siding, it would be an increase in cost. Although this product is typically less costly than other alternative clapboard styled products and other more massive cladding.

Estimated Immediate Cost Impact Justification (methodology and variables):

Backed siding is fairly new the market, but generally speaking the material costs are 20%-30% more than traditional vinyl siding.

Estimated Life Cycle Cost Impact:

Life cycle of product is at least 50 years and this type of products requires minimal maintenance, typically just water and brush every few years depending on the location of the structure.

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

Life cycle data is based on NIST's (Federal Government) Building forEnvironmental and Economic Sustainability software.

Staff Analysis: FS111-24 was AMC1 and is now on the consent agenda. That proposal included the new standard ASTM D7445-24

RB220-25

RB221-25

IRC: R703.4.1

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Residential Code

Revise as follows:

R703.4.1 Flashing installation at exterior window and door openings. . Flashing at exterior window and door openings shall extend to the surface of the exterior wall finish or to a *water-resistive barrier* complying with Section R703.2 for subsequent drainage. Air sealing shall be installed around all window and door openings on the interior side of the rough opening gap. Mechanically attached flexible flashings shall comply with AAMA 712. Flashing at exterior window and door openings shall be installed in accordance with the fenestration manufacturer's installation and flashing instructions. For applications not addressed in the fenestration manufacturer's instructions, flashing shall be installed in accordance with one or more of the following:

1. ~~The fenestration manufacturer's installation and flashing instructions, or for applications not addressed in the fenestration manufacturer's instructions, in~~ In accordance with the flashing or *water-resistive barrier* manufacturer's instructions. ~~Where flashing instructions or details are not provided, *pan flashing* shall be installed at the sill of exterior window and door openings. *Pan flashing* shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the *water-resistive barrier* for subsequent drainage. Openings using *pan flashing* shall incorporate flashing or protection at the head and sides.~~
2. In accordance with the fenestration flashing methods included in FMA/AAMA/WDMA 500.
3. In accordance with the fenestration flashing methods included in ANSI/ABTG FS200.1.
4. ~~2.~~ In accordance with the flashing design or method of a *registered design professional*.
5. ~~3.~~ In accordance with other *approved* methods.

Exception: Where flashing instructions or details are not provided, *pan flashing* shall be installed at the sill of exterior window and door openings. *Pan flashing* shall be sealed or sloped in such a manner as to direct water to the surface of the exterior wall finish or to the *water-resistive barrier* for subsequent drainage. Openings using *pan flashing* shall incorporate flashing or protection at the head and sides.

Reason: This proposal is consistent with a Group A IBC proposal, FS115-24, which was approved by committee and is on the consent agenda for public hearing in 2026. This version of the proposal for the IRC reformats Section R703.4.1 by moving the fenestration manufacturer's instructions from Item 1 into the charging language as consistent with the IBC Section 1404.4.1. Also, the pan flashing approach (in the absence of instructions which this section deals with) is moved to an exception to address the case where no source of instruction is provided. Finally, two standards addressing fenestration flashing are added in items 2 and 3. The flashing methods included in the FMA/AAMA/WDMA 500 standard (see Bibliography) provides for flashing of windows installed using a window buck on walls with foam sheathing and a separate WRB material. The ANSI/ABTG FS200.1 standard (see Bibliography) provides for flashing of windows on walls with foam sheathing used as the WRB in its Section 3.6, including with or without a window buck (it also references the FMA/AAMA/WDMA 500 standard as well as performance testing of installation methods in accordance with AAMA 504). Both of these standards are compatible and thoroughly vetted through field experience and laboratory testing (see Bibliography).

Bibliography: FMA/AAMA/WDMA 500-16: Standard Practice for the Installation of Mounting Flange Windows into Walls Utilizing Foam Plastic Insulating Sheathing (FPIS) with a Separate Water-Resistive Barrier, https://store.fgiaonline.org/pubstore/ProductResults.asp?cat=0&src=500

ABTG (2021). Installation and Performance of Flanged Fenestration Units Mounted on Walls with Foam Plastic Insulating Sheathing, ABTG Research Report No. 2104-01, Applied Building Technology Group, LLC, Madison, WI, https://www.appliedbuildingtech.com/rr/2104-01 (free download)

ANSI/ABTG FS200.1 – 2022, Standard for the Use of Foam Plastic Insulating Sheathing (FPIS) in Building Envelopes: Above-grade

Walls, Applied Building Technology Group, LLC, Madison, WI. https://www.appliedbuildingtech.com/standards (free download)

Cost Impact: The 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 reformats the provisions with no cost impact. Two standards are added to the list of options and therefore have no cost impact as they are adding options and not changing existing requirements or options.

Staff analysis: FS115-24 was AS and is now on the consent agenda. That proposal included the new standard ANSI/ABTG FS200.1 – 2022 and FMA/AAMA/WDMA 500-16

RB221-25

RB222-25

IRC: SECTION 202 (New), R703.7.3, R703.7.3.1, R703.7.3.2, TABLE 703.7.3 (New)

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Residential Code

Add new definition as follows:

STUCCO BOND BREAK. A substantially nonwater-absorbing layer placed directly behind the stucco to prevent adhesion of the stucco to the surface of the *water-resistive barrier*.

Delete and substitute as follows:

~~**R703.7.3 Water-resistive barriers.** Water-resistive barriers shall be installed as required in Section R703.2 and shall comply with Section R703.7.3.1 or R703.7.3.2.~~

~~**Exception:** Sections R703.7.3.1 and R703.7.3.2 shall not apply to construction where accumulation, condensation or freezing of moisture will not damage the materials.~~

R703.7.3 Weather protection. A *water-resistive barrier*, *stucco bond break*, means of drainage, and flashing shall be provided in accordance with Section R703.1.1 and one of the methods in Table R703.7.3.

Exceptions:

1. The requirement for a means of drainage shall not apply to construction where accumulation, condensation or freezing of moisture will not damage the materials.
2. Masonry or concrete wall construction in accordance with exception 1 of Section R703.1.1.
3. An *approved* design complying with exception 2 of Section R703.1.1.

~~**R703.7.3.1 Dry climates.** . In Dry (B) *climate zones* indicated in Figure N1101.7, *water-resistive barriers* shall comply with one of the following:~~

1. ~~The *water-resistive barrier* shall be two layers of 10-minute Grade D paper or have a water resistance equal to or greater than two layers of a *water-resistive barrier* complying with ASTM E2556, Type I. The individual layers shall be installed independently such that each layer provides a separate continuous plane. Flashing installed in accordance with Section R703.4 and intended to drain to the *water-resistive barrier* shall be directed between the layers.~~
2. ~~The *water-resistive barrier* shall be 60-minute Grade D paper or have a water resistance equal to or greater than one layer of a *water-resistive barrier* complying with ASTM E2556, Type II. The *water-resistive barrier* shall be separated from the stucco by a layer of foam plastic *insulating sheathing,* other non-water-absorbing layer, a drainage space or means of drainage complying with Section R703.7.3.2. Flashing installed in accordance with Section 703.4 and intended to drain to the *water-resistive barrier* shall be directed to the exterior side of the *water-resistive barrier.*~~

R703.7.3.1 Installation. The continuous *water-resistive barrier* shall be installed in accordance with Section R703.2. The *water-resistive barrier*, *stucco bond break*, and means of drainage shall be installed in accordance with Table R703.7.3. Water shall be directed to the exterior at the base of the stucco application and at any transition between building stories or other conditions where the means of drainage terminates.

~~**R703.7.3.2 Moist or marine climates.** In the Moist (A) or Marine (C) *climate zones* indicated in Figure N1101.7, *water-resistive barriers* shall comply with one of the following:~~

1. ~~In addition to complying with Section R703.7.3.1, a space or drainage material not less than $^3/_{16}$ inch (5 mm) in depth shall be added to the exterior side of the *water-resistive barrier*.~~
2. ~~In addition to complying with Section R703.7.3.1, Item 2, drainage on the exterior of the *water-resistive barrier* shall have a drainage efficiency of not less than 90 percent, as measured in accordance with ASTM E2273 or Annex A2 of ASTM E2925.~~

R703.7.3.2 Flashing. Flashing installed in accordance with Section R703.4 and intended to drain to the *water-resistive barrier* shall be directed to the exterior side of the *water-resistive barrier*.

Add new text as follows:

TABLE 703.7.3 WEATHER PROTECTION REQUIREMENTS FOR EXTERIOR PLASTER (STUCCO)

Method	Moisture Regime[a]	Water-Resistive Barrier (WRB)	Stucco Bond Break (SBB)	Means of Drainage
1	Moist (A), Dry (B), or Marine (C) (any moisture regime)	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	Drainage cavity with min. 3/16-inch (4.6 mm) depth between WRB and SBB layers
2		60-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type II	Foam plastic insulating sheathing or other *stucco bond break*	
3			Foam plastic insulating sheathing or other *stucco bond break*	Drainage between WRB and SBB layers with drainage efficiency of at least 90% per ASTM E2273 or Annex A2 of ASTM E2925
4	Dry (B)	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	10-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type I	Drainage is between WRB and SBB layers
5		60-minute Grade D paper or WRB with water resistance equal to or greater than one layer of ASTM E2556, Type II	Foam plastic insulating sheathing or other *stucco bond break*	
6			Not Required	Means of drainage in accordance with Method 1, 2 or 3 with means to separate stucco from direct contact with WRB

a. The appropriate moisture regime shall be selected in accordance with Chapter 3 of the *International Energy Conservation Code* commercial or residential provisions.

Reason: This proposal coordinates the IRC with an identical Group A proposal, S9-24, approved by the IBC FS committee and on the consent agenda for public hearing in 2026. This proposal represents a collaborative effort supported by a broad group of stakeholders. The previous two code cycles resulted in technical improvements to Section R703.7.3 to address water management of conventional 3-coat stucco installations in moist (A) and marine (C) climate regimes. However, these changes brought about increased complexity of the provisions that vary based on wall assembly conditions and climate conditions with options and requirements that are cross-referenced between the two subsections (existing R703.7.3.1 and R703.7.3.2 shown as deleted and replaced). This formatting approach made determining a particular solution difficult and confusing. Therefore, this proposal clarifies the existing technical requirements and options by making them more "visual" in a table format without changing the technical intent of the code. The multiple requirements and interrelated options of Sections R703.7.3.1 and R703.7.3.2 (deleted) are now incorporated in Table R703.7.3 in a straightforward manner. Also, a definition for "STUCCO BOND BREAK" is provided to facilitate clarity and accuracy in code reading and understanding of different components (and their functions) currently required for 3-coat stucco applications but vaguely described within the code text.

Beyond the overall formatting changes and new definition described above, some specific clarifications addressed by this proposal are as follows:

Section 2510.6 Weather Protection. This section is retitled to better address the scope that goes beyond just water-resistive barriers. New Table R703.7.3 is referenced for requirements instead of the existing two subsections (proposed for deletion and replacement). The ability to use an approved design is also provided as a clarification that other solutions than identified in this section and Table R703.7.3 are possible.

Section R703.7.3.1 Installation. This new subsection consolidates installation requirements that were not addressed consistently across the existing code subsections R703.7.3.1 and R703.7.3.2. Also, a sentence is added to require drainage to the exterior at the base of the stucco application and at transitions between stories or other conditions where the drainage plane or drainage space terminates. This was based on stucco performance field research in Florida (see Bibliography).

Section R703.7.3.2 Flashing. This new subsection simply captures existing code content related to installation of flashing and its integration with the water-resistive barrier.

Table R703.7.3. This new table replaces the inter-twined and cross-referenced requirements of existing subsections R703.7.3.1 and R703.7.3.2 (shown as deleted). The requirements of these subsections are now mapped into Table R703.7.3 as distinctly different solutions or methods for combining the various required components and options for those components (one combination of components is shown for each row of the table). Therefore, the user simply determines the correct climate “moisture regime” (see footnote a) and then selects an appropriate (or preferred) method and follows the required combination of components in that row of the table. This eliminates the need for a user to decipher the existing code text and cross-referenced requirements between different subsections of code to determine what is required.

Bibliography: Lstiburek, J.W. (2005). Rainwater Management Performance of Newly Constructed Residential Building Enclosures During August and Septemeber 2004. Prepared for Home Builders Association of Metro Orlando and the Florida Home Builders Association by: Building Science Corporation, Westord, MA. January 11, 2005

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

Justification for no cost impact:

This proposal strives to make no technical changes to the requirements in 2510.6 and focuses on formatting improvements and clarifications to better convey the various inter-related requirements and options in Section R703.7.3 and particularly the cross-referenced requirements in existing subsections R703.7.3.1 and R703.7.3.2 for dry and moist/marine climates. The primary change is to reformat the subsections to address topics that apply regardless of the climate moisture regime and to place specific climate-dependent requirements and options (methods) in a table format where they can be easily visualized and selected without having to decipher the logic of the current code language.

RB222-25

RB223-25

IRC: R703.8.4.2

Proponents: Charles Clark Jr, Brick Industry Association, representing Masonry Alliance for Codes and Standards (cclark@bia.org); Nicholas Lang, Concrete Masonry & Hardscapes Association, representing Masonry Alliance for Codes & Standards (nlang@masonryandhardscapes.org)

2024 International Residential Code

Delete without substitution:

~~**R703.8.4.2 Grout fill.** As an alternative to the airspace required by Table R703.8.4(1), grout shall be permitted to fill the airspace. Where the airspace is filled with grout, a *water-resistive barrier* is required over studs or sheathing. Where the airspace is filled, replacing the sheathing and *water-resistive barrier* with a wire mesh and *approved water-resistive barrier* or an *approved water-resistive barrier*-backed reinforcement attached directly to the studs is permitted.~~

Reason: In almost all residential construction, the airspace is 1 inch wide. If an airspace this size is grouted, the grout must be poured in 1-foot lifts to achieve proper construction. In practice, this is impractical, and higher lifts increase the potential for air pockets to form. These air pockets can trap moisture and increase the potential for efflorescence on the surface of the veneer. The alterative to fill the airspace with grout describes a type of construction that was used in the mid-20th century. This alternative has not been used for over 30 years and is not recommended detailing for anchored masonry veneer.

Contemporary detailing for anchored masonry veneer incorporates an airspace behind the veneer to provide drainage and air flow which improves the performance of the assembly. Allowing grout fill does not permit this to occur. In fact, in some cases, a grouted airspace could transmit moisture into the backing due to direct, sustained contact with the water resistive barrier. This is especially true when the grout is wet prior to curing or when air pockets are present against the backing.

Permitting this grout-filled alternative implies that it provides equivalent performance to anchored masonry veneer with an airspace/drainage space behind it when it does not. As a result, we recommend removing this alternative from 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:

This proposed change will not result in a cost difference in nearly all cases since this grout-filled system is rarely, if ever, used. In the rare case where the grout-filled alternative would have been used, this proposed change results in no cost change or reduces the cost of construction as no grout and no wire mesh are needed behind the veneer.

RB223-25

RB224-25

IRC: R703.10.1

Proponents: Alexander Haldeman, representing James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Residential Code

Revise as follows:

R703.10.1 Panel siding. *Fiber-cement* panels shall comply with the requirements of ASTM C1186, Type A, minimum Grade II or ISO 8336, Category A, minimum Class 2. Panels shall be installed with the long dimension either parallel or perpendicular to framing. Vertical and horizontal joints shall occur over framing members, furring, *wood structural panel* or other *approved* supporting material and shall be protected with caulking, or with battens or flashing, or be vertical or horizontal shiplap, or otherwise designed to comply with Section R703.1. Panel siding shall be installed with fasteners in accordance with Table R703.3(1) or the *approved* manufacturer's instructions.

Reason: This proposal clarifies that attachment/support of fiber-cement edges/joints can be achieved by multiple methods, and is not limited to just framing members.

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

Justification for no cost impact:

This proposal is editorial in nature, and provides clarification that fiber-cement panel joints may be supported and attached using methods/materials more than *just* framing members.

RB224-25

RB225-25

IRC: R703.10.2

Proponents: Alexander Haldeman, representing James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Residential Code

Revise as follows:

R703.10.2 Lap siding. *Fiber-cement* lap siding having a maximum width of 12 inches (305 mm) shall comply with the requirements of ASTM C1186, Type A, minimum Grade II or ISO 8336, Category A, minimum Class 2. Lap siding shall be lapped a minimum of $1^1/_4$ inches (32 mm) and lap siding not having tongue-and-groove end joints shall have the ends protected with caulking, covered with an H-section joint cover, located over a strip of metal or non-metal flashing, or shall be designed to comply with Section R703.1. Lap siding courses shall be installed with the fastener heads exposed or concealed, in accordance with Table R703.3(1) or *approved* manufacturer's instructions.

Reason: This proposal provides clarification that flashing materials may be made of metal or non-metal and fulfil the intent of this section (H-section cover, flashing, compliance with 703.1); which is to prevent the accumulation of water and provide a means for draining water to the exterior.

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

Justification for no cost impact:

This proposal is editorial, and clarifies that both metal and non-metal flashing materials satisfy the intent of this code section.

RB225-25

RB226-25

IRC: R703.11.1, TABLE R703.11.1 (New), R703.11.1.3, R703.11.1.4, R703.11.1.5, ASTM Chapter 44 (New)

Proponents: Matthew Dobson, representing Polymeric Exterior Products Association (mdobson@vinylsiding.org)

2024 International Residential Code

Revise as follows:

R703.11.1 Installation. *Vinyl siding, insulated vinyl siding* and compatible accessories shall be installed in accordance with the *manufacturer's installation instructions*. For *vinyl siding* and *insulated vinyl siding* applied in accordance with the wind speed and exposure limits of Table R703.3.2 and rated for minimum wind load design pressure rating of 30 psf or greater in accordance with ASTM D3679 or ASTM D7793, respectively, the prescriptive fastening requirements of Table R703.11.1 shall be permitted as an alternative to the manufacturer's installation instructions.

Add new text as follows:

TABLE R703.11.1 PRESCRIPTIVE FASTENER REQUIREMENTS FOR VINYL AND INSULATED VINYL SIDING

Fastener[a]	Substrate[b]	Penetration Depth[c]	Spacing
Smooth shank nail, not less than 0.120" nail shank with 0.313(5/16)" head or 16 gage staple with 3/8- to 1/2- inch crown	Nailable substrate	Not less than 1-1/4"	Horizontal siding - not greater than 16-inches on center
Ring shank nail, not less than 0.120" nail shank with 0.313(5/16)" head	min. 7/16" nailable substrate	Through substrate a minimum of 1/4"	Horizontal siding - not greater than 12-inches on center
Ring shank nail, not less than 0.120" nail shank with 0.313(5/16)" head	> 15/32" thick nailable subtrate	Through substrate a minimum of 1/4"	Horizontal siding - Not greater than-16 inches on center
Either smooth shank or ring shank (a specified above)	min. 7/16" nailable subtrate	Through substrate a minimum of 1/4"	Vertical siding - Not greater than 12-inches on center each way
Ring shank nail, not less than 0.120" nail shank with 0.313(5/16)" head or screw not less than 0.138 screw shank with a .423" truss or pan head	min. 3/4" thick wood furring	Into furring 3/4"	Horizontal sidng - Not greater than 12-inches on center
24" o.c. framing (For 20 psf or less design wind pressure)[d]			
All fastener types	Nailable substrate	Not less than 1-1/4"	Horizontal siding - Not greater than 24-inches on center

a. Smooth and ring shank roofing nails shall comply with ASTM F1667.

b. Wood framing and furring shall have a minimum specific gravity of 0.42. Other *nailable* substrates with equal or greater fastener withdrawal performance shall also be permitted. Where fiberboard, gypsum, foam plastic or other non-nailable substrate is used, fasteners must penetrate studs or other form of *nailable substrate.*

c. The total thickness of *wood structural panel*, wood furring, wood framing, and other *nailable substrates* shall satisfying the required penetration depth.

d. 24" o.c. fastener spacing for horizontal siding shall be permitted where design wind pressure is 20 psf or less in accordance with Tables R301.2.1(1) and (2) for 10 ft^2 tributary area and wall zone 5. Alternatively, it shall be permitted where the mean roof height of the building is 30 feet (9.1 m) or less and the design wind speed does not exceed 115 mph for Exposure B or 110 mph Exposure C.

Delete without substitution:

~~**R703.11.1.3 Fasteners.** Unless specified otherwise by the manufacturer's instructions, fasteners for *vinyl siding* shall be 0.120-inch (3 mm) shank diameter nails with a 0.313-inch (8 mm) head, 16-gage staples with a $^3/_8$-inch (9.5 mm) to $^1/_2$-inch (12.7 mm) crown or in accordance with Table R703.3(1).~~

~~**R703.11.1.4 Penetration depth.** Unless specified otherwise by the manufacturer's instructions or in accordance with Table R703.3(1), fasteners shall penetrate into building framing. The total penetration into sheathing, furring framing or other *nailable substrate* shall be a minimum 1 $^1/_4$ inches (32 mm).~~

~~**R703.11.1.5 Spacing.** Unless specified otherwise by the manufacturer's instructions, the maximum spacing between fasteners shall be 16 inches (406 mm) for horizontal siding and 12 inches (305 mm) for vertical siding. Where specified by the manufacturer's instructions and supported by a test report, alternative fastener spacing such as 24 inches (610 mm) is permitted.~~

Add new standard(s) as follows:

ASTM

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

<u>F1667-21a</u> <u>Specification of Driven Fasteners: Nails, Spikes and Staples.</u>

Reason: This change moves away from the long-standing "standard" installation prescription of 16" oc into the stud to a prescriptive table that offers practical fastener alternatives to installation depending the framing and sheathing patterns. It is based on industry testing using ASTM D5206 and engineering calculations and in short it requires the use of ring shank nails where it's more difficult to hit the stud framing.

In addition in "low wind" areas (a good portion of the country), 20 psf or less where 24" oc framing is used and nailable sheathing is not being used, it provides and allowance for this construction method.

We will remove references to installation practices in the code in Table R703.3(1) as the table is redundant and not used in an additional proposal.

This change will offer options of installation while addressing trends in construction related to energy efficiency and alternative framing concepts.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Estimated additional cost for and average 20 square home is between $50-$150.

Estimated Immediate Cost Impact Justification (methodology and variables):

This change offers alternatives to installation which will add additional fasteners and ring shank nails vs. smooth shank nails which are more expensive.
5lbs of 1 1/4" Roofing Smooth Shank Nails $19

5lb of 1 1/4" Roofing Ring Shank Nails $25

Adds about 25% in material costs, and potential additional labor costs.

Estimated Life Cycle Cost Impact:

Life cycle costs it not relevant here as the change in fastener type will not impact this issue.

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

NA

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
ASTMF1667-21a Specification of Driven Fasteners: Nails, Spikes and Staples.

RB226-25

RB227-25

IRC: R703.11.1.2

Proponents: Matthew Dobson, representing Polymeric Exterior Products Association (mdobson@vinylsiding.org)

2024 International Residential Code

Revise as follows:

R703.11.1.2 Utility trim and snap locks. Utility trim and snap locks shall be installed in accordance with the following:~~Where horizontal siding has to be cut or trimmed below windows and at the top of walls, the top edge of the siding shall be secured with utility *trim* and snap locks or as specified by the manufacturer's installation instructions. See Figures R703.11.1.2(1) and R703.11.1.2(2).~~

1. Where horizontal siding has to be cut or trimmed below windows and at the top of walls, the top edge of the siding shall be secured with utility *trim* and snap locks or as specified by the manufacturer's installation instructions. See Figures R703.11.1.2(1) and R703.11.1.2(2).
2. Where there are openings greater than 4 feet (1219 mm) in width, and the bottom of the siding panel has been trimmed, utility trim and snap locks shall be used above the opening. Utility trim shall be applied upside down.

Reason: This change adds to the recently added requirements with vinyl siding and the importance of starter strip and utility trim. Larger opening need additional connection points for the siding over the top, as this increases the performance of the siding system.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This change would add about $5 per opening that it impacts. So an average house might have 3-4 applications, resulting in $15-$20 per house addition.

Estimated Immediate Cost Impact Justification (methodology and variables):

Based on manufacturer and installer estimates.

Estimated Life Cycle Cost Impact:

This will help to increase the durability of the structure by adding another connection point for the system.

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

NA

RB227-25

RB228-25

IRC: R703.12, ASTM Chapter 44 (New)

Proponents: Nicholas Lang, representing Concrete Masonry & Hardscapes Association (nlang@masonryandhardscapes.org); Charles Clark Jr, representing Brick Industry Association (cclark@bia.org)

2024 International Residential Code

Revise as follows:

R703.12 Adhered masonry veneer installation. *Adhered masonry veneer* shall comply with the requirements of Section R703.7.3 and the requirements in Sections 13.1 and 13.3 of TMS 402. *Adhered masonry veneer* shall be installed in accordance with <u>one of the following:</u> ~~Section R703.7.1, Article 3.3D of TMS 602 or the manufacturer's instructions.~~

1. <u>Article 3.3D of TMS 602</u>
2. <u>For concrete masonry or manufactured stone veneer units, ASTM C1780</u>
3. <u>For clay or shale masonry units, ASTM C1935.</u>
4. <u>Manufacturer's instructions.</u>

Add new standard(s) as follows:

ASTM

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

<u>C1780-24</u>	<u>Standard Practice for Installation Methods for Cement-based Adhered Masonry Veneer</u>
<u>C1935-24</u>	<u>Standard Practice for Installation Methods for Adhered Veneer Systems Using Thin Brick Units Made from Clay or Shale</u>

Reason: This ballot proposes to add new options for installation of adhered masonry veneer. The first of the proposed changes is to remove reference to R703.7.1. That section only deals with attachment of lath, which is covered by the other options provided in this proposal.

The first proposed option is Article 3.3D of TMS 602. This option currently exists, as such, no change is proposed. This option is applicable to all types of masonry units. The second option is ASTM C1780, which is a consensus standard for installation of adhered masonry veneers where the units are cement based. In particular, this option is applicable to concrete masonry and manufactured stone veneer masonry units. The third option is ASTM C1935, which is a consensus standard for installation of adhered masonry veneers where the units are made of clay or shale. The fourth option is manufacturer's instructions. This option currently exists, as such, no change is proposed.

ASTM C1780 and ASTM C1935 have been developed by ASTM Committee C15 on Masonry. They include specific sets of installation information for the applicable units, and are valuable resources to installers. The addition of these standards will improve the quality of adhered masonry veneer installations, and provide important information to installers of adhered masonry veneers. These standards have also been aligned with requirements of TMS 602 to provide consistency across standards.

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

Justification for no cost impact:

This change provides additional options for the installer. The requirements of both new reference standards are aligned with the IRC and TMS 602, so application of those would not impact construction cost.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
ASTMC1780-24 Standard Practice for Installation Methods for Cement-based Adhered Masonry Veneer
ASTMC1935-24 Standard Practice for Installation Methods for Adhered Veneer Systems Using Thin Brick Units Made from Clay or

Shale

RB228-25

RB229-25

IRC: R703.14.1.3 (New)

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Residential Code

Add new text as follows:

R703.14.1.3 Installation over foam plastic sheathing. *Polypropylene siding* shall be installed over foam plastic sheathing in accordance with the manufacturer's installation instructions or an *approved* design. Unless otherwise specified in the manufacturer's instructions, the siding shall be permitted to be attached through maximum 2 inch (51 mm) thick foam sheathing and fastened to minimum 7/16 inch (11.1 mm) wood structural panel in accordance with Table R703.3.3. In no case shall the fastener head size, shank diameter, and spacing be less stringent than that required by the manufacturer's installation instructions.

Reason: Guidance for installation of polypropylene siding over foam plastic insulating sheathing is needed to help ensure proper installation and attachment. Currently, this information exists for vinyl siding in Section R703.11.2, but not for polypropylene siding in Section R703.14. This proposal addresses this need by requiring installation in accordance with the manufacturer's installation instructions or an approved design. As an alternative to and if not otherwise specified in the manufacturer's instructions, the proposal also permits siding attachment through foam sheathing and to underlying wood structural panels in accordance with the existing provisions for this practice in Section R703.3.3 (particularly Table R703.3.3). This proposal has been vetted through the Polymeric Exterior Products Association (formerly Vinyl Siding Institute) to ensure consistency with industry accepted practice and coordination with manufacturer installation 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 is a clarification of requirements to ensure appropriate installation of polypropylene siding over foam sheathing. It does not present new requirements and instead affirms reliance on manufacturer instructions and existing provisions for this purpose in other parts of the code. It also may be considered as a clarification of options for installation and therefore does not change current minimum requirements. Therefore, the proposal is considered to have no cost impact.

RB229-25

RB230-25

IRC: R703.15, R703.16, R703.17

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Residential Code

Revise as follows:

R703.15 Cladding attachment over foam sheathing to wood framing. *Cladding* shall be specified and installed in accordance with Section R703, the cladding manufacturer's *approved* instructions, including any limitations for use over foam plastic sheathing, or an *approved* design. In addition, the *cladding* or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section R703.15.1, Section R703.15.2, Chapter 4 of ANSI/ABTG FS200.1, or an *approved* design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided *approved* installation instructions for application over foam sheathing, those requirements shall apply.
2. For *exterior insulation and finish systems*, refer to Section R703.9.
3. For anchored masonry or stone veneer installed over foam sheathing, refer to Section R703.8.

R703.16 Cladding attachment over foam sheathing to cold-formed steel framing. *Cladding* shall be specified and installed in accordance with Section R703, the cladding manufacturer's *approved* instructions, including any limitations for use over foam plastic sheathing, or an *approved* design. In addition, the *cladding* or furring attachments through foam sheathing to framing shall meet or exceed the minimum fastening requirements of Section R703.16.1, Section R703.16.2, Chapter 4 of ANSI/ABTG FS200.1, or an *approved* design for support of cladding weight.

Exceptions:

1. Where the cladding manufacturer has provided *approved* installation instructions for application over foam sheathing, those requirements shall apply.
2. For *exterior insulation and finish systems*, refer to Section R703.9.
3. For anchored masonry or stone veneer installed over foam sheathing, refer to Section R703.8.

R703.17 Cladding attachment over foam sheathing to masonry or concrete wall construction. *Cladding* shall be specified and installed in accordance with Section R703.3 and the cladding manufacturer's instructions or an *approved* design complying with Chapter 4 of ANSI/ABTG FS200.1. Foam sheathing shall be attached to masonry or concrete construction in accordance with the insulation manufacturer's installation instructions or an *approved* design. Furring and furring attachments through foam sheathing into concrete or masonry substrate shall be designed to resist design loads determined in accordance with Section R301, including support of cladding weight as applicable. Fasteners used to attach *cladding* or furring through foam sheathing to masonry or concrete substrates shall be *approved* for application into masonry or concrete material and shall be installed in accordance with the fastener manufacturer's instructions.

Exceptions:

1. Where the cladding manufacturer has provided *approved* installation instructions for application over foam sheathing and connection to a masonry or concrete substrate, those requirements shall apply.
2. For *exterior insulation and finish systems*, refer to Section R703.9.
3. For anchored masonry or stone veneer installed over foam sheathing, refer to Section R703.8.

Reason: This proposal adds an ANSI consensus standard, FS200.1, which includes design, testing, and prescriptive requirements for attachment of cladding through foam plastic insulating sheathing. It is the basis for the prescriptive fastening provisions that are currently in Sections R703.15, R703.16, and R703.17. It provides additional options that can be used by designers and manufacturers to properly evaluate or design attachment solutions consistent with the provisions in the code. The standard is available as a free download at: https://www.appliedbuildingtech.com/standards

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$0 (see Justification)

Estimated Immediate Cost Impact Justification (methodology and variables):

By adding this standard as an option, additional equivalent design and testing (performance based) solutions will be made more accessible which generally have a tendency to promote flexibility and innovation and reduced cost. However, it is not possible to quantify those cost benefits because of the unknown variation in possible solutions that may be considered or developed.

Estimated Life Cycle Cost Impact:

Life cycle cost is not applicable to this proposal because this proposal is merely adding options. However, it is expected that this proposal would have no change to the life-cycle cost in comparison to the equivalent solutions currently in the code.

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

Life cycle cost is not applicable to this proposal because this proposal is merely adding options. However, it is expected that this proposal would have no change to the life-cycle cost in comparison to the equivalent solutions currently in the code.

Staff Analysis: Staff analysis: FS115-24 was AS and is now on the consent agenda. That proposal included the new standard ANSI/ABTG FS200.1 – 2022

RB230-25

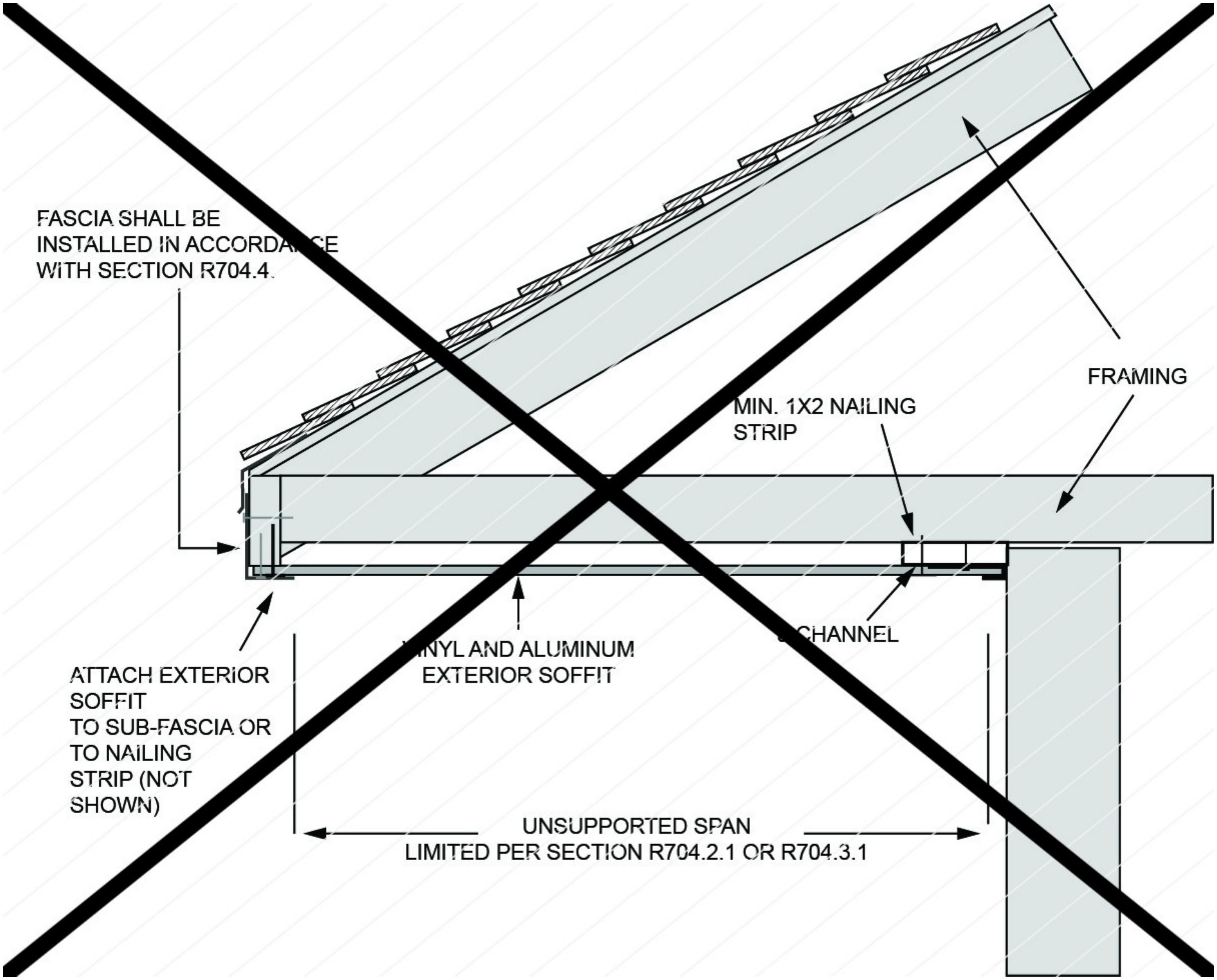
RB231-25

IRC: FIGURE R704.2.1(1), FIGURE R704.2.1(2)

Proponents: Matthew Dobson, representing Polymeric Exterior Products Association (mdobson@vinylsiding.org)

2024 International Residential Code

Delete and substitute as follows:



~~**FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL AND ALUMINUM EXTERIOR SOFFIT PANEL SUPPORT**~~

IRC Drawing 1 – will replace Figure R704.2.1(1) Single Span

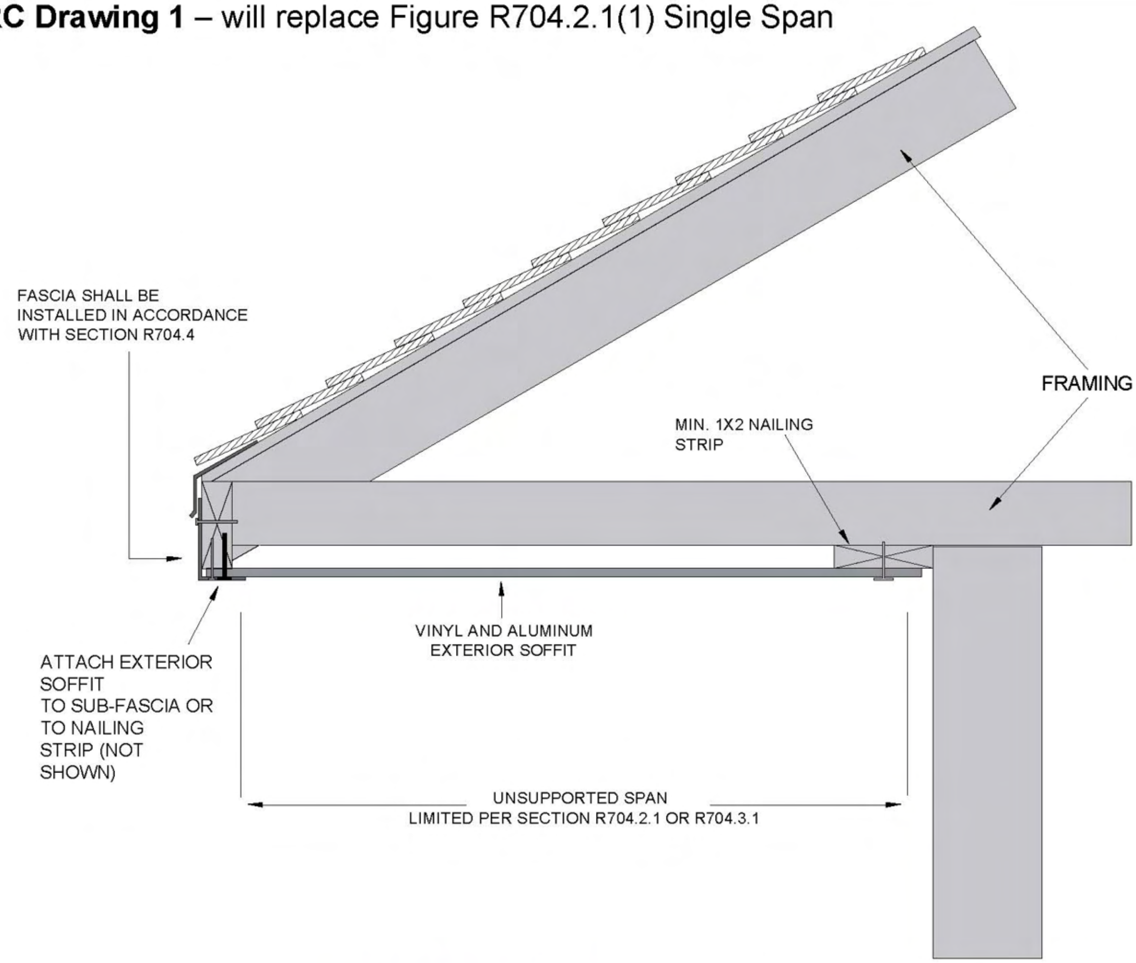
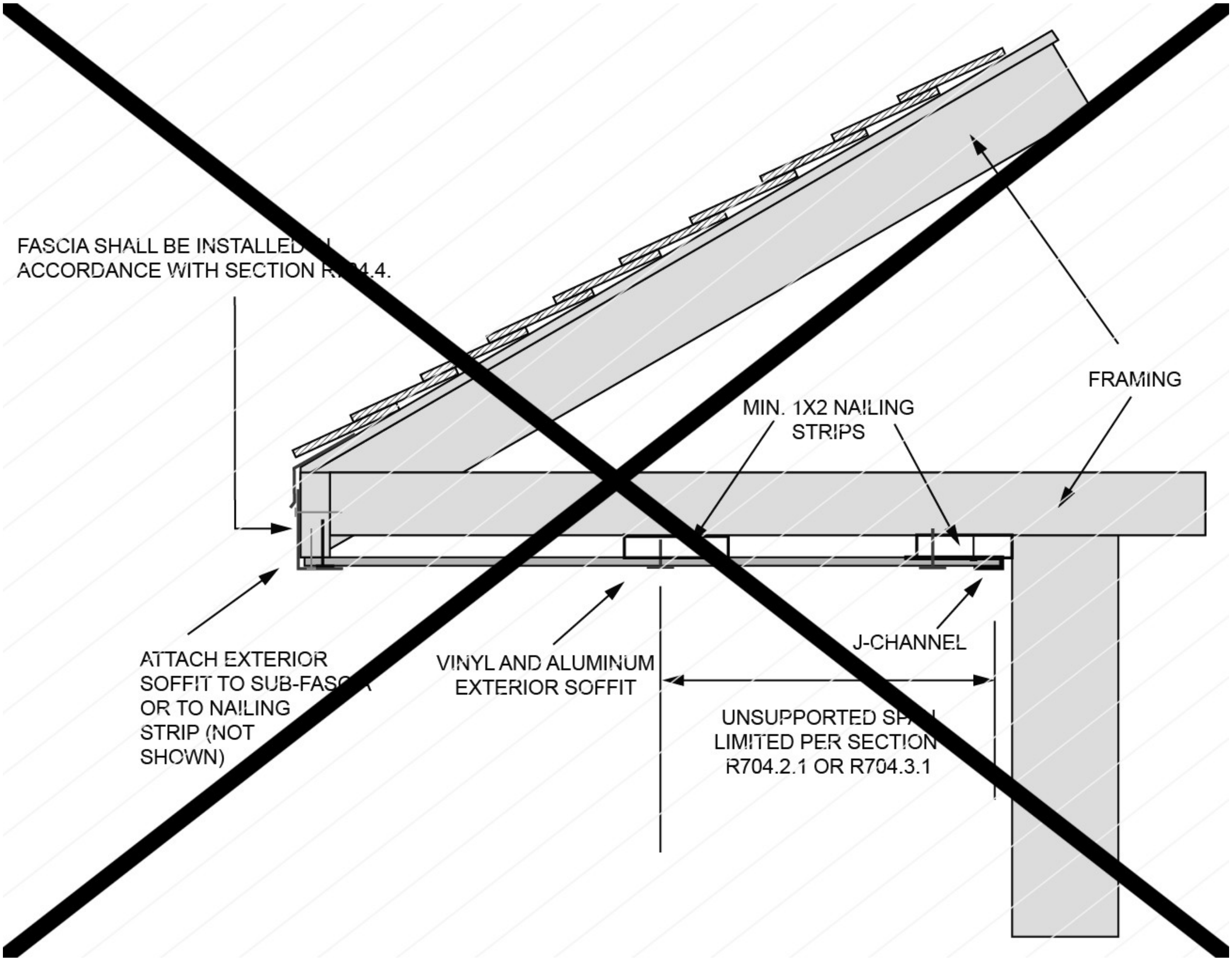


FIGURE R704.2.1 (1)
TYPICAL SINGLE-SPAN VINYL AND ALUMINUM EXTERIOR SOFFIT PANEL SUPPORT

FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL AND ALUMINUM EXTERIOR SOFFIT PANEL SUPPORT



~~FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL AND ALUMINUM EXTERIOR SOFFIT PANEL SUPPORT~~

IRC Drawing 2 – will replace Figure R704.2.1(2) Typical Double-Span Vinyl and Alum....

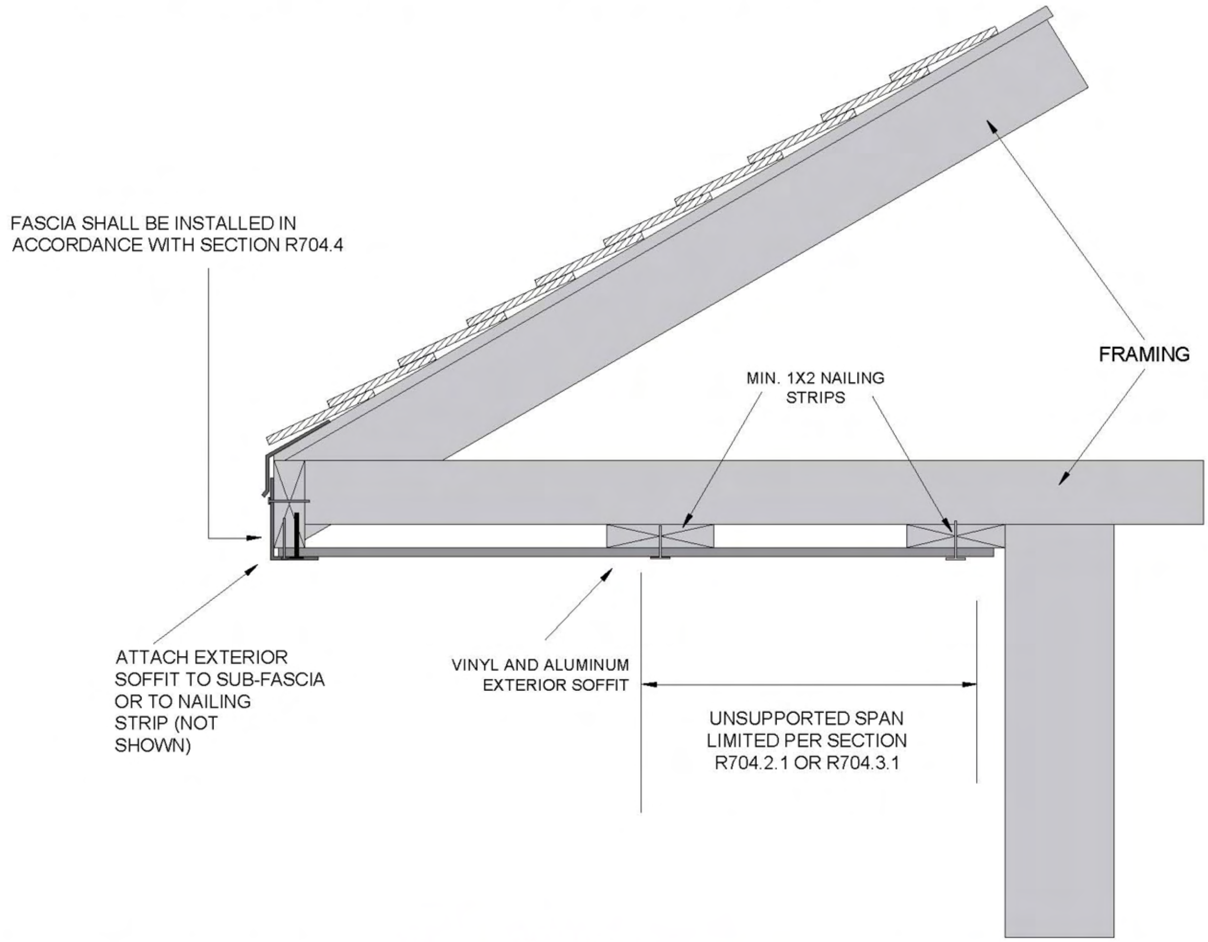


FIGURE R704.2.1 (2)
TYPICAL DOUBLE-SPAN VINYL AND ALUMINUM EXTERIOR SOFFIT PANEL SUPPORT

FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL AND ALUMINUM EXTERIOR SOFFIT PANEL SUPPORT

Reason: The change simply upgrades the soffit drawing by removing the J-channel as a requirement, which in not necessary as there are several ways to construct this connection and adding Xing to the framing members.

Cost Impact: The 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 simple changes to the drawing and removes a small component from being a requirement but will have no impact on cost.

RB231-25

RB232-25

IRC: R704.2.2

Proponents: Alexander Haldeman, representing James Hardie Building Products (alex.haldeman@jameshardie.com)

2024 International Residential Code

Revise as follows:

R704.2.2 Fiber-cement exterior soffit panels. *Fiber-cement* exterior soffit panels shall be a minimum of $^{1}/_{4}$ inch (6.4 mm) in thickness and shall comply with the requirements of ASTM C1186, Type A, minimum Grade II, or ISO 8336, Category A, minimum Class 2. Panel joints shall occur over framing, furring, ~~or over~~ *wood structural panel* sheathing or other *approved* supporting material. *Exterior soffit* panels shall be installed with spans and fasteners in accordance with the manufacturer's installation instructions.

Reason: This proposal clarifies that *approved* attachment/joint support of fiber-cement exterior soffit panels may be achieved through means/materials more than just framing or wood structural panel.

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

Justification for no cost impact:

This is editorial in nature, and clarifies that joints may be supported via mean/methods more than ONLY framing members or wood structural panels.

RB232-25

RB233-25

IRC: R704.3.1

Proponents: Matthew Dobson, representing Polymeric Exterior Products Association (mdobson@vinylsiding.org)

2024 International Residential Code

Revise as follows:

R704.3.1 Vinyl and <u>aluminum</u> exterior soffit panels. Vinyl <u>and aluminum</u> *exterior soffit* panels and their attachments shall be capable of resisting wind loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.929 m^2) and adjusted for height and exposure in accordance with Table R301.2.1(2) . Vinyl <u>and aluminum</u> *exterior soffit* panels shall be installed using fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with Figure R704.2.1(1). Where the unsupported span of *exterior soffit* panels is greater than 12 inches (305 mm), intermediate nailing strips shall be provided in accordance with Figure R704.2.1(2). Vinyl <u>and aluminum</u> *exterior soffit* panels shall be installed in accordance with the manufacturer's installation instructions.

Reason: This was missed in the last cycle and should include a reference to aluminum soffit in this high wind section as it does standard wind areas as noted in R704.2.1.

Cost Impact: Increase

Estimated Immediate Cost Impact:

This change is necessary and will add cost to the installation of aluminum soffit.

It has been estimated this will add cost of approximately $50-$100 per home.

Estimated Immediate Cost Impact Justification (methodology and variables):

This input is based on installer input on the issue.

Estimated Life Cycle Cost Impact:

This will create more durable application in the field and will help to reduce soffit blow-out during high wind events.

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

Not applicable.

RB233-25

RB234-25

IRC: TABLE R802.4.1(1), TABLE R802.4.1(3), TABLE R802.4.1(5), TABLE R802.4.1(7), TABLE R802.4.1(2), TABLE R802.4.1(4), TABLE R802.4.1(6), TABLE R802.4.1(8)

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

TABLE R802.4.1(1) RAFTER SPANS FOR COMMON LUMBER SPECIES (Roof live load = 20 psf, ceiling not attached to rafters, L/Δ = 180, <u>minimum rafter slope greater than 3:12</u>)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	SS	11-6	18-0	23-9	Note b	Note b	11-6	18-0	23-9	Note b	Note b
	Douglas fir-larch	#1	11-1	17-4	22-5	Note b	Note b	10-6	15-4	19-5	23-9	Note b
	Douglas fir-larch	#2	10-10	16-10	21-4	26-0	Note b	10-0	14-7	18-5	22-6	26-0
	Douglas fir-larch	#3	8-9	12-10	16-3	19-10	23-0	7-7	11-1	14-1	17-2	19-11
	Hem-fir	SS	10-10	17-0	22-5	Note b	Note b	10-10	17-0	22-5	Note b	Note b
	Hem-fir	#1	10 -7	16-8	22-0	Note b	Note b	10-4	15-2	19-2	23-5	Note b
	Hem-fir	#2	10-1	15-11	20-8	25-3	Note b	9-8	14-2	17-11	21-11	25-5
	Hem-fir	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Southern pine	SS	11-3	17-8	23-4	Note b	Note b	11-3	17-8	23-4	Note b	Note b
	Southern pine	#1	10-10	17-0	22-5	Note b	Note b	10-6	15-8	19-10	23-2	Note b
	Southern pine	#2	10-4	15-7	19-8	23-5	Note b	9-0	13-6	17-1	20-3	23-10
	Southern pine	#3	8-0	11-9	14-10	18-0	21-4	6-11	10-2	12-10	15-7	18-6
	Spruce-pine-fir	SS	10-7	16-8	21-11	Note b	Note b	10-7	16-8	21-9	Note b	Note b
	Spruce-pine-fir	#1	10-4	16-3	21-0	25-8	Note b	9-10	14-4	18-2	22-3	25-9
	Spruce-pine-fir	#2	10-4	16-3	21-0	25-8	Note b	9-10	14-4	18-2	22-3	25-9
	Spruce-pine-fir	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
16	Douglas fir-larch	SS	10-5	16-4	21-7	Note b	Note b	10-5	16-3	20-7	25-2	Note b
	Douglas fir-larch	#1	10-0	15-4	19-5	23-9	Note b	9-1	13-3	16-10	20-7	23-10
	Douglas fir-larch	#2	9-10	14-7	18-5	22-6	26-0	8-7	12-7	16-0	19-6	22-7
	Douglas fir-larch	#3	7-7	11-1	14-1	17-2	19-11	6-7	9-8	12-12	14-11	17-3
	Hem-fir	SS	9-10	15-6	20-5	Note b	Note b	9-10	15-6	19-11	24-4	Note b
	Hem-fir	#1	9-8	15-2	19-2	23-5	Note b	9-0	13-1	16-7	20-4	23-7
	Hem-fir	#2	9-2	14-2	17-11	21-11	25-5	8-5	12-3	15-6	18-11	22-0
	Hem-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Southern pine	SS	10-3	16-1	21-2	Note b	Note b	10-3	16-1	21-2	25-7	Note b
	Southern pine	#1	9-10	15-6	19-10	23-2	Note b	9-1	13-7	17-2	20-1	23-10
	Southern pine	#2	9-0	13-6	17-1	20-3	23-10	7-9	11-8	14-9	17-6	20-8
	Southern pine	#3	6-11	10-2	12-10	15-7	18-6	6-0	8-10	11-2	13-6	16-0
	Spruce-pine-fir	SS	9-8	15-2	19-11	25-5	Note b	9-8	14-10	18-10	23-0	Note b
	Spruce-pine-fir	#1	9-5	14-4	18-2	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir	#2	9-5	14-4	18-2	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
19.2	Douglas fir-larch	SS	9-10	15-5	20-4	25-11	Note b	9-10	14-10	18-10	23-0	Note b
	Douglas fir-larch	#1	9-5	14-0	17-9	21-8	25-2	8-4	12-2	15-4	18-9	21-9
	Douglas fir-larch	#2	9-1	13-3	16-10	20-7	23-10	7-10	11-6	14-7	17-10	20-8
	Douglas fir-larch	#3	6-11	10-2	12-10	15-8	18-3	6-0	8-9	11-2	12-7	15-9
	Hem-fir	SS	9-3	14-7	19-2	24-6	Note b	9-3	14-4	18-2	22-3	25-9
	Hem-fir	#1	9-1	13-10	17-6	21-5	24-10	8-2	12-0	15-2	18-6	21-6
	Hem-fir	#2	8-8	12-11	16-4	20-0	23-2	7-8	11-2	14-2	17-4	20-1
	Hem-fir	#3	6-9	9-11	12-7	15-4	17-9	5-10	8-7	10-10	13-3	15-5
	Southern pine	SS	9-8	15-2	19-11	25-5	Note b	9-8	15-2	19-7	23-4	Note b
	Southern pine	#1	9-3	14-3	18-1	21-2	25-2	8-4	12-4	15-8	18-4	21-9
	Southern pine	#2	8-2	12-3	15-7	18-6	21-9	7-1	10-8	13-6	16-0	18-10
	Southern pine	#3	6-4	9-4	11-9	14-3	16-10	5-6	8-1	10-2	12-4	14-7
	Spruce-pine-fir	SS	9-1	14-3	18-9	23-11	Note b	9-1	13-7	17-2	21-0	24-4
	Spruce-pine-fir	#1	8-10	13-1	16-7	20-3	23-6	7-9	11-4	14-4	17-7	20-4
	Spruce-pine-fir	#2	8-10	13-1	16-7	20-3	23-6	7-9	11-4	14-4	17-7	20-4
	Spruce-pine-fir	#3	6-9	9-11	12-7	15-4	17-9	5-10	8-7	10-10	13-3	15-5
	Douglas fir-larch	SS	9-1	14-4	18-10	23-9	Note b	9-1	13-3	16-10	20-7	23-10

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	DEAD LOAD = 20 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
24	Douglas fir-larch	#1	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Douglas fir-larch	#2	8-2	11-11	15-1	18-5	21-4	7-0	10-4	13-0	15-11	18-6
	Douglas fir-larch	#3	6-2	9-1	11-6	14-1	16-3	5-4	7-10	10-0	12-2	14-1
	Hem-fir	SS	8-7	13-6	17-10	22-9	Note b	8-7	12-10	16-3	19-10	23-0
	Hem-fir	#1	8-5	12-4	15-8	19-2	22-2	7-4	10-9	13-7	16-7	19-3
	Hem-fir	#2	7-11	11-7	14-8	17-10	20-9	6-10	10-0	12-8	15-6	17-11
	Hem-fir	#3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9
	Southern pine	SS	8-11	14-1	18-6	23-8	Note b	8-11	13-10	17-6	20-10	24-8
	Southern pine	#1	8-7	12-9	16-2	18-11	22-6	7-5	11-1	14-0	16-5	19-6
	Southern pine	#2	7-4	11-0	13-11	16-6	19-6	6-4	9-6	12-1	14-4	16-10
	Southern pine	#3	5-8	8-4	10-6	12-9	15-1	4-11	7-3	9-1	11-0	13-1
	Spruce-pine-fir	SS	8-5	13-3	17-5	21-8	25-2	8-4	12-2	15-4	18-9	21-9
	Spruce-pine-fir	#1	8-0	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir	#2	8-0	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir	#3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds 26 feet in length.

TABLE R802.4.1(3) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 30 psf, ceiling not attached to rafters, L/Δ = 180, minimum rafter slope greater than 3:12)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	DEAD LOAD = 20 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	SS	10-0	15-9	20-9	Note b	Note b	10-0	15-9	20-5	24-11	Note b
	Douglas fir-larch	#1	9-8	14-9	18-8	22-9	Note b	9-0	13-2	16-8	20-4	23-7
	Douglas fir-larch	#2	9-6	14-0	17-8	21-7	25-1	8-6	12-6	15-10	19-4	22-5
	Douglas fir-larch	#3	7-3	10-8	13-6	16-6	19-2	6-6	9-6	12-1	14-9	17-1
	Hem-fir	SS	9-6	14-10	19-7	25-0	Note b	9-6	14-10	19-7	24-1	Note b
	Hem-fir	#1	9-3	14-6	18-5	22-6	26-0	8-11	13-0	16-6	20-1	23-4
	Hem-fir	#2	8-10	13-7	17-2	21-0	24-4	8-4	12-2	15-4	18-9	21-9
	Hem-fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Southern pine	SS	9-10	15-6	20-5	Note b	Note b	9-10	15-6	20-5	25-4	Note b
	Southern pine	#1	9-6	14-10	19-0	22-3	Note b	9-0	13-5	17-0	19-11	23-7
	Southern pine	#2	8-7	12-11	16-4	19-5	22-10	7-8	11-7	14-8	17-4	20-5
	Southern pine	#3	6-7	9-9	12-4	15-0	17-9	5-11	8-9	11-0	13-5	15-10
	Spruce-pine-fir	SS	9-3	14-7	19-2	24-6	Note b	9-3	14-7	18-8	22-9	Note b
	Spruce-pine-fir	#1	9-1	13-9	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Spruce-pine-fir	#2	9-1	13-9	17-5	21-4	24-8	8-5	12-4	15-7	19-1	22-1
	Spruce-pine-fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
16	Douglas fir-larch	SS	9-1	14-4	18-10	24-1	Note b	9-1	14-0	17-8	21-7	25-1
	Douglas fir-larch	#1	8-9	12-9	16-2	19-9	22-10	7-10	11-5	14-5	17-8	20-5
	Douglas fir-larch	#2	8-3	12-1	15-4	18-9	21-8	7-5	10-10	13-8	16-9	19-5
	Douglas fir-larch	#3	6-4	9-3	11-8	14-3	16-7	5-8	8-3	10-6	12-9	14-10
	Hem-fir	SS	8-7	13-6	17-10	22-9	Note b	8-7	13-6	17-1	20-10	24-2
	Hem-fir	#1	8-5	12-7	15-11	19-6	22-7	7-8	11-3	14-3	17-5	20-2
	Hem-fir	#2	8-0	11-9	14-11	18-2	21-1	7-2	10-6	13-4	16-3	18-10
	Hem-fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Southern pine	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	18-5	1-11	25-11
	Southern pine	#1	8-7	13-0	16-6	19-3	22-10	7-10	11-7	14-9	17-3	20-5
	Southern pine	#2	7-6	11-2	14-2	16-10	19-10	6-8	10-0	12-8	15-1	17-9
	Southern pine	#3	5-9	8-6	10-8	13-0	15-4	5-2	7-7	9-7	11-7	13-9
	Spruce-pine-fir	SS	8-5	13-3	17-5	22-1	25-7	8-5	12-9	16-2	19-9	22-10

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
19.2	Spruce-pine-fir	#1	8-2	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-pine-fir	#2	8-2	11-11	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-pine-fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Douglas fir-larch	SS	8-7	13-6	17-9	22-1	25-7	8-7	12-9	16-2	19-9	22-10
	Douglas fir-larch	#1	7-11	11-8	14-9	18-0	20-11	7-1	10-5	13-2	16-1	18-8
	Douglas fir-larch	#2	7-7	11-0	14-0	17-1	19-10	6-9	9-10	12-6	15-3	17-9
	Douglas fir-larch	#3	5-9	8-5	10-8	13-1	15-2	5-2	7-7	9-7	11-8	13-6
	Hem-fir	SS	8-1	12-9	16-9	21-4	24-8	8-1	12-4	15-7	19-1	22-1
	Hem-fir	#1	7-10	11-6	14-7	17-9	20-7	7-0	10-3	13-0	15-11	18-5
	Hem-fir	#2	7-4	10-9	13-7	16-7	19-3	6-7	9-7	12-2	14-10	17-3
	Hem-fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Southern pine	SS	8-5	13-3	17-5	22-3	Note b	8-5	13-3	16-10	20-0	23-7
	Southern pine	#1	8-0	11-10	15-1	17-7	20-11	7-1	10-7	13-5	15-9	18-8
	Southern pine	#2	6-10	10-2	12-11	15-4	18-1	6-1	9-2	11-7	13-9	16-2
	Southern pine	#3	5-3	7-9	9-9	11-10	14-0	4-8	6-11	8-9	10-7	12-6
24	Spruce-pine-fir	SS	7-11	12-5	16-5	20-2	23-4	7-11	11-8	14-9	18-0	20-11
	Spruce-pine-fir	#1	7-5	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-pine-fir	#2	7-5	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-pine-fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Douglas fir-larch	SS	8-0	12-6	16-2	19-9	22-10	7-10	11-5	14-5	17-8	20-5
	Douglas fir-larch	#1	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	#2	6-9	9-10	12-6	15-3	17-9	6-0	8-10	11-2	13-8	15-10
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-7	6-9	8-7	10-5	12-1
	Hem-fir	SS	7-6	11-10	15-7	19-1	22-1	7-6	11-0	13-11	17-0	19-9
	Hem-fir	#1	7-0	10-3	13-0	15-11	18-5	6-3	9-2	11-8	14-3	16-6
	Hem-fir	#2	6-7	9-7	12-2	14-10	17-3	5-10	8-7	10-10	13-3	15-5
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
	Southern pine	SS	7-10	12-3	16-2	20-0	23-7	7-10	11-10	15-0	17-11	21-2
	Southern pine	#1	7-1	10-7	13-5	15-9	18-8	6-4	9-6	12-0	14-1	16-8
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-5	8-2	10-4	12-3	14-6
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-2	6-2	7-10	9-6	11-2
	Spruce-pine-fir	SS	7-4	11-7	14-9	18-0	20-11	7-1	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#1	6-8	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-pine-fir	#2	6-8	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds 26 feet in length.

TABLE R802.4.1(5) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 50 psf, ceiling not attached to rafters, L/Δ = 180, minimum rafter slope greater than 3:12)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Douglas fir-larch	SS	8-5	13-3	17-6	22-4	26-0	8-5	13-3	17-3	21-1	24-5
	Douglas fir-larch	#1	8-2	12-0	15-3	18-7	21-7	7-7	11-2	14-1	17-3	20-0
	Douglas fir-larch	#2	7-10	11-5	14-5	17-8	20-5	7-3	10-7	13-4	16-4	18-11
	Douglas fir-larch	#3	6-0	8-9	11-0	13-6	15-7	5-6	8-1	10-3	12-6	14-6
	Hem-fir	SS	8-0	12-6	16-6	21-1	25-6	8-0	12-6	16-6	20-4	23-7
	Hem-fir	#1	7-10	11-10	15-0	18-4	21-3	7-6	11-0	13-11	17-0	19-9
	Hem-fir	#2	7-5	11-1	14-0	17-2	19-11	7-0	10-3	13-0	15-10	18-5
	Hem-fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Southern pine	SS	8-4	13-1	17-2	21-11	Note b	8-4	13-1	17-2	21-5	25-3
	Southern pine	#1	8-0	12-3	15-6	18-2	21-7	7-7	11-4	14-5	16-10	20-0

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Southern pine	#2	7-0	10-6	13-4	15-10	18-8	6-6	9-9	12-4	14-8	17-3
	Southern pine	#3	5-5	8-0	10-1	12-3	14-6	5-0	7-5	9-4	11-4	13-5
	Spruce-pine-fir	SS	7-10	12-3	16-2	20-8	24-1	7-10	12-3	15-9	19-3	22-4
	Spruce-pine-fir	#1	7-8	11-3	14-3	17-5	20-2	7-1	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#2	7-8	11-3	14-3	17-5	20-2	7-1	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
16	Douglas fir-larch	SS	7-8	12-1	15-11	19-9	22-10	7-8	11-10	14-11	18-3	21-2
	Douglas fir-larch	#1	7-1	10-5	13-2	16-1	18-8	6-7	9-8	12-2	14-11	17-3
	Douglas fir-larch	#2	6-9	9-10	12-6	15-3	17-9	6-3	9-2	11-7	14-2	16-5
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-9	7-0	8-10	10-10	12-6
	Hem-fir	SS	7-3	11-5	15-0	19-1	22-1	7-3	11-5	14-5	17-8	20-5
	Hem-fir	#1	7-0	10-3	13-0	15-11	18-5	6-6	9-6	12-1	14-9	17-1
	Hem-fir	#2	6-7	9-7	12-2	14-10	17-3	6-1	8-11	11-3	13-9	15-11
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Southern pine	SS	7-6	11-10	15-7	19-11	23-7	7-6	11-10	15-7	18-6	21-10
	Southern pine	#1	7-1	10-7	13-5	15-9	18-8	6-7	9-10	12-5	14-7	17-3
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-8	8-5	10-9	12-9	15-0
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-4	6-5	8-1	9-10	11-7
	Spruce-pine-fir	SS	7-1	11-2	14-8	18-0	20-11	7-1	10-9	13-8	15-11	19-4
	Spruce-pine-fir	#1	6-8	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-pine-fir	#2	6-8	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
19.2	Douglas fir-larch	SS	7-3	11-4	14-9	18-0	20-11	7-3	10-9	13-8	16-8	19-4
	Douglas fir-larch	#1	6-6	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Douglas fir-larch	#2	6-2	9-0	11-5	13-11	16-2	5-8	8-4	10-9	12-11	15-0
	Douglas fir-larch	#3	4-8	6-11	8-9	10-8	12-4	4-4	6-4	8-1	9-10	11-5
	Hem-fir	SS	6-10	10-9	14-2	17-5	20-2	6-10	10-5	13-2	16-1	18-8
	Hem-fir	#1	6-5	9-5	11-11	14-6	16-10	8-11	8-8	11-0	13-5	15-7
	Hem-fir	#2	6-0	8-9	11-1	13-7	15-9	5-7	8-1	10-3	12-7	14-7
	Hem-fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Southern pine	SS	7-1	11-2	14-8	18-3	21-7	7-1	11-2	14-2	16-11	20-0
	Southern pine	#1	6-6	9-8	12-3	14-4	17-1	6-0	9-0	11-4	13-4	15-9
	Southern pine	#2	5-7	8-4	10-7	12-6	14-9	5-2	7-9	9-9	11-7	13-8
	Southern pine	#3	4-3	6-4	8-0	9-8	11-5	4-0	5-10	7-4	8-11	10-7
	Spruce-pine-fir	SS	6-8	10-6	13-5	16-5	19-1	6-8	9-10	12-5	15-3	17-8
	Spruce-pine-fir	#1	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-pine-fir	#2	6-1	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-pine-fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
24	Douglas fir-larch	SS	6-8	10-5	13-2	16-1	18-8	6-7	9-8	12-2	14-11	17-3
	Douglas fir-larch	#1	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Douglas fir-larch	#2	5-6	8-1	10-3	12-6	14-6	5-1	7-6	9-5	11-7	13-5
	Douglas fir-larch	#3	4-3	6-2	7-10	9-6	11-1	3-11	5-8	7-3	8-10	10-3
	Hem-fir	SS	6-4	9-11	12-9	15-7	18-0	6-4	9-4	11-9	14-5	16-8
	Hem-fir	#1	5-9	8-5	10-8	13-0	15-1	8-4	7-9	9-10	12-0	13-11
	Hem-fir	#2	5-4	7-10	9-11	12-1	14-1	4-11	7-3	9-2	11-3	13-0
	Hem-fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Southern pine	SS	6-7	10-4	13-8	16-4	19-3	6-7	10-0	12-8	15-2	17-10
	Southern pine	#1	5-10	8-8	11-0	12-10	15-3	5-5	8-0	10-2	11-11	14-1
	Southern pine	#2	5-0	7-5	9-5	11-3	13-2	4-7	6-11	8-9	10-5	12-3
	Southern pine	#3	3-10	5-8	7-1	8-8	10-3	3-6	5-3	6-7	8-0	9-6
	Spruce-pine-fir	SS	6-2	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Spruce-pine-fir	#1	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-pine-fir	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-pine-fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds 26 feet in length.

TABLE R802.4.1(7) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 70 psf, ceiling not attached to rafters, L/Δ = 180, minimum rafter slope greater than 3:12)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	SS	7-7	11-10	15-8	19-9	22-10	7-7	11-10	15-3	18-7	21-7
	Douglas fir-larch	#1	7-1	10-5	13-2	16-1	18-8	6-8	9-10	12-5	15-2	17-7
	Douglas fir-larch	#2	6-9	9-10	12-6	15-3	17-9	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-10	7-1	9-0	11-0	12-9
	Hem-fir	SS	7-2	11-3	14-9	18-10	22-1	7-2	11-3	14-8	18-0	20-10
	Hem-fir	#1	7-0	10-3	13-0	15-11	18-5	6-7	9-8	12-3	15-0	17-5
	Hem-fir	#2	6-7	9-7	12-2	14-10	17-3	6-2	9-1	11-5	14-0	16-3
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
	Southern pine	SS	7-5	11-8	15-4	19-7	23-7	7-5	11-8	15-4	18-10	22-3
	Southern pine	#1	7-1	10-7	13-5	15-9	18-8	6-9	10-0	12-8	14-10	17-7
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-9	8-7	10-11	12-11	15-3
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-5	6-6	8-3	10-0	11-10
	Spruce-pine-fir	SS	7-0	11-0	14-6	18-0	20-11	7-0	11-0	13-11	17-0	19-8
	Spruce-pine-fir	#1	6-8	9-9	12-4	15-1	17-6	6-3	9-2	11-8	14-2	16-6
	Spruce-pine-fir	#2	6-8	9-9	12-4	15-1	17-6	6-3	9-2	11-8	14-2	16-6
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
16	Douglas fir-larch	SS	6-10	10-9	14-0	17-1	19-10	6-10	10-5	13-2	16-1	18-8
	Douglas fir-larch	#1	6-2	9-0	11-5	13-11	16-2	5-10	8-6	10-9	13-2	15-3
	Douglas fir-larch	#2	5-10	8-7	10-10	13-3	15-4	5-6	8-1	10-3	12-6	14-6
	Douglas fir-larch	#3	4-6	6-6	8-3	10-1	11-9	4-3	6-2	7-10	9-6	11-1
	Hem-fir	SS	6-6	10-2	13-5	16-6	19-2	6-6	10-1	12-9	15-7	18-0
	Hem-fir	#1	6-1	8-11	11-3	13-9	16-0	5-9	8-5	10-8	13-0	15-1
	Hem-fir	#2	5-8	8-4	10-6	12-10	14-11	5-4	7-10	9-11	12-1	14-1
	Hem-fir	#3	4-4	6-4	8-1	9-10	11-5	4-1	6-0	7-7	9-4	10-9
	Southern pine	SS	6-9	10-7	14-0	17-4	20-5	6-9	10-7	13-9	16-4	19-3
	Southern pine	#1	6-2	9-2	11-8	13-8	16-2	5-10	8-8	11-0	12-10	15-3
	Southern pine	#2	5-3	7-11	10-0	11-11	14-0	5-0	7-5	9-5	11-3	13-2
	Southern pine	#3	4-1	6-0	7-7	9-2	10-10	3-10	5-8	7-1	8-8	10-3
	Spruce-pine-fir	SS	6-4	10-0	12-9	15-7	18-1	6-4	9-6	12-0	14-8	17-1
	Spruce-pine-fir	#1	5-9	8-5	10-8	13-1	15-2	5-5	7-11	10-1	12-4	14-3
	Spruce-pine-fir	#2	5-9	8-5	10-8	13-1	15-2	5-5	7-11	10-1	12-4	14-3
	Spruce-pine-fir	#3	4-4	6-4	8-1	9-10	11-5	4-1	6-0	7-7	9-4	10-9
19.2	Douglas fir-larch	SS	6-6	10-1	12-9	15-7	18-1	6-6	9-6	12-0	14-8	17-1
	Douglas fir-larch	#1	5-7	8-3	10-5	12-9	14-9	5-4	7-9	9-10	12-0	13-11
	Douglas fir-larch	#2	5-4	7-10	9-11	12-1	14-0	5-0	7-4	9-4	11-5	13-2
	Douglas fir-larch	#3	4-1	6-0	7-7	9-3	10-8	3-10	5-7	7-1	8-8	10-1
	Hem-fir	SS	6-1	9-7	12-4	15-1	17-4	6-1	9-2	11-8	14-2	15-5
	Hem-fir	#1	5-7	8-2	10-3	12-7	14-7	5-3	7-8	9-8	11-10	13-9
	Hem-fir	#2	5-2	7-7	9-7	11-9	13-7	4-11	7-2	9-1	11-1	12-10
	Hem-fir	#3	4-0	5-10	7-4	9-0	10-5	3-9	5-6	6-11	8-6	9-10
	Southern pine	SS	6-4	10-0	13-2	15-10	18-8	6-4	9-10	12-6	14-11	17-7
	Southern pine	#1	5-8	8-5	10-8	12-5	14-9	5-4	7-11	10-0	11-9	13-11
	Southern pine	#2	4-10	7-3	9-2	10-10	12-9	4-6	6-10	8-8	10-3	12-1
	Southern pine	#3	3-8	5-6	6-11	8-4	9-11	3-6	5-2	6-6	7-11	9-4
	Spruce-pine-fir	SS	6-0	9-2	11-8	14-3	16-6	5-11	8-8	11-0	13-5	15-7
	Spruce-pine-fir	#1	5-3	7-8	9-9	11-11	13-10	5-0	7-3	9-2	11-3	13-0
	Spruce-pine-fir	#2	5-3	7-8	9-9	11-11	13-10	5-0	7-3	9-2	11-3	13-0
	Spruce-pine-fir	#3	4-0	5-10	7-4	9-0	10-5	3-9	5-6	6-11	8-6	9-10
24	Douglas fir-larch	SS	6-0	9-0	11-5	13-11	16-2	5-10	8-6	10-9	13-2	15-3
	Douglas fir-larch	#1	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
	Douglas fir-larch	#2	4-9	7-0	8-10	10-10	12-6	4-6	6-7	8-4	10-2	11-10
	Douglas fir-larch	#3	3-8	5-4	6-9	8-3	9-7	3-5	5-0	6-4	7-9	9-10
	Hem-fir	SS	5-8	8-8	11-0	13-6	13-11	5-7	8-3	10-5	12-4	12-4
	Hem-fir	#1	5-0	7-3	9-2	11-3	13-0	4-8	6-10	8-8	10-7	12-4
	Hem-fir	#2	4-8	6-9	8-7	10-6	12-2	4-4	6-5	8-1	9-11	11-6
	Hem-fir	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10
	Southern pine	SS	5-11	9-3	11-11	14-2	16-8	5-11	8-10	11-2	13-4	15-9
	Southern pine	#1	5-0	7-6	9-6	11-1	13-2	4-9	7-1	9-0	10-6	12-5
	Southern pine	#2	4-4	6-5	8-2	9-9	11-5	4-1	6-1	7-9	9-2	10-9
	Southern pine	#3	3-4	4-11	6-2	7-6	8-10	3-1	4-7	5-10	7-1	8-4

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	DEAD LOAD = 20 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Spruce-pine-fir	SS	5-6	8-3	10-5	12-9	14-9	5-4	7-9	9-10	12-0	12-11
	Spruce-pine-fir	#1	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	10-0	11-8
	Spruce-pine-fir	#2	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	10-0	11-8
	Spruce-pine-fir	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

TABLE R802.4.1(2) RAFTER SPANS FOR COMMON LUMBER SPECIES (Roof live load = 20 psf, flexible ceiling finish attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	DEAD LOAD = 20 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	SS	10-5	16-4	21-7	Note b	Note b	10-5	16-4	21-7	Note b	Note b
	Douglas fir-larch	#1	10-0	15-9	20-10	Note b	Note b	10-0	15-4	19-5	23-9	Note b
	Douglas fir-larch	#2	9-10	15-6	20-5	26-0	Note b	9-10	14-7	18-5	22-6	26-0
	Douglas fir-larch	#3	8-9	12-10	16-3	19-10	23-0	7-7	11-1	14-1	17-2	19-11
	Hem-fir	SS	9-10	15-6	20-5	Note b	Note b	9-10	15-6	20-5	Note b	Note b
	Hem-fir	#1	9-8	15-2	19-11	25-5	Note b	9-8	15-2	19-2	23-5	Note b
	Hem-fir	#2	9-2	14-5	19-0	24-3	Note b	9-2	14-2	17-11	21-11	25-5
	Hem-fir	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Southern pine	SS	10-3	16-1	21-2	Note b	Note b	10-3	16-1	21-2	Note b	Note b
	Southern pine	#1	9-10	15-6	20-5	Note b	Note b	9-10	15-6	19-10	23-2	Note b
	Southern pine	#2	9-5	14-9	19-6	23-5	Note b	9-0	13-6	17-1	20-3	23-10
	Southern pine	#3	8-0	11-9	14-10	18-0	21-4	6-11	10-2	12-10	15-7	18-6
	Spruce-pine-fir	SS	9-8	15-2	19-11	25-5	Note b	9-8	15-2	19-11	25-5	Note b
	Spruce-pine-fir	#1	9-5	14-9	19-6	24-10	Note b	9-5	14-4	18-2	22-3	25-9
	Spruce-pine-fir	#2	9-5	14-9	19-6	24-10	Note b	9-5	14-4	18-2	22-3	25-9
	Spruce-pine-fir	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
16	Douglas fir-larch	SS	9-6	14-11	19-7	25-0	Note b	9-6	14-11	19-7	25-0	Note b
	Douglas fir-larch	#1	9-1	14-4	18-11	23-9	Note b	9-1	13-3	16-10	20-7	23-10
	Douglas fir-larch	#2	8-11	14-1	18-5	22-6	26-0	8-7	12-7	16-0	19-6	22-7
	Douglas fir-larch	#3	7-7	11-1	14-1	17-2	19-11	6-7	9-8	12-2	14-11	17-3
	Hem-fir	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	18-6	23-8	Note b
	Hem-fir	#1	8-9	13-9	18-1	23-1	Note b	8-9	13-1	16-7	20-4	23-7
	Hem-fir	#2	8-4	13-1	17-3	21-11	25-5	8-4	12-3	15-6	18-11	22-0
	Hem-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Southern pine	SS	9-4	14-7	19-3	24-7	Note b	9-4	14-7	19-3	24-7	Note b
	Southern pine	#1	8-11	14-1	18-6	23-2	Note b	8-11	13-7	17-2	20-1	23-10
	Southern pine	#2	8-7	13-5	17-1	20-3	23-10	7-9	11-8	14-9	17-6	20-8
	Southern pine	#3	6-11	10-2	12-10	15-7	18-6	6-0	8-10	11-2	13-6	16-0
	Spruce-pine-fir	SS	8-9	13-9	18-1	23-1	Note b	8-9	13-9	18-1	23-0	Note b
	Spruce-pine-fir	#1	8-7	13-5	17-9	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir	#2	8-7	13-5	17-9	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
19.2	Douglas fir-larch	SS	8-11	14-0	18-5	23-7	Note b	8-11	14-0	18-5	23-0	Note b
	Douglas fir-larch	#1	8-7	13-6	17-9	21-8	25-2	8-4	12-2	15-4	18-9	21-9
	Douglas fir-larch	#2	8-5	13-3	16-10	20-7	23-10	7-10	11-6	14-7	17-10	20-8
	Douglas fir-larch	#3	6-11	10-2	12-10	15-8	18-3	6-0	8-9	11-2	13-7	15-9
	Hem-fir	SS	8-5	13-3	17-5	22-3	Note b	8-5	13-3	17-5	22-3	25-9
	Hem-fir	#1	8-3	12-11	17-1	21-5	24-10	8-2	12-0	15-2	18-6	21-6
	Hem-fir	#2	7-10	12-4	16-3	20-0	23-2	7-8	11-2	14-2	17-4	20-1
	Hem-fir	#3	6-9	9-11	12-7	15-4	17-9	5-10	8-7	10-10	13-3	15-5
	Southern pine	SS	8-9	13-9	18-2	23-1	Note b	8-9	13-9	18-2	23-1	Note b
	Southern pine	#1	8-5	13-3	17-5	21-2	25-2	8-4	12-4	15-8	18-4	21-9
	Southern pine	#2	8-1	12-3	15-7	18-6	21-9	7-1	10-8	13-6	16-0	18-10
	Southern pine	#3	6-4	9-4	11-9	14-3	16-10	5-6	8-1	10-2	12-4	14-7

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
24	Spruce-pine-fir	SS	8-3	12-11	17-1	21-9	Note b	8-3	12-11	17-1	21-0	24-4
	Spruce-pine-fir	#1	8-1	12-8	16-7	20-3	23-6	7-9	11-4	14-4	17-7	20-4
	Spruce-pine-fir	#2	8-1	12-8	16-7	20-3	23-6	7-9	11-4	14-4	17-7	20-4
	Spruce-pine-fir	#3	6-9	9-11	12-7	15-4	17-9	5-10	8-7	10-10	13-3	15-5
	Douglas fir-larch	SS	8-3	13-0	17-2	21-10	Note b	8-3	13-0	16-10	20-7	23-10
	Douglas fir-larch	#1	8-0	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Douglas fir-larch	#2	7-10	11-11	15-1	18-5	21-4	7-0	10-4	13-0	15-11	18-6
	Douglas fir-larch	#3	6-2	9-1	11-6	14-1	16-3	5-4	7-10	10-0	12-2	14-1
	Hem-fir	SS	7-10	12-3	16-2	20-8	25-1	7-10	12-3	16-2	19-10	23-0
	Hem-fir	#1	7-8	12-0	15-8	19-2	22-2	7-4	10-9	13-7	16-7	19-3
	Hem-fir	#2	7-3	11-5	14-8	17-10	20-9	6-10	10-0	12-8	15-6	17-11
	Hem-fir	#3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9
	Southern pine	SS	8-1	12-9	16-10	21-6	Note b	8-1	12-9	16-10	20-10	24-8
	Southern pine	#1	7-10	12-3	16-2	18-11	22-6	7-5	11-1	14-0	16-5	19-6
	Southern pine	#2	7-4	11-0	13-11	16-6	19-6	6-4	9-6	12-1	14-4	16-10
	Southern pine	#3	5-8	8-4	10-6	12-9	15-1	4-11	7-3	9-1	11-0	13-1
	Spruce-pine-fir	SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-4	18-9	21-9
	Spruce-pine-fir	#1	7-6	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir	#2	7-6	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir	#3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds 26 feet in length.

TABLE R802.4.1(4) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 30 psf, flexible ceiling finish attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	SS	9-1	14-4	18-10	24-1	Note b	9-1	14-4	18-10	24-1	Note b
	Douglas fir-larch	#1	8-9	13-9	18-2	22-9	Note b	8-9	13-2	16-8	20-4	23-7
	Douglas fir-larch	#2	8-7	13-6	17-8	21-7	25-1	8-6	12-6	15-10	19-4	22-5
	Douglas fir-larch	#3	7-3	10-8	13-6	16-6	19-2	6-6	9-6	12-1	14-9	17-1
	Hem-fir	SS	8-7	13-6	17-10	22-9	Note b	8-7	13-6	17-10	22-9	Note b
	Hem-fir	#1	8-5	13-3	17-5	22-3	26-0	8-5	13-0	16-6	20-1	23-4
	Hem-fir	#2	8-0	12-7	16-7	21-0	24-4	8-0	12-2	15-4	18-9	21-9
	Hem-fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Southern pine	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	18-6	23-8	Note b
	Southern pine	#1	8-7	13-6	17-10	22-3	Note b	8-7	13-5	17-0	19-11	23-7
	Southern pine	#2	8-3	12-11	16-4	19-5	22-10	7-8	11-7	14-8	17-4	20-5
	Southern pine	#3	6-7	9-9	12-4	15-0	17-9	5-11	8-9	11-0	13-5	15-10
	Spruce-pine-fir	SS	8-5	13-3	17-5	22-3	Note b	8-5	13-3	17-5	22-3	Note b
	Spruce-pine-fir	#1	8-3	12-11	17-0	21-4	24-8	8-3	12-4	15-7	19-1	22-1
	Spruce-pine-fir	#2	8-3	12-11	17-0	21-4	24-8	8-3	12-4	15-7	19-1	22-1
	Spruce-pine-fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	SS	8-3	13-0	17-2	21-10	Note b	8-3	13-0	17-2	21-7	25-1
	Douglas fir-larch	#1	8-0	12-6	16-2	19-9	22-10	7-10	11-5	14-5	17-8	20-5
	Douglas fir-larch	#2	7-10	12-1	15-4	18-9	21-8	7-5	10-10	13-8	16-9	19-5
	Douglas fir-larch	#3	6-4	9-3	11-8	14-3	16-7	5-8	8-3	10-6	12-9	14-10
	Hem-fir	SS	7-10	12-3	16-2	20-8	25-1	7-10	12-3	16-2	20-8	24-2
	Hem-fir	#1	7-8	12-0	15-10	19-6	22-7	7-8	11-3	14-3	17-5	20-2
	Hem-fir	#2	7-3	11-5	14-11	18-2	21-1	7-2	10-6	13-4	16-3	18-10
	Hem-fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Southern pine	SS	8-1	12-9	16-10	21-6	Note b	8-1	12-9	16-10	21-6	25-11
	Southern pine	#1	7-10	12-3	16-2	19-3	22-10	7-10	11-7	14-9	17-3	20-5

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
16	Southern pine	#2	7-6	11-2	14-2	16-10	19-10	6-8	10-0	12-8	15-1	17-9
	Southern pine	#3	5-9	8-6	10-8	13-0	15-4	5-2	7-7	9-7	11-7	13-9
	Spruce-pine-fir	SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-10	19-9	22-10
	Spruce-pine-fir	#1	7-6	11-9	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-pine-fir	#2	7-6	11-9	15-1	18-5	21-5	7-3	10-8	13-6	16-6	19-2
	Spruce-pine-fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Douglas fir-larch	SS	7-9	12-3	16-1	20-7	25-0	7-9	12-3	16-1	19-9	22-10
	Douglas fir-larch	#1	7-6	11-8	14-9	18-0	20-11	7-1	10-5	13-2	16-1	18-8
	Douglas fir-larch	#2	7-4	11-0	14-0	17-1	19-10	6-9	9-1	12-6	15-3	17-9
	Douglas fir-larch	#3	5-9	8-5	10-8	13-1	15-2	5-2	7-7	9-7	11-8	13-6
	Hem-fir	SS	7-4	11-7	15-3	19-5	23-7	7-4	11-7	15-3	19-1	22-1
	Hem-fir	#1	7-2	11-4	14-7	17-9	20-7	7-0	16-3	13-0	15-11	18-5
	Hem-fir	#2	6-10	10-9	13-7	16-7	19-3	6-7	9-7	12-2	14-10	17-3
	Hem-fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
19.2	Southern pine	SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-10	20-0	23-7
	Southern pine	#1	7-4	11-7	15-1	17-7	20-11	7-1	10-7	13-5	15-9	18-8
	Southern pine	#2	6-10	10-2	12-11	15-4	18-1	6-1	9-2	11-7	13-9	16-2
	Southern pine	#3	5-3	7-9	9-9	11-10	14-0	4-8	6-11	8-9	10-7	12-6
	Spruce-pine-fir	SS	7-2	11-4	14-11	19-0	23-1	7-2	11-4	14-9	18-0	20-11
	Spruce-pine-fir	#1	7-0	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-pine-fir	#2	7-0	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-pine-fir	#3	5-7	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Douglas fir-larch	SS	7-3	11-4	15-0	19-1	22-10	7-3	11-4	14-5	17-8	20-5
	Douglas fir-larch	#1	7-0	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	#2	6-9	9-10	12-6	15-3	17-9	6-0	8-10	11-2	13-8	15-10
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-7	6-9	8-7	10-5	12-1
	Hem-fir	SS	6-10	10-9	14-2	18-0	21-11	6-10	10-9	13-11	17-0	19-9
	Hem-fir	#1	6-8	10-3	13-0	15-11	18-5	6-3	9-2	11-8	14-3	16-6
	Hem-fir	#2	6-4	9-7	12-2	14-10	17-3	5-10	8-7	10-10	13-3	15-5
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
24	Southern pine	SS	7-1	11-2	14-8	18-9	22-10	7-1	11-2	14-8	17-11	21-2
	Southern pine	#1	6-10	10-7	13-5	15-9	18-8	6-4	9-6	12-0	14-1	16-8
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-5	8-2	10-4	12-3	14-6
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-2	6-2	7-10	9-6	11-2
	Spruce-pine-fir	SS	6-8	10-6	13-10	17-8	20-11	6-8	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#1	6-6	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-pine-fir	#2	6-6	9-9	12-4	15-1	17-6	5-11	8-8	11-0	13-6	15-7
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds 26 feet in length.

TABLE R802.4.1(6) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 50 psf, flexible ceiling finish attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)
	Douglas fir-larch	SS	7-8	12-1	15-11	20-3	24-8	7-8	12-1	15-11	20-3	24-5
	Douglas fir-larch	#1	7-5	11-7	15-3	18-7	21-7	7-5	11-2	14-1	17-3	20-0
	Douglas fir-larch	#2	7-3	11-5	14-5	17-8	20-5	7-3	10-7	13-4	16-4	18-11
	Douglas fir-larch	#3	6-0	8-9	11-0	13-6	15-7	5-6	8-1	10-3	12-6	14-6
	Hem-fir	SS	7-3	11-5	15-0	19-2	23-4	7-3	11-5	15-0	19-2	23-4
	Hem-fir	#1	7-1	11-2	14-8	18-4	21-3	7-1	11-0	13-11	17-0	19-9

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)
12	Hem-fir	#2	6-9	10-8	14-0	17-2	19-11	6-9	10-3	13-0	15-10	18-5
	Hem-fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Southern pine	SS	7-6	11-10	15-7	19-11	24-3	7-6	11-10	15-7	19-11	24-3
	Southern pine	#1	7-3	11-5	15-0	18-2	21-7	7-3	11-4	14-5	16-10	20-0
	Southern pine	#2	6-11	10-6	13-4	15-10	18-8	6-6	9-9	12-4	14-8	17-3
	Southern pine	#3	5-5	8-0	10-1	12-3	14-6	5-0	7-5	9-4	11-4	13-5
	Spruce-pine-fir	SS	7-1	11-2	14-8	18-9	22-10	7-1	11-2	14-8	18-9	22-4
	Spruce-pine-fir	#1	6-11	10-11	14-3	17-5	20-2	6-11	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#2	6-11	10-11	14-3	17-5	20-2	6-11	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Douglas fir-larch	SS	7-0	11-0	14-5	18-5	22-5	7-0	11-0	14-5	18-3	21-2
	Douglas fir-larch	#1	6-9	10-5	13-2	16-1	18-8	6-7	9-8	12-2	14-11	17-3
	Douglas fir-larch	#2	6-7	9-10	12-6	15-3	17-9	6-3	9-2	11-7	14-2	16-5
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-9	7-0	8-10	10-10	12-6
16	Hem-fir	SS	6-7	10-4	13-8	17-5	21-2	6-7	10-4	13-8	17-5	20-5
	Hem-fir	#1	6-5	10-2	13-0	15-11	18-5	6-5	9-6	12-1	14-9	17-1
	Hem-fir	#2	6-2	9-7	12-2	14-10	17-3	6-1	8-11	11-3	13-9	15-11
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Southern pine	SS	6-10	10-9	14-2	18-1	22-0	6-10	10-9	14-2	18-1	21-10
	Southern pine	#1	6-7	10-4	13-5	15-9	18-8	6-7	9-10	12-5	14-7	17-3
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-8	8-5	10-9	12-9	15-0
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-4	6-5	8-1	9-10	11-7
	Spruce-pine-fir	SS	6-5	10-2	13-4	17-0	20-9	6-5	10-2	13-4	16-8	19-4
	Spruce-pine-fir	#1	6-4	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-pine-fir	#2	6-4	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	10-6	12-3
	Douglas fir-larch	SS	6-7	10-4	13-7	17-4	20-11	6-7	10-4	13-7	16-8	19-4
	Douglas fir-larch	#1	6-4	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Douglas fir-larch	#2	6-2	9-0	11-5	13-11	16-2	5-8	8-4	10-7	12-11	15-0
	Douglas fir-larch	#3	4-8	6-11	8-9	10-8	12-4	4-4	6-4	8-1	9-10	11-5
19.2	Hem-fir	SS	6-2	9-9	12-10	16-5	19-11	6-2	9-9	12-10	16-1	18-8
	Hem-fir	#1	6-1	9-5	11-11	14-6	16-10	5-11	8-8	11-0	13-5	15-7
	Hem-fir	#2	5-9	8-9	11-1	13-7	15-9	5-7	8-1	10-3	12-7	14-7
	Hem-fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Southern pine	SS	6-5	10-2	13-4	17-0	20-9	6-5	10-2	13-4	16-11	20-0
	Southern pine	#1	6-2	9-8	12-3	14-4	17-1	6-0	9-0	11-4	13-4	15-9
	Southern pine	#2	5-7	8-4	10-7	12-6	14-9	5-2	7-9	9-9	11-7	13-8
	Southern pine	#3	4-3	6-4	8-0	9-8	11-5	4-0	5-10	7-4	8-11	10-7
	Spruce-pine-fir	SS	6-1	9-6	12-7	16-0	19-1	6-1	9-6	12-5	15-3	17-8
	Spruce-pine-fir	#1	5-11	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-pine-fir	#2	5-11	8-11	11-3	13-9	15-11	5-7	8-3	10-5	12-9	14-9
	Spruce-pine-fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Douglas fir-larch	SS	6-1	9-7	12-7	16-1	18-8	6-1	9-7	12-2	14-11	17-3
	Douglas fir-larch	#1	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Douglas fir-larch	#2	5-6	8-1	10-3	12-6	14-6	5-1	7-6	9-5	11-7	13-5
	Douglas fir-larch	#3	4-3	6-2	7-10	9-6	11-1	3-11	5-8	7-3	8-10	10-3
24	Hem-fir	SS	5-9	9-1	11-11	15-2	18-0	5-9	9-1	11-9	14-5	15-11
	Hem-fir	#1	5-8	8-5	10-8	13-0	15-1	5-4	7-9	9-10	12-0	13-11
	Hem-fir	#2	5-4	7-10	9-11	12-1	14-1	4-11	7-3	9-2	11-3	13-0
	Hem-fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0
	Southern pine	SS	6-0	9-5	12-5	15-10	19-3	6-0	9-5	12-5	15-2	17-10
	Southern pine	#1	5-9	8-8	11-0	12-10	15-3	5-5	8-0	10-2	11-11	14-1
	Southern pine	#2	5-0	7-5	9-5	11-3	13-2	4-7	6-11	8-9	10-5	12-3
	Southern pine	#3	3-10	5-8	7-1	8-8	10-3	3-6	5-3	6-7	8-0	9-6
	Spruce-pine-fir	SS	5-8	8-10	11-8	14-8	17-1	5-8	8-10	11-2	13-7	15-9
	Spruce-pine-fir	#1	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-pine-fir	#2	5-5	7-11	10-1	12-4	14-3	5-0	7-4	9-4	11-5	13-2
	Spruce-pine-fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

TABLE R802.4.1(8) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 70 psf, flexible ceiling finish attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	SS	6-10	10-9	14-3	18-2	22-1	6-10	10-9	14-3	18-2	21-7
	Douglas fir-larch	#1	6-7	10-5	13-2	16-1	18-8	6-7	9-10	12-5	15-2	17-7
	Douglas fir-larch	#2	6-6	9-10	12-6	15-3	17-9	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-10	7-1	9-0	11-0	12-9
	Hem-fir	SS	6-6	10-2	13-5	17-2	20-10	6-6	10-2	13-5	17-2	20-10
	Hem-fir	#1	6-4	10-0	13-0	15-11	18-5	6-4	9-8	12-3	15-0	17-5
	Hem-fir	#2	6-1	9-6	12-2	14-10	17-3	6-1	9-1	11-5	14-0	16-3
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
	Southern pine	SS	6-9	10-7	14-0	17-10	21-8	6-9	10-7	14-0	17-10	21-8
	Southern pine	#1	6-6	10-2	13-5	15-9	18-8	6-6	10-0	12-8	14-10	17-7
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-9	8-7	10-11	12-11	15-3
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-5	6-6	8-3	10-0	11-10
	Spruce-pine-fir	SS	6-4	10-0	13-2	16-9	20-5	6-4	10-0	13-2	16-9	19-8
	Spruce-pine-fir	#1	6-2	9-9	12-4	15-1	17-6	6-2	9-2	11-8	14-2	16-6
	Spruce-pine-fir	#2	6-2	9-9	12-4	15-1	17-6	6-2	9-2	11-8	14-2	16-6
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
16	Douglas fir-larch	SS	6-3	9-10	12-11	16-6	19-10	6-3	9-10	12-11	16-1	18-8
	Douglas fir-larch	#1	6-0	9-0	11-5	13-11	16-2	5-10	8-6	10-9	13-2	15-3
	Douglas fir-larch	#2	5-10	8-7	10-10	13-3	15-4	5-6	8-1	10-3	12-6	14-6
	Douglas fir-larch	#3	4-6	6-6	8-3	10-1	11-9	4-3	6-2	7-10	9-6	11-1
	Hem-fir	SS	5-11	9-3	12-2	15-7	18-11	5-11	9-3	12-2	15-7	18-0
	Hem-fir	#1	5-9	8-11	11-3	13-9	16-0	5-9	8-5	10-8	13-0	15-1
	Hem-fir	#2	5-6	8-4	10-6	12-10	14-11	5-4	7-10	9-11	12-1	14-1
	Hem-fir	#3	4-4	6-4	8-1	9-10	11-5	4-1	6-0	7-7	9-4	10-9
	Southern pine	SS	6-1	9-7	12-8	16-2	19-8	6-1	9-7	12-8	16-2	19-3
	Southern pine	#1	5-11	9-2	11-8	13-8	16-2	5-10	8-8	11-0	12-10	15-3
	Southern pine	#2	5-3	7-11	10-0	11-11	14-0	5-0	7-5	9-5	11-3	13-2
	Southern pine	#3	4-1	6-0	7-7	9-2	10-10	3-10	5-8	7-1	8-8	10-3
	Spruce-pine-fir	SS	5-9	9-1	11-11	15-3	18-1	5-9	9-1	11-11	14-8	17-1
	Spruce-pine-fir	#1	5-8	8-5	10-8	13-1	15-2	5-5	7-11	10-1	12-4	14-3
	Spruce-pine-fir	#2	5-8	8-5	10-8	13-1	15-2	5-5	7-11	10-1	12-4	14-3
	Spruce-pine-fir	#3	4-4	6-4	8-1	9-10	11-5	4-1	6-0	7-7	9-4	10-9
19.2	Douglas fir-larch	SS	5-10	9-3	12-2	15-6	18-1	5-10	9-3	12-0	14-8	17-1
	Douglas fir-larch	#1	5-7	8-3	10-5	12-9	14-9	5-4	7-9	9-10	12-0	13-11
	Douglas fir-larch	#2	5-4	7-10	9-11	12-1	14-0	5-0	7-4	9-4	11-5	13-2
	Douglas fir-larch	#3	4-1	6-0	7-7	9-3	10-8	3-10	5-7	7-1	8-8	10-1
	Hem-fir	SS	5-6	8-8	11-6	14-8	17-4	5-6	8-8	11-6	14-2	15-5
	Hem-fir	#1	5-5	8-2	10-3	12-7	14-7	5-3	7-8	9-8	11-10	13-9
	Hem-fir	#2	5-2	7-7	9-7	11-9	13-7	4-11	7-2	9-1	11-1	12-10
	Hem-fir	#3	4-0	5-10	7-4	9-0	10-5	3-9	5-6	6-11	8-6	9-10
	Southern pine	SS	5-9	9-1	11-11	15-3	18-6	5-9	9-1	11-11	14-11	17-7
	Southern pine	#1	5-6	8-5	10-8	12-5	14-9	5-4	7-11	10-0	11-9	13-11
	Southern pine	#2	4-10	7-3	9-2	10-10	12-9	4-6	6-10	8-8	10-3	12-1
	Southern pine	#3	3-8	5-6	6-11	8-4	9-11	3-6	5-2	6-6	7-11	9-4
	Spruce-pine-fir	SS	5-5	8-6	11-3	14-3	16-6	5-5	8-6	11-0	13-5	15-7
	Spruce-pine-fir	#1	5-3	7-8	9-9	11-11	13-10	5-0	7-3	9-2	11-3	13-0
	Spruce-pine-fir	#2	5-3	7-8	9-9	11-11	13-10	5-0	7-3	9-2	11-3	13-0
	Spruce-pine-fir	#3	4-0	5-10	7-4	9-0	10-5	3-9	5-6	6-11	8-6	9-10
	Douglas fir-larch	SS	5-5	8-7	11-3	13-11	16-2	5-5	8-6	10-9	13-2	15-3
	Douglas fir-larch	#1	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
	Douglas fir-larch	#2	4-9	7-0	8-10	10-10	12-6	4-6	6-7	8-4	10-2	11-10
	Douglas fir-larch	#3	3-8	5-4	6-9	8-3	9-7	3-5	5-0	6-4	7-9	9-0
	Hem-fir	SS	5-2	8-1	10-8	13-6	13-11	5-2	8-1	10-5	12-4	12-4
	Hem-fir	#1	5-0	7-3	9-2	11-3	13-0	4-8	6-10	8-8	10-7	12-4
	Hem-fir	#2	4-8	6-9	8-7	10-6	12-2	4-4	6-5	8-1	9-11	11-6
	Hem-fir	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10
	Southern pine	SS	5-4	8-5	11-1	14-2	16-8	5-4	8-5	11-1	13-4	15-9

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
24	Southern pine	#1	5-0	7-6	9-6	11-1	13-2	4-9	7-1	9-0	10-6	12-5
	Southern pine	#2	4-4	6-5	8-2	9-9	11-5	4-1	6-1	7-9	9-2	10-9
	Southern pine	#3	3-4	4-11	6-2	7-6	8-10	3-1	4-7	5-10	7-1	8-4
	Spruce-pine-fir	SS	5-0	7-11	10-5	12-9	14-9	5-0	7-9	9-10	12-0	12-11
	Spruce-pine-fir	#1	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	10-0	11-8
	Spruce-pine-fir	#2	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	10-0	11-8
	Spruce-pine-fir	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

Reason: Table R301.7 provides the maximum allowable deflection for rafters, regardless of how they are designed. Chapter 8 provides prescriptive rafters span tables to satisfy the requirements in Chapter 3, but they are missing important criteria.

1) Rafters with a maximum allowable deflection of L/180 must have no ceiling attached, but must also be greater than 3:12 slope. The slope criteria for using the rafter span tables is not provided in the L/180 tables.

2) Rafters with a maximum allowable deflection of L/240 can only have a "flexible ceiling finish" installed and not a "brittle ceiling finish", such as plaster, which would require L/360. The tables for L/240 only say "ceiling attached" and that could be misleading as a brittle ceiling (plaster) could not be designed from the L/240 tables.

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

Justification for no cost impact:

This proposal only makes the current intent of the IRC more easily understood. There is no change to the cost of construction.

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IRC: TABLE R802.4.1(1), TABLE R802.4.1(2), TABLE R802.4.1(3), TABLE R802.4.1(4), TABLE R802.4.1(5), TABLE R802.4.1(6), TABLE R802.4.1(7), TABLE R802.4.1(8)

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

Revise as follows:

TABLE R802.4.1(1) RAFTER SPANS FOR COMMON LUMBER SPECIES (Roof live load = 20 psf, ceiling not attached to rafters, L/Δ = 180)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	SS	11-6	18-0	23-9	Note b	Note b	11-6	18-0	23-9	Note b	Note b
	Douglas fir-larch	#1	11-1	17-4	22-5	Note b	Note b	10-6	15-4	19-5	23-9	Note b
	Douglas fir-larch	#2	10-10	16-10	21-4	~~26-0~~ Note b	Note b	~~10-0~~ 9-11	14-7	18-5	22-6	~~26-0~~ Note b
	Douglas fir-larch	#3	8-9	12-10	16-3	19-10	23-0	7-7	11-1	14-1	17-2	19-11
	Hem-fir	SS	10-10	17-0	22-5	Note b	Note b	10-10	17-0	22-5	Note b	Note b
	Hem-fir	#1	10 -7	16-8	~~22-0~~ 21-11	Note b	Note b	10-4	15-2	19-2	23-5	Note b
	Hem-fir	#2	10-1	15-11	20-8	25-3	Note b	9-8	14-2	17-11	21-11	25-5
	Hem-fir	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
16	Douglas fir-larch	SS	10-5	16-4	21-7	Note b	Note b	10-5	16-3	20-7	25-2	Note b
	Douglas fir-larch	#1	10-0	15-4	19-5	23-9	Note b	9-1	13-3	16-10	20-7	23-10
	Douglas fir-larch	#2	9-10	14-7	18-5	22-6	26-0	8-7	12-7	16-0	19-6	22-7
	Douglas fir-larch	#3	7-7	11-1	14-1	17-2	19-11	6-7	9-8	~~12-12~~ 12-2	14-11	17-3
19.2	Douglas fir-larch	SS	9-10	15-5	20-4	25-11	Note b	9-10	14-10	18-10	23-0	Note b
	Douglas fir-larch	#1	9-5	14-0	17-9	21-8	25-2	8-4	12-2	15-4	18-9	21-9
	Douglas fir-larch	#2	9-1	13-3	16-10	20-7	23-10	7-10	11-6	14-7	17-10	20-8
	Douglas fir-larch	#3	6-11	10-2	12-10	15-8	18-3	6-0	8-9	11-2	~~12-7~~ 13-7	15-9

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds 26 feet in length.

TABLE R802.4.1(2) RAFTER SPANS FOR COMMON LUMBER SPECIES (Roof live load = 20 psf, ceiling attached to rafters, L/Δ = 240)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Hem-fir	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	18-6	23-8	Note b
	Hem-fir	#1	8-9	13-9	~~18-1~~ 18-2	23-1	Note b	8-9	13-1	16-7	20-4	23-7
	Hem-fir	#2	8-4	13-1	17-3	21-11	25-5	8-4	12-3	15-6	18-11	22-0
	Hem-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Spruce-pine-fir	SS	8-9	13-9	~~18-1~~ 18-2	23-1	Note b	8-9	13-9	~~18-1~~ 18-2	23-0	Note b
	Spruce-pine-fir	#1	8-7	13-5	17-9	22-3	25-9	8-6	12-5	15-9	19-3	22-4
16	Spruce-pine-fir	#2	8-7	13-5	17-9	22-3	25-9	8-6	12-5	15-9	19-3	22-4

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Spruce-pine-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds 26 feet in length.

TABLE R802.4.1(3) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 30 psf, ceiling not attached to rafters, L/Δ = 180)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	SS	10-0	15-9	~~20-9~~ Note b	Note b	Note b	10-0	15-9	~~20-5~~ Note b	~~24-11~~ Note b	Note b
	Douglas fir-larch	#1	9-8	14-9	18-8	~~22-9~~ Note b	Note b	9-0	13-2	16-8	~~20-4~~ Note b	~~23-7~~ Note b
	Douglas fir-larch	#2	9-6	14-0	17-8	~~21-7~~ Note b	~~25-1~~ Note b	8-6	12-6	15-10	19-4	~~22-5~~ Note b
	Douglas fir-larch	#3	7-3	10-8	13-6	16-6	19-2	6-6	9-6	12-1	14-9	17-1
	Hem-fir	SS	9-6	14-10	19-7	~~25-0~~ Note b	Note b	9-6	14-10	19-7	~~24-1~~ Note b	Note b
	Hem-fir	#1	9-3	14-6	18-5	~~22-6~~ Note b	~~26-0~~ Note b	8-11	13-0	16-6	~~20-1~~ Note b	~~23-4~~ Note b
	Hem-fir	#2	8-10	13-7	17-2	~~21-0~~ Note b	~~24-4~~ Note b	8-4	12-2	15-4	18-9	~~21-9~~ Note b
	Hem-fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Southern pine	SS	9-10	15-6	~~20-5~~ Note b	Note b	Note b	9-10	15-6	~~20-5~~ Note b	~~25-4~~ Note b	Note b
	Southern pine	#1	9-6	14-10	19-0	~~22-3~~ Note b	Note b	9-0	13-5	17-0	19-11	~~23-7~~ Note b
	Southern pine	#2	8-7	12-11	16-4	19-5	~~22-10~~ Note b	7-8	11-7	14-8	17-4	~~20-5~~ Note b
	Southern pine	#3	6-7	9-9	12-4	15-0	17-9	5-11	8-9	11-0	13-5	15-10
	Spruce-pine-fir	SS	9-3	14-7	19-2	~~24-6~~ Note b	Note b	9-3	14-7	18-8	~~22-9~~ Note b	Note b
	Spruce-pine-fir	#1	9-1	13-9	17-5	~~21-4~~ Note b	~~24-8~~ Note b	8-5	12-4	15-7	19-1	~~22-1~~ Note b
	Spruce-pine-fir	#2	9-1	13-9	17-5	~~21-4~~ Note b	~~24-8~~ Note b	8-5	12-4	15-7	19-1	~~22-1~~ Note b
	Spruce-pine-fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
16	Douglas fir-larch	SS	9-1	14-4	18-10	~~24-1~~ Note b	Note b	9-1	14-0	17-8	~~21-7~~ Note b	~~25-1~~ Note b
	Douglas fir-larch	#1	8-9	12-9	16-2	19-9	~~22-10~~ Note b	7-10	11-5	14-5	17-8	~~20-5~~ Note b
	Douglas fir-larch	#2	8-3	12-1	15-4	18-9	~~21-8~~ Note b	7-5	10-10	13-8	16-9	19-5
	Douglas fir-larch	#3	6-4	9-3	11-8	14-3	16-7	5-8	8-3	10-6	12-9	14-10
	Hem-fir	SS	8-7	13-6	17-10	~~22-9~~ Note b	Note b	8-7	13-6	17-1	~~20-10~~ Note b	~~24-2~~ Note b
	Hem-fir	#1	8-5	12-7	15-11	19-6	~~22-7~~ Note b	7-8	11-3	14-3	17-5	~~20-2~~ Note b
	Hem-fir	#2	8-0	11-9	14-11	18-2	~~21-1~~ Note b	7-2	10-6	13-4	16-3	18-10
	Hem-fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Southern pine	SS	8-11	14-1	18-6	~~23-8~~ Note b	Note b	8-11	14-1	18-5	~~1-11~~ Note b	~~25-11~~ Note b
	Southern pine	#1	8-7	13-0	16-6	19-3	~~22-10~~ Note b	7-10	11-7	14-9	17-3	~~20-5~~ Note b
	Southern pine	#2	7-6	11-2	14-2	16-10	19-10	6-8	10-0	12-8	15-1	17-9
	Southern pine	#3	5-9	8-6	10-8	13-0	15-4	5-2	7-7	9-7	11-7	13-9
	Spruce-pine-fir	SS	8-5	13-3	17-5	~~22-1~~ Note b	~~25-7~~ Note b	8-5	12-9	16-2	19-9	~~22-10~~ Note b
	Spruce-pine-fir	#1	8-2	11-11	15-1	18-5	~~21-5~~ Note b	7-3	10-8	13-6	16-6	19-2
	Spruce-pine-fir	#2	8-2	11-11	15-1	18-5	~~21-5~~ Note b	7-3	10-8	13-6	16-6	19-2
	Spruce-pine-fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
19.2	Douglas fir-larch	SS	8-7	13-6	17-9	~~22-1~~ Note b	~~25-7~~ Note b	8-7	12-9	16-2	19-9	~~22-10~~ Note b
	Douglas fir-larch	#1	7-11	11-8	14-9	18-0	~~20-11~~ Note b	7-1	10-5	13-2	16-1	18-8
	Douglas fir-larch	#2	7-7	11-0	14-0	17-1	19-10	6-9	9-10	12-6	15-3	17-9
	Douglas fir-larch	#3	5-9	8-5	10-8	13-1	15-2	5-2	7-7	9-7	11-8	13-6
	Hem-fir	SS	8-1	12-9	16-9	~~21-4~~ Note b	~~24-8~~ Note b	8-1	12-4	15-7	19-1	~~22-1~~ Note b
	Hem-fir	#1	7-10	11-6	14-7	17-9	~~20-7~~ Note b	7-0	10-3	13-0	15-11	18-5
	Hem-fir	#2	7-4	10-9	13-7	16-7	19-3	6-7	9-7	12-2	14-10	17-3
	Hem-fir	#3	~~5-7~~ 5-8	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Southern pine	SS	8-5	13-3	17-5	~~22-3~~ Note b	Note b	8-5	13-3	16-10	~~20-0~~ Note b	~~23-7~~ Note b
	Southern pine	#1	~~8-0~~ 7-11	11-10	15-1	17-7	~~20-11~~ Note b	7-1	10-7	13-5	15-9	18-8
	Southern pine	#2	6-10	10-2	12-11	15-4	18-1	6-1	9-2	11-7	13-9	16-2

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	DEAD LOAD = 20 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Southern pine	#3	5-3	7-9	9-9	11-10	14-0	4-8	6-11	8-9	10-7	12-6
	Spruce-pine-fir	SS	7-11	12-5	16-5	~~20-2~~ Note b	~~23-4~~ Note b	7-11	11-8	14-9	18-0	~~20-11~~ Note b
	Spruce-pine-fir	#1	7-5	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-pine-fir	#2	7-5	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-pine-fir	#3	~~5-7~~ 5-8	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Douglas fir-larch	SS	~~8-0~~ 7-11	12-6	16-2	19-9	~~22-10~~ Note b	7-10	11-5	14-5	17-8	~~20-5~~ Note b
	Douglas fir-larch	#1	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	#2	6-9	9-10	12-6	15-3	17-9	6-0	8-10	11-2	13-8	15-10
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-7	6-9	8-7	10-5	12-1
	Hem-fir	SS	7-6	11-10	15-7	19-1	~~22-1~~ Note b	7-6	11-0	13-11	~~17-0~~ 17-1	19-9
	Hem-fir	#1	7-0	10-3	13-0	15-11	18-5	6-3	9-2	11-8	14-3	16-6
	Hem-fir	#2	6-7	9-7	12-2	14-10	17-3	5-10	8-7	10-10	13-3	15-5
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
24	Southern pine	SS	7-10	12-3	16-2	~~20-0~~ Note b	~~23-7~~ Note b	7-10	11-10	15-0	17-11	~~21-2~~ Note b
	Southern pine	#1	7-1	10-7	13-5	15-9	18-8	6-4	9-6	12-0	14-1	16-8
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-5	8-2	10-4	12-3	14-6
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-2	6-2	7-10	9-6	11-2
	Spruce-pine-fir	SS	7-4	11-7	14-9	18-0	~~20-11~~ Note b	7-1	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#1	6-8	9-9	12-4	15-1	17-6	5-11	~~8-8~~ 8-9	11-0	13-6	15-7
	Spruce-pine-fir	#2	6-8	9-9	12-4	15-1	17-6	5-11	~~8-8~~ 8-9	11-0	13-6	15-7
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds ~~26~~ 20 feet in length.

TABLE R802.4.1(4) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 30 psf, ceiling attached to rafters, L/Δ = 240)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	DEAD LOAD = 20 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Douglas fir-larch	SS	9-1	14-4	18-10	~~24-1~~ Note b	Note b	9-1	14-4	18-10	~~24-1~~ Note b	Note b
	Douglas fir-larch	#1	8-9	13-9	18-2	~~22-9~~ Note b	Note b	8-9	13-2	16-8	~~20-4~~ Note b	~~23-7~~ Note b
	Douglas fir-larch	#2	8-7	13-6	17-8	~~21-7~~ Note b	~~25-1~~ Note b	8-6	12-6	15-10	19-4	~~22-5~~ Note b
	Douglas fir-larch	#3	7-3	10-8	13-6	16-6	19-2	6-6	9-6	12-1	14-9	17-1
	Hem-fir	SS	8-7	13-6	17-10	~~22-9~~ Note b	Note b	8-7	13-6	17-10	~~22-9~~ Note b	Note b
	Hem-fir	#1	8-5	13-3	17-5	~~22-3~~ Note b	~~26-0~~ Note b	8-5	13-0	16-6	~~20-1~~ Note b	~~23-4~~ Note b
	Hem-fir	#2	8-0	12-7	16-7	~~21-0~~ Note b	~~24-4~~ Note b	8-0	12-2	15-4	18-9	~~21-9~~ Note b
12	Hem-fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Southern pine	SS	8-11	14-1	18-6	~~23-8~~ Note b	Note b	8-11	14-1	18-6	~~23-8~~ Note b	Note b
	Southern pine	#1	8-7	13-6	17-10	~~22-3~~ Note b	Note b	8-7	13-5	17-0	19-11	~~23-7~~ Note b
	Southern pine	#2	8-3	12-11	16-4	19-5	~~22-10~~ Note b	7-8	11-7	14-8	17-4	~~20-5~~ Note b
	Southern pine	#3	6-7	9-9	12-4	15-0	17-9	5-11	8-9	11-0	13-5	15-10
	Spruce-pine-fir	SS	8-5	13-3	17-5	~~22-3~~ Note b	Note b	8-5	13-3	17-5	~~22-3~~ Note b	Note b
	Spruce-pine-fir	#1	8-3	12-11	17-0	~~21-4~~ Note b	~~24-8~~ Note b	8-3	12-4	15-7	19-1	~~22-1~~ Note b
	Spruce-pine-fir	#2	8-3	12-11	17-0	~~21-4~~ Note b	~~24-8~~ Note b	8-3	12-4	15-7	19-1	~~22-1~~ Note b
	Spruce-pine-fir	#3	7-1	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	SS	8-3	13-0	17-2	~~21-10~~ Note b	Note b	8-3	13-0	17-2	~~21-7~~ Note b	~~25-1~~ Note b
	Douglas fir-larch	#1	8-0	12-6	16-2	19-9	~~22-10~~ Note b	7-10	11-5	14-5	17-8	~~20-5~~ Note b
	Douglas fir-larch	#2	7-10	12-1	15-4	18-9	~~21-8~~ Note b	7-5	10-10	13-8	16-9	19-5
	Douglas fir-larch	#3	6-4	9-3	11-8	14-3	16-7	5-8	8-3	10-6	12-9	14-10
	Hem-fir	SS	7-10	12-3	16-2	~~20-8~~ Note b	~~25-1~~ Note b	7-10	12-3	16-2	~~20-8~~ Note b	~~24-2~~ Note b
	Hem-fir	#1	7-8	12-0	15-10	19-6	~~22-7~~ Note b	7-8	11-3	14-3	17-5	~~20-2~~ Note b
	Hem-fir	#2	7-3	11-5	14-11	18-2	~~21-1~~ Note b	7-2	10-6	13-4	16-3	18-10

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
16	Hem-fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Southern pine	SS	8-1	12-9	16-10	~~21-6~~ Note b	Note b	8-1	12-9	16-10	~~21-6~~ Note b	~~25-11~~ Note b
	Southern pine	#1	7-10	12-3	16-2	19-3	~~22-10~~ Note b	7-10	11-7	14-9	17-3	~~20-5~~ Note b
	Southern pine	#2	7-6	11-2	14-2	16-10	19-10	6-8	10-0	12-8	15-1	17-9
	Southern pine	#3	5-9	8-6	10-8	13-0	15-4	5-2	7-7	9-7	11-7	13-9
	Spruce-pine-fir	SS	7-8	12-0	15-10	~~20-2~~ Note b	~~24-7~~ Note b	7-8	12-0	15-10	19-9	~~22-10~~ Note b
	Spruce-pine-fir	#1	7-6	11-9	15-1	18-5	~~21-5~~ Note b	7-3	10-8	13-6	16-6	19-2
	Spruce-pine-fir	#2	7-6	11-9	15-1	18-5	~~21-5~~ Note b	7-3	10-8	13-6	16-6	19-2
	Spruce-pine-fir	#3	6-2	9-0	11-5	13-11	16-2	5-6	8-1	10-3	12-6	14-6
	Douglas fir-larch	SS	7-9	12-3	16-1	~~20-7~~ Note b	~~25-0~~ Note b	7-9	12-3	16-1	19-9	~~22-10~~ Note b
	Douglas fir-larch	#1	7-6	11-8	14-9	18-0	~~20-11~~ Note b	7-1	10-5	13-2	16-1	18-8
	Douglas fir-larch	#2	7-4	11-0	14-0	17-1	19-10	6-9	~~9-1~~ 9-10	12-6	15-3	17-9
	Douglas fir-larch	#3	5-9	8-5	10-8	13-1	15-2	5-2	7-7	9-7	11-8	13-6
19.2	Hem-fir	SS	7-4	11-7	15-3	19-5	~~23-7~~ Note b	7-4	11-7	15-3	19-1	~~22-1~~ Note b
	Hem-fir	#1	7-2	11-4	14-7	17-9	~~20-7~~ Note b	7-0	~~16-3~~ 10-3	13-0	15-11	18-5
	Hem-fir	#2	6-10	10-9	13-7	16-7	19-3	6-7	9-7	12-2	14-10	17-3
	Hem-fir	#3	~~5-7~~ 5-8	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Southern pine	SS	7-8	12-0	15-10	~~20-2~~ Note b	~~24-7~~ Note b	7-8	12-0	15-10	~~20-0~~ Note b	~~23-7~~ Note b
	Southern pine	#1	7-4	11-7	15-1	17-7	~~20-11~~ Note b	7-1	10-7	13-5	15-9	18-8
	Southern pine	#2	6-10	10-2	12-11	15-4	18-1	6-1	9-2	11-7	13-9	16-2
	Southern pine	#3	5-3	7-9	9-9	11-10	14-0	4-8	6-11	8-9	10-7	12-6
	Spruce-pine-fir	SS	7-2	11-4	14-11	19-0	~~23-1~~ Note b	7-2	11-4	14-9	18-0	~~20-11~~ Note b
	Spruce-pine-fir	#1	7-0	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-pine-fir	#2	7-0	10-11	13-9	16-10	19-6	6-8	9-9	12-4	15-1	17-6
	Spruce-pine-fir	#3	~~5-7~~ 5-8	8-3	10-5	12-9	14-9	5-0	7-4	9-4	11-5	13-2
	Douglas fir-larch	SS	7-3	11-4	15-0	19-1	~~22-10~~ Note b	7-3	11-4	14-5	17-8	~~20-5~~ Note b
	Douglas fir-larch	#1	7-0	10-5	13-2	16-1	18-8	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	#2	6-9	9-10	12-6	15-3	17-9	6-0	8-10	11-2	13-8	15-10
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-7	6-9	8-7	10-5	12-1
24	Hem-fir	SS	6-10	10-9	14-2	18-0	~~21-11~~ Note b	6-10	10-9	13-11	~~17-0~~ 17-1	19-9
	Hem-fir	#1	6-8	10-3	13-0	15-11	18-5	6-3	9-2	11-8	14-3	16-6
	Hem-fir	#2	6-4	9-7	12-2	14-10	17-3	5-10	8-7	10-10	13-3	15-5
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10
	Southern pine	SS	7-1	11-2	14-8	18-9	~~22-10~~ Note b	7-1	11-2	14-8	17-11	~~21-2~~ Note b
	Southern pine	#1	6-10	10-7	13-5	15-9	18-8	6-4	9-6	12-0	14-1	16-8
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-5	8-2	10-4	12-3	14-6
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-2	6-2	7-10	9-6	11-2
	Spruce-pine-fir	SS	6-8	10-6	13-10	17-8	~~20-11~~ Note b	6-8	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#1	6-6	9-9	12-4	15-1	17-6	5-11	~~8-8~~ 8-9	11-0	13-6	15-7
	Spruce-pine-fir	#2	6-6	9-9	12-4	15-1	17-6	5-11	~~8-8~~ 8-9	11-0	13-6	15-7
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-6	6-7	8-4	10-2	11-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds ~~26~~ 20 feet in length.

TABLE R802.4.1(5) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 50 psf, ceiling not attached to rafters, L/Δ = 180)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Douglas fir-larch	SS	8-5	13-3	17-6	~~22-4~~ Note b	~~26-0~~ Note b	8-5	13-3	17-3	~~21-1~~ Note b	~~24-5~~ Note b
	Douglas fir-larch	#1	8-2	12-0	15-3	18-7	~~21-7~~ Note b	7-7	11-2	14-1	17-3	20-0

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	DEAD LOAD = 20 psf 2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	#2	7-10	11-5	14-5	17-8	~~20-5~~ Note b	7-3	10-7	13-4	16-4	18-11
	Douglas fir-larch	#3	~~6-0~~ 5-11	8-9	11-0	13-6	15-7	5-6	8-1	10-3	12-6	14-6
	Hem-fir	SS	8-0	12-6	16-6	~~21-1~~ Note b	~~25-6~~ Note b	8-0	12-6	16-6	~~20-4~~ Note b	~~23-7~~ Note b
	Hem-fir	#1	7-10	11-10	15-0	18-4	~~21-3~~ Note b	7-6	11-0	13-11	17-0	19-9
	Hem-fir	#2	7-5	11-1	14-0	17-2	19-11	7-0	10-3	13-0	15-10	18-5
	Hem-fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Southern pine	SS	8-4	13-1	17-2	~~21-11~~ Note b	Note b	8-4	13-1	17-2	~~21-5~~ Note b	~~25-3~~ Note b
	Southern pine	#1	8-0	12-3	15-6	18-2	~~21-7~~ Note b	7-7	11-4	14-5	16-10	20-0
	Southern pine	#2	7-0	10-6	13-4	15-10	18-8	6-6	9-9	12-4	14-8	17-3
	Southern pine	#3	5-5	8-0	10-1	12-3	14-6	5-0	7-5	9-4	11-4	13-5
	Spruce-pine-fir	SS	7-10	12-3	16-2	~~20-8~~ Note b	~~24-1~~ Note b	7-10	12-3	15-9	19-3	~~22-4~~ Note b
	Spruce-pine-fir	#1	7-8	11-3	14-3	17-5	~~20-2~~ Note b	7-1	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#2	7-8	11-3	14-3	17-5	~~20-2~~ Note b	7-1	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
16	Douglas fir-larch	SS	7-8	12-1	15-11	19-9	~~22-10~~ Note b	7-8	11-10	14-11	18-3	~~21-2~~ Note b
	Douglas fir-larch	#1	7-1	10-5	13-2	16-1	18-8	6-7	9-8	12-2	14-11	17-3
	Douglas fir-larch	#2	6-9	9-10	12-6	15-3	17-9	6-3	9-2	11-7	14-2	16-5
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-9	7-0	8-10	10-10	12-6
	Hem-fir	SS	7-3	11-5	15-0	19-1	~~22-1~~ Note b	7-3	11-5	14-5	17-8	~~20-5~~ Note b
	Hem-fir	#1	7-0	10-3	13-0	15-11	18-5	6-6	9-6	12-1	14-9	17-1
	Hem-fir	#2	6-7	9-7	12-2	14-10	17-3	6-1	8-11	11-3	13-9	15-11
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	~~10-6~~ 10-7	12-3
	Southern pine	SS	7-6	11-10	15-7	19-11	~~23-7~~ Note b	7-6	11-10	15-7	18-6	~~21-10~~ Note b
	Southern pine	#1	7-1	10-7	13-5	15-9	18-8	6-7	9-10	12-5	14-7	17-3
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-8	8-5	10-9	12-9	15-0
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-4	6-5	8-1	9-10	11-7
	Spruce-pine-fir	SS	7-1	11-2	14-8	18-0	~~20-11~~ Note b	7-1	10-9	13-8	~~15-11~~ 16-8	19-4
	Spruce-pine-fir	#1	6-8	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-pine-fir	#2	6-8	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	~~10-6~~ 10-7	12-3
19.2	Douglas fir-larch	SS	7-3	11-4	14-9	18-0	~~20-11~~ Note b	7-3	10-9	13-8	16-8	19-4
	Douglas fir-larch	#1	6-6	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Douglas fir-larch	#2	6-2	9-0	11-5	13-11	16-2	5-8	8-4	~~10-9~~ 10-7	12-11	15-0
	Douglas fir-larch	#3	4-8	6-11	8-9	10-8	12-4	4-4	6-4	8-1	9-10	11-5
	Hem-fir	SS	6-10	10-9	14-2	17-5	~~20-2~~ Note b	6-10	10-5	13-2	16-1	18-8
	Hem-fir	#1	6-5	9-5	11-11	14-6	16-10	~~8-11~~ 5-11	8-8	11-0	13-5	15-7
	Hem-fir	#2	6-0	8-9	11-1	13-7	15-9	5-7	8-1	10-3	12-7	14-7
	Hem-fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
	Southern pine	SS	7-1	11-2	14-8	18-3	~~21-7~~ Note b	7-1	11-2	14-2	16-11	20-0
	Southern pine	#1	6-6	9-8	12-3	14-4	17-1	6-0	9-0	11-4	13-4	15-9
	Southern pine	#2	5-7	8-4	10-7	12-6	14-9	5-2	7-9	9-9	11-7	13-8
	Southern pine	#3	4-3	6-4	8-0	9-8	11-5	4-0	5-10	7-4	8-11	10-7
	Spruce-pine-fir	SS	6-8	10-6	13-5	16-5	19-1	6-8	9-10	12-5	15-3	17-8
	Spruce-pine-fir	#1	6-1	8-11	11-3	13-9	15-11	~~5-7~~ 5-8	8-3	10-5	12-9	14-9
	Spruce-pine-fir	#2	6-1	8-11	11-3	13-9	15-11	~~5-7~~ 5-8	8-3	10-5	12-9	14-9
	Spruce-pine-fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
24	Hem-fir	SS	6-4	9-11	12-9	15-7	18-0	6-4	9-4	11-9	14-5	16-8
	Hem-fir	#1	5-9	8-5	10-8	13-0	15-1	~~8-4~~ 5-4	7-9	9-10	12-0	13-11
	Hem-fir	#2	5-4	7-10	9-11	12-1	14-1	~~4-11~~ 5-0	7-3	9-2	11-3	13-0
	Hem-fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds ~~26~~ 20 feet in length.

TABLE R802.4.1(6) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 50 psf, ceiling attached to rafters, L/Δ = 240)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)	(feet- inches)
12	Douglas fir-larch	SS	7-8	12-1	15-11	~~20-3~~ Note b	~~24-8~~ Note b	7-8	12-1	15-11	~~20-3~~ Note b	~~24-5~~ Note b
	Douglas fir-larch	#1	7-5	~~11-7~~ 11-8	15-3	18-7	~~21-7~~ Note b	7-5	11-2	14-1	17-3	20-0
	Douglas fir-larch	#2	7-3	11-5	14-5	17-8	~~20-5~~ Note b	7-3	10-7	13-4	16-4	18-11
	Douglas fir-larch	#3	~~6-0~~ 5-11	8-9	11-0	13-6	15-7	5-6	8-1	10-3	12-6	14-6
	Hem-fir	SS	7-3	11-5	15-0	19-2	~~23-4~~ Note b	7-3	11-5	15-0	19-2	~~23-4~~ Note b
	Hem-fir	#1	7-1	11-2	14-8	18-4	~~21-3~~ Note b	7-1	11-0	13-11	17-0	19-9
	Hem-fir	#2	6-9	10-8	14-0	17-2	19-11	6-9	10-3	13-0	15-10	18-5
	Hem-fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
	Southern pine	SS	7-6	11-10	15-7	19-11	~~24-3~~ Note b	7-6	11-10	15-7	19-11	~~24-3~~ Note b
	Southern pine	#1	7-3	11-5	15-0	18-2	~~21-7~~ Note b	7-3	11-4	14-5	16-10	20-0
	Southern pine	#2	6-11	10-6	13-4	15-10	18-8	6-6	9-9	12-4	14-8	17-3
	Southern pine	#3	5-5	8-0	10-1	12-3	14-6	5-0	7-5	9-4	11-4	13-5
	Spruce-pine-fir	SS	7-1	11-2	14-8	18-9	~~22-10~~ Note b	7-1	11-2	14-8	18-9	~~22-4~~ Note b
	Spruce-pine-fir	#1	6-11	10-11	14-3	17-5	~~20-2~~ Note b	6-11	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#2	6-11	10-11	14-3	17-5	~~20-2~~ Note b	6-11	10-5	13-2	16-1	18-8
	Spruce-pine-fir	#3	5-10	8-6	10-9	13-2	15-3	5-5	7-10	10-0	12-2	14-1
16	Douglas fir-larch	SS	7-0	11-0	14-5	18-5	~~22-5~~ Note b	7-0	11-0	14-5	18-3	~~21-2~~ Note b
	Douglas fir-larch	#1	6-9	10-5	13-2	16-1	18-8	6-7	9-8	12-2	14-11	17-3
	Douglas fir-larch	#2	6-7	9-10	12-6	15-3	17-9	6-3	9-2	11-7	14-2	16-5
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-9	7-0	8-10	10-10	12-6
	Hem-fir	SS	6-7	10-4	13-8	17-5	~~21-2~~ Note b	6-7	10-4	13-8	17-5	~~20-5~~ Note b
	Hem-fir	#1	6-5	10-2	13-0	15-11	18-5	6-5	9-6	12-1	14-9	17-1
	Hem-fir	#2	6-2	9-7	12-2	14-10	17-3	6-1	8-11	11-3	13-9	15-11
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	~~10-6~~ 10-7	12-3
	Southern pine	SS	6-10	10-9	14-2	18-1	~~22-0~~ Note b	6-10	10-9	14-2	18-1	~~21-10~~ Note b
	Southern pine	#1	6-7	10-4	13-5	15-9	18-8	6-7	9-10	12-5	14-7	17-3
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-8	8-5	10-9	12-9	15-0
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-4	6-5	8-1	9-10	11-7
	Spruce-pine-fir	SS	6-5	10-2	13-4	17-0	~~20-9~~ Note b	6-5	10-2	13-4	16-8	19-4
	Spruce-pine-fir	#1	6-4	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-pine-fir	#2	6-4	9-9	12-4	15-1	17-6	6-2	9-0	11-5	13-11	16-2
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-8	6-10	8-8	~~10-6~~ 10-7	12-3
19.2	Douglas fir-larch	SS	6-7	10-4	13-7	17-4	~~20-11~~ Note b	6-7	10-4	13-7	16-8	19-4
	Douglas fir-larch	#1	6-4	9-6	12-0	14-8	17-1	6-0	8-10	11-2	13-7	15-9
	Douglas fir-larch	#2	6-2	9-0	11-5	13-11	16-2	5-8	8-4	10-7	12-11	15-0
	Douglas fir-larch	#3	4-8	6-11	8-9	10-8	12-4	4-4	6-4	8-1	9-10	11-5
	Southern pine	SS	6-5	10-2	13-4	17-0	~~20-9~~ Note b	6-5	10-2	13-4	16-11	20-0
	Southern pine	#1	6-2	9-8	12-3	14-4	17-1	6-0	9-0	11-4	13-4	15-9
	Southern pine	#2	5-7	8-4	10-7	12-6	14-9	5-2	7-9	9-9	11-7	13-8
	Southern pine	#3	4-3	6-4	8-0	9-8	11-5	4-0	5-10	7-4	8-11	10-7
	Spruce-pine-fir	SS	6-1	9-6	12-7	16-0	19-1	6-1	9-6	12-5	15-3	17-8
	Spruce-pine-fir	#1	5-11	8-11	11-3	13-9	15-11	~~5-7~~ 5-8	8-3	10-5	12-9	14-9
	Spruce-pine-fir	#2	5-11	8-11	11-3	13-9	15-11	~~5-7~~ 5-8	8-3	10-5	12-9	14-9
	Spruce-pine-fir	#3	4-7	6-9	8-6	10-5	12-1	4-3	6-3	7-11	9-7	11-2
24	Hem-fir	SS	5-9	9-1	11-11	15-2	18-0	5-9	9-1	11-9	14-5	~~15-11~~ 16-8
	Hem-fir	#1	5-8	8-5	10-8	13-0	15-1	5-4	7-9	9-10	12-0	13-11
	Hem-fir	#2	5-4	7-10	9-11	12-1	14-1	~~4-11~~ 5-0	7-3	9-2	11-3	13-0
	Hem-fir	#3	4-1	6-0	7-7	9-4	10-9	3-10	5-7	7-1	8-7	10-0

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds 20 feet in length.

TABLE R802.4.1(7) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 70 psf, ceiling not attached to rafters, L/Δ = 180)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Douglas fir-larch	SS	7-7	11-10	15-8	19-9	~~22-10~~ Note b	7-7	11-10	15-3	18-7	~~21-7~~ Note b
	Douglas fir-larch	#1	7-1	10-5	13-2	16-1	18-8	6-8	9-10	12-5	15-2	17-7
	Douglas fir-larch	#2	6-9	9-10	12-6	15-3	17-9	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-10	7-1	9-0	11-0	12-9
	Hem-fir	SS	7-2	11-3	14-9	18-10	~~22-1~~ Note b	7-2	11-3	14-8	18-0	~~20-10~~ Note b
	Hem-fir	#1	7-0	10-3	13-0	15-11	18-5	6-7	9-8	12-3	15-0	17-5
	Hem-fir	#2	6-7	9-7	12-2	14-10	17-3	6-2	9-1	~~11-5~~ 11-6	14-0	16-3
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
	Southern pine	SS	7-5	11-8	15-4	19-7	~~23-7~~ Note b	7-5	11-8	15-4	18-10	~~22-3~~ Note b
	Southern pine	#1	7-1	10-7	13-5	15-9	18-8	6-9	10-0	12-8	14-10	17-7
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-9	8-7	10-11	12-11	15-3
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-5	6-6	8-3	10-0	11-10
	Spruce-pine-fir	SS	7-0	11-0	14-6	18-0	~~20-11~~ Note b	7-0	11-0	13-11	17-0	19-8
	Spruce-pine-fir	#1	6-8	9-9	12-4	15-1	17-6	6-3	9-2	11-8	14-2	16-6
	Spruce-pine-fir	#2	6-8	9-9	12-4	15-1	17-6	6-3	9-2	11-8	14-2	16-6
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
16	Southern pine	SS	6-9	10-7	14-0	17-4	~~20-5~~ Note b	6-9	10-7	13-9	16-4	19-3
	Southern pine	#1	6-2	9-2	11-8	13-8	16-2	5-10	8-8	11-0	12-10	15-3
	Southern pine	#2	5-3	7-11	10-0	11-11	14-0	5-0	7-5	9-5	11-3	13-2
	Southern pine	#3	4-1	6-0	7-7	9-2	10-10	3-10	5-8	7-1	8-8	10-3
19.2	Douglas fir-larch	SS	6-6	10-1	12-9	15-7	18-1	6-6	9-6	12-0	14-8	17-1
	Douglas fir-larch	#1	~~5-7~~ 5-8	8-3	10-5	12-9	14-9	5-4	7-9	9-10	12-0	13-11
	Douglas fir-larch	#2	5-4	7-10	9-11	12-1	14-0	5-0	7-4	9-4	11-5	13-2
	Douglas fir-larch	#3	4-1	6-0	7-7	9-3	10-8	3-10	5-7	7-1	8-8	10-1
	Hem-fir	SS	6-1	9-7	12-4	15-1	~~17-4~~ 17-6	6-1	9-2	11-8	14-2	~~15-5~~ 16-6
	Hem-fir	#1	5-7	8-2	10-3	12-7	14-7	5-3	7-8	9-8	11-10	13-9
	Hem-fir	#2	5-2	7-7	9-7	11-9	13-7	4-11	7-2	9-1	11-1	12-10
	Hem-fir	#3	4-0	5-10	7-4	9-0	10-5	3-9	5-6	6-11	8-6	9-10
24	Douglas fir-larch	SS	6-0	9-0	11-5	13-11	16-2	5-10	8-6	10-9	13-2	15-3
	Douglas fir-larch	#1	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
	Douglas fir-larch	#2	4-9	7-0	8-10	10-10	12-6	4-6	6-7	8-4	10-2	11-10
	Douglas fir-larch	#3	3-8	5-4	6-9	8-3	9-7	3-5	5-0	6-4	7-9	~~9-10~~ 9-0
	Hem-fir	SS	5-8	~~8-8~~ 8-9	11-0	13-6	~~13-11~~ 15-7	5-7	8-3	10-5	~~12-4~~ 12-8	~~12-4~~ 14-9
	Hem-fir	#1	5-0	7-3	9-2	11-3	13-0	4-8	6-10	8-8	10-7	12-4
	Hem-fir	#2	4-8	6-9	8-7	10-6	12-2	4-4	6-5	8-1	9-11	11-6
	Hem-fir	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10
	Spruce-pine-fir	SS	5-6	8-3	10-5	12-9	14-9	5-4	7-9	9-10	12-0	~~12-11~~ 13-11
	Spruce-pine-fir	#1	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	~~10-0~~ 10-1	11-8
	Spruce-pine-fir	#2	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	~~10-0~~ 10-1	11-8
	Spruce-pine-fir	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds 20 feet in length.

TABLE R802.4.1(8) RAFTER SPANS FOR COMMON LUMBER SPECIES (Ground snow load = 70 psf, ceiling attached to rafters, L/Δ = 240)

Portions of table not shown remain unchanged.

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans[a]									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Douglas fir-larch	SS	6-10	10-9	14-3	18-2	~~22-1~~ Note b	6-10	10-9	14-3	18-2	~~21-7~~ Note b
	Douglas fir-larch	#1	6-7	10-5	13-2	16-1	18-8	6-7	9-10	12-5	15-2	17-7

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 × 4	2 × 6	2 × 8	2 × 10	2 × 12	2 × 4	2 × 6	2 × 8	2 × 10	2 × 12
			Maximum rafter spans									
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
	Douglas fir-larch	#2	6-6	9-10	12-6	15-3	17-9	6-4	9-4	11-9	14-5	16-8
	Douglas fir-larch	#3	5-2	7-7	9-7	11-8	13-6	4-10	7-1	9-0	11-0	12-9
	Hem-fir	SS	6-6	10-2	13-5	17-2	~~20-10~~ Note b	6-6	10-2	13-5	17-2	~~20-10~~ Note b
12	Hem-fir	#1	6-4	10-0	13-0	15-11	18-5	6-4	9-8	12-3	15-0	17-5
	Hem-fir	#2	6-1	9-6	12-2	14-10	17-3	6-1	9-1	~~11-5~~ 11-6	14-0	16-3
	Hem-fir	#3	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
	Southern pine	SS	6-9	10-7	14-0	17-10	~~21-8~~ Note b	6-9	10-7	14-0	17-10	~~21-8~~ Note b
	Southern pine	#1	6-6	10-2	13-5	15-9	18-8	6-6	10-0	12-8	14-10	17-7
	Southern pine	#2	6-1	9-2	11-7	13-9	16-2	5-9	8-7	10-11	12-11	15-3
	Southern pine	#3	4-8	6-11	8-9	10-7	12-6	4-5	6-6	8-3	10-0	11-10
	Spruce-pine-fir	SS	6-4	10-0	13-2	16-9	~~20-5~~ Note b	6-4	10-0	13-2	16-9	19-8
	Spruce-pine-fir	#1	6-2	9-9	12-4	15-1	17-6	6-2	9-2	11-8	14-2	16-6
	Spruce-pine-fir	#2	6-2	9-9	12-4	15-1	17-6	6-2	9-2	11-8	14-2	16-6
	Spruce-pine-fir	#3	5-0	7-4	9-4	11-5	13-2	4-9	6-11	8-9	10-9	12-5
	Douglas fir-larch	SS	5-10	9-3	12-2	15-6	18-1	5-10	9-3	12-0	14-8	17-1
	Douglas fir-larch	#1	~~5-7~~ 5-8	8-3	10-5	12-9	14-9	5-4	7-9	9-10	12-0	13-11
	Douglas fir-larch	#2	5-4	7-10	9-11	12-1	14-0	5-0	7-4	9-4	11-5	13-2
	Douglas fir-larch	#3	4-1	6-0	7-7	9-3	10-8	3-10	5-7	7-1	8-8	10-1
19.2	Hem-fir	SS	5-6	8-8	11-6	14-8	~~17-4~~ 17-6	5-6	8-8	11-6	14-2	~~15-5~~ 16-6
	Hem-fir	#1	5-5	8-2	10-3	12-7	14-7	5-3	7-8	9-8	11-10	13-9
	Hem-fir	#2	5-2	7-7	9-7	11-9	13-7	4-11	7-2	9-1	11-1	12-10
	Hem-fir	#3	4-0	5-10	7-4	9-0	10-5	3-9	5-6	6-11	8-6	9-10
	Hem-fir	SS	5-2	8-1	10-8	13-6	~~13-11~~ 15-7	5-2	8-1	10-5	~~12-4~~ 12-8	~~12-4~~ 14-9
	Hem-fir	#1	5-0	7-3	9-2	11-3	13-0	4-8	6-10	8-8	10-7	12-4
	Hem-fir	#2	4-8	6-9	8-7	10-6	12-2	4-4	6-5	8-1	9-11	11-6
24	Hem-fir	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10
	Spruce-pine-fir	SS	5-0	7-11	10-5	12-9	14-9	5-0	7-9	9-10	12-0	~~12-11~~ 13-11
	Spruce-pine-fir	#1	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	~~10-0~~ 10-1	11-8
	Spruce-pine-fir	#2	4-8	6-11	8-9	10-8	12-4	4-5	6-6	8-3	~~10-0~~ 10-1	11-8
	Spruce-pine-fir	#3	3-7	5-2	6-7	8-1	9-4	3-4	4-11	6-3	7-7	8-10

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. Where ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the adjustment factors in Table R802.4.1(9).

b. Span exceeds 20 feet in length.

Reason: This proposal updates the span tables in multiple locations to be aligned with ASCE 7-22 and corrects errors in spans that could not be corrected by ICC staff using ICC's editorial process. The proposed spans align with those found in the ANSI/AWC 2024 *Wood Frame Construction Manual* (WFCM). To address complexity of ASCE 7 requirements for unbalanced snow loads, horizontally-projected rafter spans over 20' have been removed from prescriptive values in the IRC, which also matches the method used in the WFCM. New calculations for horizontally-projected spans over 20' require the use of additional factors including wind exposure of the building, attic insulation, heat differential of a building, and a new winter wind provision. In order to provide prescriptive values for horizontally-projected rafter spans over 20', many conservative assumptions would need to be made so that the tables can be used prescriptively in all locations. These assumptions would create conservative spans for these rafters. It should be noted that rafters with a horizontally-projected span over 20' will typically be 25'-30' long. These longer spans are often associated with use of trusses or other engineered wood solutions. Therefore, the impact of reducing the tabulated span length limit from 26' to 20' may be negligible.

Cost Impact: Increase

Estimated Immediate Cost Impact:

$0 - $300 for engineering of spans between 20' and 26'

Estimated Immediate Cost Impact Justification (methodology and variables):

This proposal updates the span tables in multiple locations to be aligned with ASCE 7-22 and corrects errors in spans. The adjustment in spans due to alignment with ASCE 7-22 will likely not impact the lumber lengths needed for construction, as some trimming will still be necessary to accommodate the actual span end use. The error corrections are considered editorial. As Note b has changed, where a project involves spans between 20' and 26', the cost impact is estimated to be up to $300 for engineering.

RB235-25

RB236-25

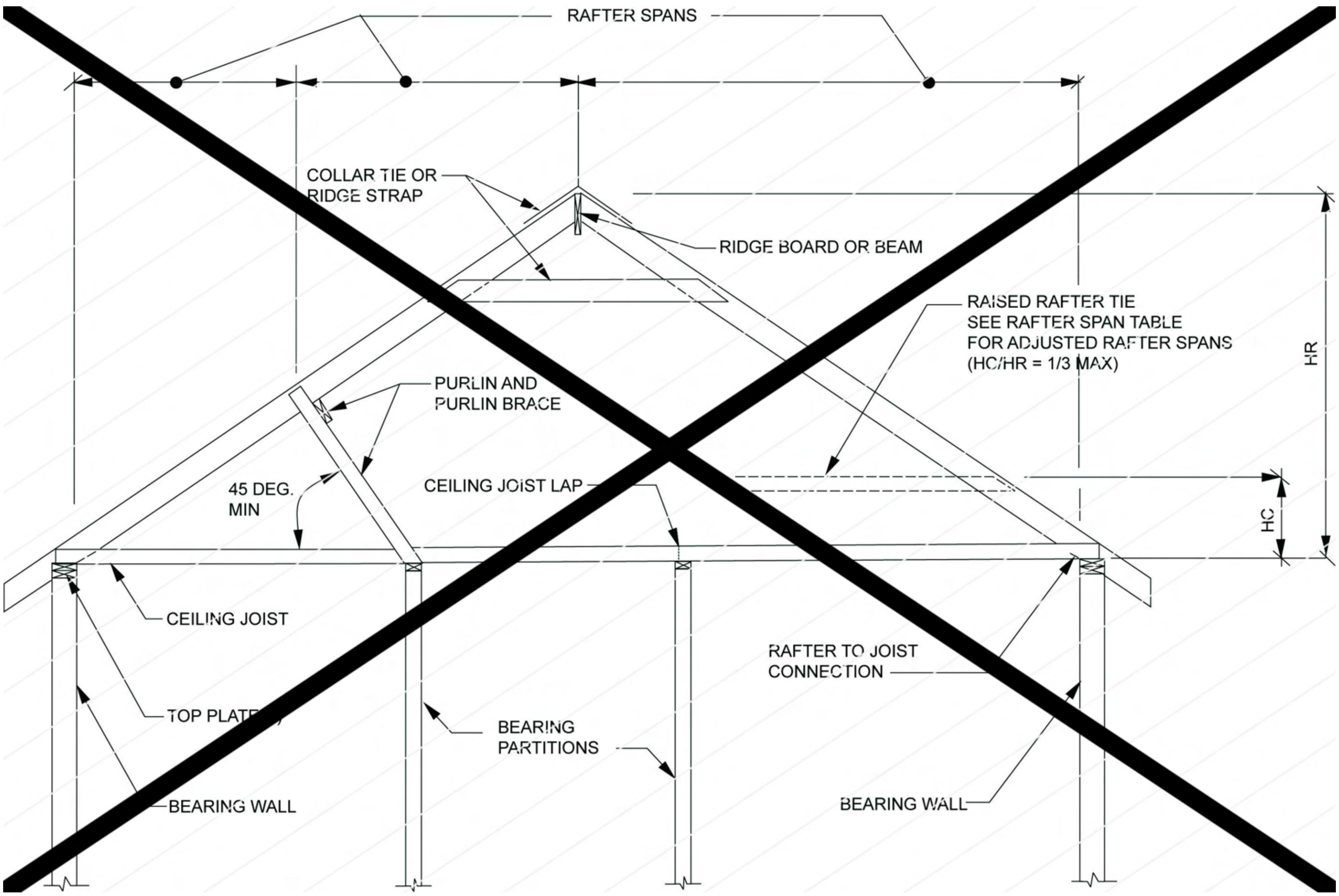
IRC: R802.4.5, FIGURE R802.4.5

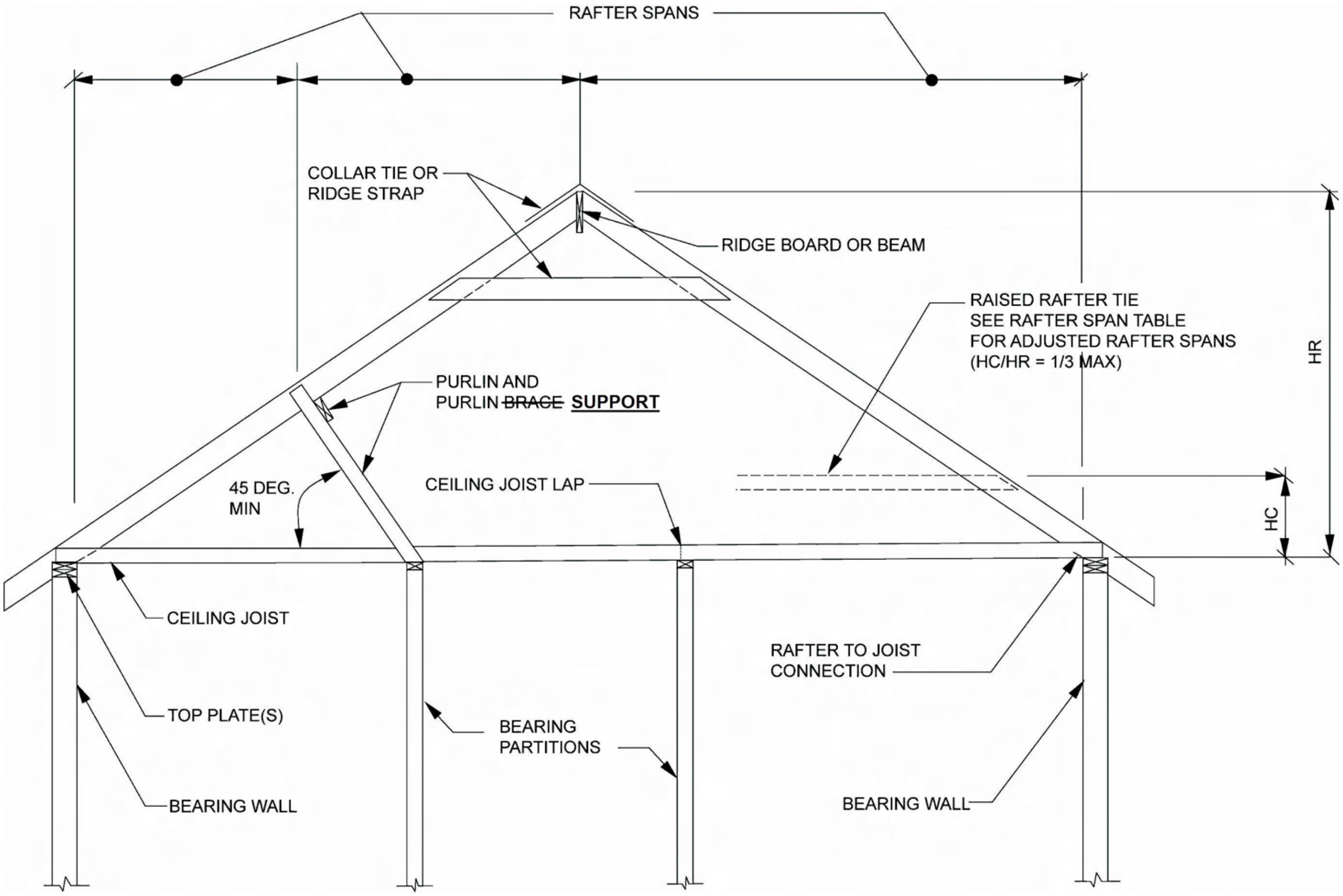
Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2024 International Residential Code

Revise as follows:

R802.4.5 Purlins. Installation of purlins to reduce the span of rafters is permitted as shown in Figure R802.4.5. Purlins shall be sized not less than the required size of the rafters that they support. Purlins shall be continuous and shall be supported by 2-inch by 4-inch (51 mm by 102 mm) ~~braces~~ purlin supports installed ~~to bearing walls~~ at a slope not less than 45 degrees (0.79 rad) from the horizontal. Purlin supports shall bear on a bearing wall or a beam designed in accordance with accepted engineering practice and supported on each end by a wall or column. The ~~braces~~ purlin supports shall be spaced not more than 4 feet (1219 mm) on center and the unbraced length of purlin supports shall not exceed 8 feet (2438 mm).





For SI: 1 degree = 0.018 rad.

H_C = Height of ceiling joists or rafter ties measured vertically above the top of rafter support walls.

H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

FIGURE R802.4.5 BRACED RAFTER CONSTRUCTION

Reason: This proposal is to just add an option for when supported purlins are used to increase the span of stick-framed rafters.

In many parts of the country, builders prefer to construct roofs using IRC prescriptive framing rather than using roof trusses. Use of the purlin system has traditionally been used to support the rafter in between the ridge and the wall top plate to reduce its effective span. Currently the purlin brace is required to be supported by a bearing wall below. With the increasing use of open floor plans, there may not be a bearing wall located where the code requires the brace to be located. This change adds the option of using an engineered beam to support the purlin braces to the existing requirement for bearing on a wall. It is important that this beam be properly designed to take the load imparted on it by the braces, and that the beam bear on an adequate support. The description of the beam is the same as the language used to describe the design and support for a ridge beam.

A second part of this change is to change the purlin "brace" to a purlin "support". We think "support" is a better term for a member that transfers gravity loads down from the purlin to a wall or beam.

Cost Impact: The 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 adds an option for support of purlin systems when used for rafter bracing. There should be no cost impact. If anything, providing these options could save a builder money by preventing them from having to hire a designer to design the roof framing system or use larger size lumber for rafters when there is not a bearing wall present that could be used to support a purlin system.

RB237-25

IRC: TABLE R802.5.1(1), TABLE R802.5.1(2)

Proponents: Shane Nilles, representing American Wood Council (snilles@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org)

2024 International Residential Code

Revise as follows:

TABLE R802.5.1(1) CEILING JOIST SPANS FOR COMMON LUMBER SPECIES (Uninhabitable attics without storage, live load = 10 psf, L/Δ = 240)

Portions of table not shown remain unchanged.

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 5 psf			
			2 × 4	2 × 6	2 × 8	2 × 10
			Maximum ceiling joist spans			
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
16	Southern pine	SS	11-9	18-5	24-3	Note a
	Southern pine	#1	11-3	17-8	~~23-10~~23-4	Note a
	Southern pine	#2	10-9	16-11	21-7	25-7
	Southern pine	#3	8-9	12-11	16-3	19-9
19.2	Southern -pine	SS	11-0	17-4	22-10	Note a
	Southern pine	#1	10-7	16-8	~~22-0~~21-11	Note a
	Southern pine	#2	10-2	15-7	19-8	23-5
	Southern pine	#3	8-0	11-9	14-10	18-0
24	Southern pine	SS	10-3	16-1	21-2	Note a
	Southern pine	#1	9-10	15-6	20-5	~~24-0~~23-11
	Southern pine	#2	9-3	13-11	17-7	20-11
	Southern pine	#3	7-2	10-6	13-3	16-1

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Span exceeds 26 feet in length.

TABLE R802.5.1(2) CEILING JOIST SPANS FOR COMMON LUMBER SPECIES (Uninhabitable attics with limited storage, live load = 20 psf, L/Δ = 240)

Portions of table not shown remain unchanged.

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf			
			2 × 4	2 × 6	2 × 8	2 × 10
			Maximum ceiling joist spans			
			(feet-inches)	(feet-inches)	(feet-inches)	(feet-inches)
12	Southern pine	SS	10-3	16-1	21-2	Note a
	Southern pine	#1	9-10	15-6	20-5	~~24-0~~23-11
	Southern pine	#2	9-3	13-11	17-7	20-11
	Southern pine	#3	7-2	10-6	13-3	16-1
16	Southern pine	SS	9-4	14-7	19-3	24-7
	Southern pine	#1	8-11	14-0	17-9	20-9
	Southern pine	#2	8-0	12-0	15-3	18-1
	Southern pine	#3	6-2	9-2	11-6	~~14-0~~13-11
	Spruce-pine-fir	SS	8-9	13-9	~~18-1~~18-2	23-1
	Spruce-pine-fir	#1	8-7	12-10	16-3	19-10
	Spruce-pine-fir	#2	8-7	12-10	16-3	19-10
	Spruce-pine-fir	#3	6-8	9-8	12-4	15-0

Check sources for availability of lumber in lengths greater than 20 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

a. Span exceeds 26 feet in length.

Reason: This proposal updates the span tables to be aligned with ASCE 7-22 and corrects errors in spans that could not be corrected by ICC staff using ICC's editorial process. The proposed spans align with those found in the ANSI/AWC 2024 *Wood Frame Construction Manual* (WFCM).

Cost Impact: The 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 corrects errors and updates for ceiling joist spans to align with the WFCM.

RB237-25

RB238-25

IRC: TABLE R802.5.2(1)

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

TABLE R802.5.2(1) ~~RAFTER/CEILING JOIST~~ RAFTER/RAFTER TIE HEEL JOINT CONNECTIONS[g]

		GROUND SNOW LOAD (psf)											
		20[e]			30			50			70		
RAFTER SLOPE	RAFTER TIE SPACING (inches)	Roof span (feet)											
		12	24	36	12	24	36	12	24	36	12	24	36
		Required number of 16d common nails per heel joint connection [a, b, c, d, f]											
3:12	12	3	5	8	3	6	9	5	9	13	6	12	17
	16	4	7	10	4	8	12	6	12	17	8	15	23
	19.2	4	8	12	5	10	14	7	14	21	9	18	27
	24	5	10	15	6	12	18	9	17	26	12	23	34
4:12	12	3	4	6	3	5	7	4	7	10	5	9	13
	16	3	5	8	3	6	9	5	9	13	6	12	17
	19.2	3	6	9	4	7	11	6	11	16	7	14	21
	24	4	8	11	5	9	13	7	13	19	9	17	26
5:12	12	3	3	5	3	4	6	3	6	8	4	7	11
	16	3	4	6	3	5	7	4	7	11	5	9	14
	19.2	3	5	7	3	6	9	5	9	13	6	11	17
	24	3	6	9	4	7	11	6	11	16	7	14	21
7:12	12	3	3	4	3	3	4	3	4	6	3	5	8
	16	3	3	5	3	4	5	3	5	8	4	7	10
	19.2	3	4	5	3	4	6	3	6	9	4	8	12
	24	3	5	7	3	5	8	4	8	11	5	10	15
9:12	12	3	3	3	3	3	3	3	3	5	3	4	6
	16	3	3	4	3	3	4	3	4	6	3	5	8
	19.2	3	3	4	3	4	5	3	5	7	3	6	9
	24	3	4	5	3	4	6	3	6	9	4	8	12
12:12	12	3	3	3	3	3	3	3	3	4	3	3	5
	16	3	3	3	3	3	3	3	3	5	3	4	6
	19.2	3	3	3	3	3	4	3	4	6	3	5	7
	24	3	3	4	3	3	5	3	5	7	3	6	9

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

g. Tabulated requirements are based on 10 psf roof dead load in combination with the specified roof snow load and roof live load.

f. Tabulated heel joint connection requirements assume that ceiling joists or rafter ties are located at the bottom of the attic space. Where ceiling joists or rafter ties are located higher in the attic, heel joint connection requirements shall be increased by the adjustment factors in Table 802.5.2(2).

e. Applies to roof live load of 20 psf or less.

d. Equivalent nailing patterns are required for ~~ceiling joist to ceiling joist~~ rafter tie to rafter tie lap splices.

c. Where intermediate support of the rafter is provided by vertical struts or purlins to a load-bearing wall, the tabulated heel joint connection requirements shall be permitted to be reduced proportionally to the reduction in span.

b. Heel joint connections are not required where the ridge is supported by a load-bearing wall, header or ridge beam.

a. 10d common (3″ × 0.148″) nails shall be permitted to be substituted for 16d common ($3^1/_2$″ × 0.162″) nails where the required number of nails is taken as 1.2 times the required number of 16d common nails, rounded up to the next full nail.

Reason: A ceiling joist can function as a rafter tie, but is not always a rafter tie. The fastening required in this table is for rafter ties. Whether that be rafter ties or ceiling joists acting as rafter ties. However, using the term "ceiling joist" in the title of this table is misleading and can lead to misinterpretation. Section R802.5 is specific to ceiling joists and requires they only be fastened to the top plate in accordance with the basic fastening found in Table R602.3(1). The ceiling joist does not need to be fastened to the rafter at all, if the ceiling joist is not functioning as a rafter tie, such as in these examples:

A "shed roof" type of assembly, where the rafter is directly supported at the top and no rafter thrust exists.

When the rafter is supported by a ridge BEAM, there is no rafter thrust

When a rafter tie is installed above the ceiling joists due to the ceiling joists being perpendicular to the rafters and not able to function as rafter ties.

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

Justification for no cost impact:

Clarification of terms for better interpretation of existing intent and purpose. No impact to cost of construction.

RB238-25

RB239-25

IRC: R802.10.2.1

Proponents: Greg Greenlee, SBCA, representing SBCA, Technical Director (ggreenlee@sbcacomponents.com); Jay Jones, representing Truss Plate Institute, Executive Director (jpjones@tpinst.org)

2024 International Residential Code

Delete without substitution:

~~**R802.10.2.1 Applicability limits.** The provisions of this section shall control the design of truss roof framing where snow controls for *buildings* that are not greater than 60 feet (18 288 mm) in length perpendicular to the joist, rafter or truss span, not greater than 36 feet (10 973 mm) in width parallel to the joist, rafter or truss span, not more than three *stories above grade plane* in height, and have roof slopes not smaller than 3:12 (25-percent slope) or greater than 12:12 (100-percent slope). Truss roof framing constructed in accordance with the provisions of this section shall be limited to sites subjected to a maximum design wind speed of 140 miles per hour (63 m/s), Exposure B or C, and a maximum ground snow load of 70 psf (3352 Pa). For consistent loading of all truss types, roof snow load is to be computed as: 0.7~~ $\cancel{p_g}$~~.~~

Reason: This provision was added to the 2006 version of the IRC. It allows for a reduced snow load to be used in certain defined conditions for the design of metal-plate-connected wood trusses. As written, it is not and was not intended to be a blanket statement of applicability limits for all metal plate connected wood trusses. This is clear by reading the reason statement provided in RB193-04/05 when the provision was introduced.

> *Where snow falls, how it falls and how it applies load to a structure is independent of structure type and the structural framing that is used. Although we believe following ASCE 7 is more appropriate, the truss industry respectfully requests that there is a level engineering playing field when it comes to the requirements of structural building components. In this case, the industry requests that approach taken by the code with respect to the application of snow loads on steel structures be identical to the application of snow loads on truss structures, within the identical design constraints.*
>
> *The code referenced steel rafter tables from the American Iron and Steel Institute (AISI), Standard for Cold-Formed Steel Framing. Prescriptive Method for One- and Two-family Dwellings (COFS/PM), as referenced in R301.1.1, are based upon the following design rationale per Section A2.1 of the Commentary to the 2003 CFS Prescriptive Method:*
>
> *Applied roof snow loads were calculated by multiplying the ground snow load by a 0.7 conversion factor in accordance with ASCE 7 (ASCE, 1998). No further reductions were made for special cases.*
>
> *The sloped roof snow load, Ps = Cs x Pf, where Pf is the flat roof snow load. Pf = 0.7 Ce Ct I Pg.*
>
> *Unbalanced snow loads, sliding snow loads, and snow drifts on lower roofs were not considered due to the lack of evidence for damage from unbalanced loads on homes and the lack of data to typify the statistical uncertainties associated with this load pattern on residential structures. Rain-on-snow surcharge load was also not considered in the calculations. Roof slopes in this document exceed the ½-inch per foot requirement by ASCE 7 for the added load to be considered. Therefore, roof snow load was computed as: 1.0 * 0.7 * 1.0 * 1.0 * Pg = 0.7 Pg.*

The sections of the IRC referenced for this code change were taken from the prescriptive tables for CFS rafters. Component manufacturers rely on design software to calculate snow loads using the code referenced and selected version of ASCE-7. Accordingly, in practice the provided provisions of this section are not utilized for the design of metal-plate-connected wood trusses.

The reason statement provided in RB193-04/05 suggests that the roof snow load can be calculated as 0.7*Pg and the effects of unbalanced snow load do not need to be considered, which is inconsistent with ASCE 7-22. Also, using a reduced ground snow load is inconsistent with Section R301.6 which states “The roof shall be designed for the live load indicated in Table R301.6 or the ground snow load indicated in Table R301.2, whichever is greater.”

Since the code modification was incorporated in the 2006 edition of the IRC the method by which the CFS rafter tables are calculated has changed. Table R804.3.2.1(1) in the 2024 IRC is derived from AISI S230-19, North American Standard for Cold-Formed Steel Framing—Prescriptive Method for One- and Two-Family Dwellings. The Commentary for AISI S230-19 Section F3.1 indicates that snow loads for the tables were calculated using ASCE 7-16 and unbalanced snow loads were considered.

As written, Section R802.10.2.1 is difficult to follow and has the potential to be misunderstood, applied incorrectly, or used in an unconservative manner. The provision is not utilized in the software developed by manufacturers for the design of metal-plate-connected wood trusses, so it is not of value to the industry to which it is targeted. Eliminating the provision will help reduce confusion.

Cost Impact: The 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 provision that is not utilized by component manufacturers. Eliminating this section will not have a cost impact.

RB239-25

RB240-25

IRC: R802.11

Proponents: Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com)

2024 International Residential Code

Revise as follows:

R802.11 Roof tie uplift resistance. *Roof assemblies* shall have uplift resistance in accordance with Sections R802.11.1 and R802.11.2.

Exceptions: Rafters or trusses shall be permitted to be attached to their supporting wall assemblies in accordance with Table R602.3(1) where <u>the specific gravity of the wood species used for the wall and roof framing is greater than or equal to 0.42 in accordance with AWC NDS and </u>either of the following occur:

1. Where ~~the specific gravity of the wood species used for wall framing is greater than or equal to 0.42 in accordance with AWC NDS and~~ the uplift force per rafter or truss does not exceed 200 pounds (90.8 kg) as determined by Table R802.11.
2. Where the *basic wind speed* does not exceed 115 miles per hour (51.4 m/s), the wind exposure category is B, the roof pitch is 5 units vertical in 12 units horizontal (42-percent slope) or greater, the roof span is 32 feet (9754 mm) or less, and rafters and trusses are spaced not more than 24 inches (610 mm) on center.

Reason: The purpose of this code change proposal is to relocate the requirement for wood framing to have a specific gravity greater than or equal to 0.42 from the first of the two cases to the charging paragraph. The requirement should apply to both cases, not just the first one. Both cases are just saying that the assumption is that the IRC standard roof framing fastening provides around 200 pounds of uplift resistance, assuming a minimum of SPF lumber. The first explicitly states the 200 pound value, and the second just points to the place in the table where the uplift starts to exceed 200 pounds. At the time this section was written, SPF lumber had the minimum specific gravity generally available so that was the worst case and was the basis for the 200-pound trigger. Recently, lumber with lower specific gravity has become available, and it would provide an uplift resistance of somewhat less than 200 pounds for the roof to wall connection, so the 200-pound value would not be applicable.

Cost Impact: The 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 primarily a clarification (and correction), moving the requirement for a minimum specific gravity from only one case to the charging paragraph where it would apply to both cases.

RB240-25

RB241-25

IRC: R806.5

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Residential Code

Revise as follows:

R806.5 Unvented attic and unvented enclosed rafter assemblies. Unvented *attics* and unvented enclosed roof framing assemblies created by ceilings that are applied directly to the underside of the roof framing members and structural roof sheathing applied directly to the top of the roof framing members/rafters, shall be permitted where all the following conditions are met:

1. The unvented *attic* space is completely within the *building thermal envelope*.
2. Interior Class I vapor retarders are not installed on the ceiling side (*attic* floor) of the unvented *attic* assembly or on the ceiling side of the unvented enclosed roof framing assembly.
3. Where wood shingles or shakes are used, a minimum $^{1}/_{4}$-inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing *underlayment* above the structural sheathing.
4. In *Climate Zones* 5, 6, 7 and 8, any *air-impermeable insulation* shall be a Class II vapor retarder, or shall have a Class II vapor retarder coating or covering in direct contact with the underside of the insulation.
5. Insulation shall comply with Item 5.3 and either Item 5.1 or 5.2:

    5.1. Item 5.1.1, 5.1.2, 5.1.3 or 5.1.4 shall be met, depending on the air permeability of the insulation directly under the structural roof sheathing.

    5.1.1. Where only *air-impermeable insulation* is provided, it shall be applied in direct contact with the underside of the structural roof sheathing.

    5.1.2. Where *air-permeable insulation* is installed directly below the structural sheathing, rigid board or sheet insulation shall be installed directly above the structural roof sheathing in accordance with the *R*-values in Table R806.5 for condensation control.

    5.1.3. Where both *air-impermeable* and *air-permeable insulation* are provided, the *air-impermeable insulation* shall be applied in direct contact with the underside of the structural roof sheathing in accordance with Item 5.1.1 and shall be in accordance with the *R*-values in Table R806.5 for condensation control. The *air-permeable insulation* shall be installed directly under the *air-impermeable insulation*.

    5.1.4. Alternatively, sufficient rigid board or sheet insulation shall be installed directly above the structural roof sheathing to maintain the monthly average temperature of the underside of the structural roof sheathing above 45°F (7°C). For calculation purposes, an interior air temperature of 68°F (20°C) is assumed and the exterior air temperature is assumed to be the monthly average outside air temperature of the three coldest months.

5.2. In *Climate Zones* 1, 2 and 3, air-permeable insulation installed in unvented *attics* shall meet the following requirements:

5.2.1. An *approved vapor diffusion port* shall be installed not more than 12 inches (305 mm) from the highest point of the roof, measured vertically from the highest point of the roof to the lower edge of the port.

5.2.2. The port area shall be greater than or equal to 1:150 ~~1:600~~ of the ceiling area. Where there are multiple ports in the *attic*, the sum of the port areas shall be greater than or equal to the area requirement.

5.2.3. The vapor-permeable membrane in the *vapor diffusion port* shall have a vapor permeance rating of greater than or equal to 20 perms when tested in accordance with Procedure A of ASTM E96.

5.2.4. The *vapor diffusion port* shall serve as an *air barrier* between the *attic* and the exterior of the building.

5.2.5. The *vapor diffusion port* shall protect the *attic* against the entrance of rain and snow.

5.2.6. Framing members and blocking shall not block the free flow of water vapor to the port. Not less than a 2-inch (51 mm) space shall be provided between any blocking and the roof sheathing. Air-permeable insulation shall be permitted within that space.

5.2.7. The roof slope shall be greater than or equal to 3:12 (vertical/horizontal).

5.2.8. Where only air-permeable insulation is used, it shall be installed directly below the structural roof sheathing, on top of the *attic* floor, or on top of the ceiling.

5.2.9. *Air-impermeable insulation*, where used in conjunction with air-permeable insulation, shall be directly above or below the structural roof sheathing and is not required to meet the *R*-value in Table R806.5. Where directly below the structural roof sheathing, there shall be no space between the *air-impermeable insulation* and air-permeable insulation.

5.2.10. Where air-permeable insulation is used and is installed directly below the roof structural sheathing, air shall be supplied at a flow rate greater than or equal to 50 CFM (23.6 L/s) per 1,000 square feet (93 m^2) of ceiling. The air shall be supplied from ductwork providing supply air to the occupiable space when the conditioning system is operating. Alternatively, the air shall be supplied by a supply fan when the conditioning system is operating.

Exceptions:

1. Where both air-impermeable and air-permeable insulation are used, and the *R*-value in Table 806.5 is met, air supply to the *attic* is not required.
2. Where only air-permeable insulation is used and is installed on top of the *attic* floor, or on top of the ceiling, air supply to the *attic* is not required.

5.3. Where preformed insulation board is used as the *air-impermeable insulation* layer, it shall be sealed at the perimeter of each individual sheet interior surface to form a continuous layer.

Reason: An error in the ratio of vapor diffusion port area to ceiling area was made when the vapor diffusion port provisions were originally added to the 2021 IBC (G119-18) and the 2018 IRC (RB327-16). That error was corrected by the original proponents in the 2024 IBC (G160-21), but has not been corrected in the IRC. This proposal makes that correction. The original proponent's reason statement from G160-21 when this was corrected in the IBC indicated, "I got it wrong in my original proposal. There was an error in converting the measurements. The original work was based on 1:300 and the intention was to double the vent area. Doubling the vent area is really 1:150 not 1:600."

Cost Impact: The 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 corrects an error in the code. No change in cost of construction should occur.

RB241-25

RB242-25

IRC: R807.1

Proponents: Allen Burris, Clark County Nevada, representing Southern Nevada Chapter (allen.burris@clarkcountynv.gov); Jeffrey Grove, representing Southern Nevada ICC Chapter (jeff.grove@coffman.com)

2024 International Residential Code

Revise as follows:

R807.1 Attic access. Buildings with attics shall have an access opening to attic areas that have a vertical height of 30 inches (762 mm) or greater over an area of not less than 30 square feet (2.8 m^2). The vertical height shall be measured from the top of the ceiling framing members to the underside of the roof framing members.

The rough-framed opening shall be not less than 22 inches by 30 inches (559 mm by 762 mm) and shall be located in a hallway or other location with *ready access*. Where located in a wall, the opening shall be not less than 22 inches wide by 30 inches high (559 mm wide by 762 mm high). Where the access is located in a ceiling, unobstructed headroom in the attic space above the access shall be not less than 30 inches (762 mm) along one side or more measured vertically from the bottom of ceiling framing members. See Section M1305.1.2 for access requirements where mechanical *equipment* is located in *attics*.

Exception: Access openings are not required for attic spaces that do not have plumbing, mechanical, or electrical components that require access for periodic maintenance.

Reason: The proposed exception in this section is to clarify that when a structure has non-contiguous attic spaces and no equipment that would require periodic maintenance, access openings are not required. This proposal would also address large porch, patio, or other outdoor living spaces that may require access per the current language due to the size of the attic area.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

$200 per access

Estimated Immediate Cost Impact Justification (methodology and variables):

The current code requires accesses that serve no purpose. Depending on the house design, this could lead to several attic accesses that would need to be installed. The cost would increase exponentially if the accesses needed to be decorative or disguised.

RB242-25

RB243-25

IRC: R807.1

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

R807.1 Attic access. ~~Buildings with attics shall have an access opening to~~ attic areas with ~~that have~~ a vertical height of 30 inches (762 mm) or greater over an area of ~~not less than~~ 30 square feet (2.8 m^2) or greater shall have an access opening. The vertical height shall be measured from the top of the ceiling framing members to the underside of the roof framing members. Where the access is located in a ceiling, unobstructed headroom in the attic space above the access shall be not less than 30 inches (762 mm) along one side or more measured vertically from the bottom of ceiling framing members. Where located in a ceiling, the ~~The~~ rough-framed opening shall be not less than 22 inches by 30 inches (559 mm by 762 mm) and shall be located in a hallway or other location with *ready access*. Where located in a wall, the opening shall be not less than 22 inches wide by 30 inches high (559 mm wide by 762 mm high). ~~Where the access is located in a ceiling, unobstructed headroom in the attic space above the access shall be not less than 30 inches (762 mm) along one side or more measured vertically from the bottom of ceiling framing members.~~ ~~See Section M1305.1.2 for access requirements where~~ Where mechanical *equipment* is located in *attics,* the access shall comply with Section M1305.1.2.

Reason: This proposal aims only to simplify the language with no change in the intent.

Prior to the 2015 IRC this section referred to the size of attics as "exceeding 30 square feet". Proposal RB407 - 13, changed the language to the current "area of not less than 30 square feet", but that wasn't the significant reason for the overall change. I think it would be clearer to simply refer to the area as "Areas that have a vertical height of 30 inches or greater over an area of 30 square feet or greater.".

Currently this section discusses the height of the attic for when an opening is required, then the size of the ceiling opening, then the size of the wall opening, then back to the height of the attic over the ceiling opening. The last part seems out of place, so I suggest moving it up in the text.

The phrase "See Section ###" is not commonly used in the body of the IRC. "in accordance with" and "shall comply with" are the significantly common phrases. I believe "shall comply with" is more common when referencing other IRC sections.

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

Justification for no cost impact:

This code proposal only clarifies the current intent. There is no impact to the cost of construction.

RB243-25

RB244-25

IRC: R902.1

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2024 International Residential Code

Revise as follows:

R902.1 Roof assemblies. Roof decks shall be covered with materials as set forth in Section R904 and with the applicable provisions for ~~or with~~ roof coverings as set forth in Section R905. Class A, B or C roof assemblies shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the roof deck is less than 3 feet (914 mm) from a *lot line*. Where Class A, B or C roof assemblies are required, they shall be tested in accordance with ASTM E108 or UL 790. Where required, the roof assembly shall be listed and identified as to class by an approved testing agency.

Exceptions:

1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible roof decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot (4.882 kg/m^2) copper sheets installed over combustible roof decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible roof decks.

Reason: The prior cycle included changes to Section R902.1 brought forward via RB251-22 and RB252-22, which were combined to create the 2024 IRC language. As was pointed out by Aaron Phillips, of ARMA, unfortunately, a minor detail was missed, resulting in the change of "and" to "or," which is technically incorrect without further clarification. Provisions of both Sections R904 and R905 are intended to apply, as applicable. Section R904 deals with the materials in roof assemblies and Section R905 deals with the roof coverings.

Looking at section R904.1, it is clear that only the "applicable provisions" of R905 apply. Sections R904.1 and R905.1 are being shown for reference.This proposal addresses the issue.

SECTIONR904 MATERIALS

R904.1 Scope. The requirements set forth in this section shall apply to the application of roof covering materials specified herein. *Roof assemblies* shall be applied in accordance with this chapter and the manufacturer's installation instructions. Installation of *roof assemblies* shall comply with the applicable provisions of Section R905.

SECTIONR905 REQUIREMENTS FOR ROOF COVERINGS

R905.1 Roof covering application. *Roof coverings* shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions. Unless otherwise specified in this section, *roof coverings* shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(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:

clarification

RB244-25

RB245-25

IRC: R902.1

Proponents: Aaron Phillips, representing Asphalt Roofing Manufacturers Association (aphillips@asphaltroofing.org)

2024 International Residential Code

Revise as follows:

R902.1 Roof assemblies. Roof decks shall be covered with materials as set forth in Section R904 and ~~or~~ with roof coverings as set forth in Section R905. Class A, B or C roof assemblies shall be installed in *jurisdictions* designated by law as requiring their use or where the edge of the roof deck is less than 3 feet (914 mm) from a *lot line*. Where Class A, B or C roof assemblies are required, they shall be tested in accordance with ASTM E108 or UL 790. Where required, the roof assembly shall be listed and identified as to class by an approved testing agency.

Exceptions:

4. Class A *roof assemblies* include slate installed over *underlayment* over combustible roof decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot (4.882 kg/m^2) copper sheets installed over combustible roof decks.
2. Class A *roof assemblies* include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile, or slate installed on noncombustible roof decks.
1. Class A *roof assemblies* include those with coverings of brick, masonry and exposed concrete *roof deck*.

Reason: The prior cycle included changes to Section R902.1 brought forward via RB251-22 and RB252-22, which were combined to create the 2024 IRC language. Unfortunately, a minor detail was missed, resulting in the change of "and" to "or," which is technically incorrect. The provisions of Section R904 apply in all situations. That is, materials shall be compatible with each other and the building or structure to which they are applied (R904.2), they shall conform to the applicable standards (R904.3), and they shall be identified (R904.4). Application of roof coverings is in accordance with R905, the first section of which points out that only applicable provisions of the section apply. Both R904 and R905 contains provisions which must be satisfied. Therefore, the correct conjunction in this situation is "and".

Cost Impact: The 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 corrects an error made in the previous code cycle. No change in cost of construction relative to historical precedent will occur.

RB245-25

RB246-25

IRC: R902.2

Proponents: Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

2024 International Residential Code

Revise as follows:

R902.2 *Fire-retardant-treated <u>wood</u>* shingles and shakes. *Fire-retardant-treated wood* ~~shakes and~~ shingles<u> and shakes</u> shall be treated by impregnation with chemicals by the full-cell vacuum-pressure process, in accordance with AWPA C1. Each bundle shall be marked to identify the manufactured unit and the manufacturer, and shall be *labeled* to identify the classification of the material in accordance with the testing required in Section R902.1, the treating company and an *approved* agency.

Reason: Purely editorial. The most common way to designate these products is as "fire-retardant-treated wood shingles and shakes". This proposal simply uses those words both in the title and in the requirements. No change in requirements.

See below language in the IBC and the IWUIC, although some cleanup would be needed there too.

IBC: [BF] 1505.6 Fire-retardant-treated wood shingles and shakes. *Fire-retardant-treated wood* shakes and shingles shall be treated by impregnation with chemicals by the full-cell vacuum-pressure process, in accordance with AWPA C1. Each bundle shall be marked to identify the manufactured unit and the manufacturer, and shall be *labeled* to identify the classification of the material in accordance with the testing required in Section 1505.1, the treating company and the quality control agency.

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

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

Justification for no cost impact:

Change in the order of words.

RB246-25

RB247-25

IRC: R902.3

Proponents: Larry Sherwood, Sustainable Energy Action Committee, representing IREC (larry@irecusa.org); Dara Yung, representing California Solar & Storage Association (CALSSA) (dara@calssa.org); Joseph H. Cain, P.E., representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Philip Oakes, representing NASFM (phil@browning.red)

2024 International Residential Code

Revise as follows:

R902.3 Building-integrated photovoltaic (BIPV) systems. *Building-integrated photovoltaic* (BIPV) *systems* installed as the *roof covering* shall be tested, *listed* and *labeled* for fire classification in accordance with UL 7103. Class A, B or C BIPV ~~products~~ systems shall be installed in jurisdictions designated by law as requiring their use or where the edge of the roof is less than 3 feet (914 mm) from a *lot line*.

Reason: Just like any other roofing systems and for rooftop mounted PV panel systems, BIPV roofing systems that have a fire classification should be required to be installed where required by law. The current requirement only applies to when the edge of the roof is less than 3 feet from a lot line.

This proposal was prepared by the Sustainable Energy Action Committee (SEAC), a forum for all stakeholders (including, but not limited to, AHJs, designers, engineers, contractors, first responders, manufacturers, suppliers, utilities, and testing labs) to collaboratively identify and find solutions for issues that affect the installation and use of solar energy systems, energy storage systems, demand response, and energy efficiency. The purpose is to facilitate the deployment and use of affordable, clean and renewable energy in a safe, efficient, and sustainable manner.
All recommendations from SEAC are approved by diverse stakeholders through a consensus process. For more information, please visit www.sustainableenergyaction.org

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

Justification for no cost impact:

This proposal clarifies what the local laws already require.

RB247-25

RB248-25

IRC: R903.2

Proponents: Mark S. Graham, representing National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2024 International Residential Code

Revise as follows:

R903.2 Flashing. Flashings shall be designed in accordance with this code and installed in accordance with the *roof covering* manufacturer's *approved* instructions in a manner that prevents moisture from entering the wall and roof through joints in copings, through moisture permeable materials and at intersections with parapet walls and other penetrations through the roof plane.

Reason: This proposed code change is intended to clarify the code's requirements regarding to roofing-related flashings by making it clear roofing-reated flashing design and installation need to be according to the roof covering manufacturer's instructions. The previous section, Section R903.1, already provides a similar requirement for the roof covering itself. Since roofing-related flashings are integral to, but not necessarily always considered a part of the roof covering ("roof covering" is specifically defined in Section 202), this added clarification is appropriate.

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

Justification for no cost impact:

This proposed change is clarifying in nature and will not increase or decrese the cost of construction.

RB248-25

RB249-25

IRC: R903.5 (New)

Proponents: Mark S. Graham, representing National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2024 International Residential Code

Add new text as follows:

R903.5 Attic and rafter ventilation. Intake and exhaust vents for ventilation of *attic* and enclosed rafter assemblies shall be provided in accordance with Sections R806 and the vent product manufacturer's installation instructions.

Exception: Unvented *attic* and unvented enclosed rafter assemblies in accordance with Section R806.5.

Reason: This code change proposal is intended to add clarity to the code by providing a new pointer in Chapter 9-Roof Assemblies to the IRC's requirements in Chapter 8-Roof-Ceiling Construction for attic ventilation and ventilation of enclosed rafter spaces formed where ceilings are applied directly to the underside of roof rafters. The exception provides a direct pointer to the code's provisions for unvented attics and unvented enclosed roof framing assemblies created by ceilings that are applied directly to the underside of the roof framing.

This proposal will not have an impact on the stringency of the IRC.

Language similar to what is proposed here is already provided in IBC Chapter 15-Roof Assemblies and Rooftop Structures, Section 1503.4-Attic and Rafter Ventilation.

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

Justification for no cost impact:

This code change proposal is editorial in nature and will not increase or decrease the cost of construction.

RB249-25

RB250-25

IRC: TABLE R905.1.1(1)

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

2024 International Residential Code

Revise as follows:

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257 ASTM D6757
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D1970 ASTM D2626 ASTM D6380 Class M ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D8257
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Wood shakes on solid sheathing	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Metal panels on solid sheathing	R905.10	ASTM D226 Type I or II ASTM D4869 Type I, II III or IV	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
BIPV roof coverings	R905.15	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257 ASTM D6757

For SI: 1 mile per hour = 0.447 m/s.

Reason: This code change proposal adds an additional underlayment material for use in areas where wind design is required. Underlayment complying with ASTM D6757 has long been permitted for asphalt shingle roof coverings in the International Codes and is currently permitted to be used in areas where wind design is not required in the IRC. In the 2021 IRC, the underlayment requirements for areas requiring wind design were updated to be consistent with the IBHS Fortified Home requirements for a sealed roof deck (SRD). At the time, Fortified did not specifically permit the use of underlayment complying with ASTM D6757 for a SRD. Since then, Fortified has been updated and now specifically permits the use of underlayment complying with ASTM D6757 to create a SRD. Support of this proposal will align the underlayment requirements in areas requiring wind design in the IRC with the IBHS Fortified SRD and add an additional underlayment option to be used in these areas.

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

Justification for no cost impact:

This proposal adds an additional underlayment material for use in areas where wind design is required.

RB250-25

RB251-25

IRC: TABLE R905.1.1(1), TABLE R905.1.1(2), TABLE R905.1.1(3), R905.16.3.1, R905.16.4

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

2024 International Residential Code

Revise as follows:

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D1970 ASTM D2626 ASTM D6380 Class M ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D8257
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Wood shakes on solid sheathing	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Metal panels on solid sheathing	R905.10	ASTM D226 Type I or II ASTM D4869 Type I, II III or IV	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
BIPV roof coverings	R905.15 R905.16	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full-width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full-width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4-inch-wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4-inch- wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering.
Clay and concrete tile	R905.3	Underlayment shall be one of the following: 1. For roof slopes from $2^{1}/_{2}$ units vertical in 12 units horizontal ($2^{1}/_{2}$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full-width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortionsin the underlayment shall not interferewith the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4-inch-wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering.
Metal roof shingles	R905.4	Apply in accordance with the manufacturer's installation instructions.	Underlayment shall be be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4-inch-wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
BIPV roof coverings	R905.15 R905.16	Underlayment shall be one of the following: 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering.	Underlayment shall be one of the following: 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 2. A minimum 4-inch-wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide membrane strips. 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	Mechnically fastened underlayment shall be fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturers' installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3		
BIPV roof covering	R905.15 R905.16		
Metal roof shingles	R905.4	Manufacturer's installation instructions.	Mechnically fastened underlayment shall be fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^{3}/_{4}$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturers' installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. **Exception:** Self-adhering polymer modified bitumen underlayment shall not be installed under wood shakes or wood shingles.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

Delete without substitution:

~~**R905.16.3.1 Ice barrier.** Where required, an ice barrier shall comply with Section R905.1.2.~~

Revise as follows:

R905.16.4 Ice barrier. Where required, ice barriers shall comply with Section R905.1.2. ~~In areas where there has been a history of ice forming along the eaves causing a backup of water, as designated in Table R301.2, an ice barrier that consists of not less than two layers of *underlayment* cemented together or of a self-adhering polymer-modified bitumen sheet shall be used in lieu of normal *underlayment* and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the *building*.~~

~~**Exception:** Detached *accessory structures* that do not contain *conditioned floor area*.~~

Reason: This code change is simply a cleanup. It adds the appropriate section reference in the underlayment tables for BIPV roof panels that is currently missing. Additionally, it cleans up the multiple sections addressing ice barriers. There are no technical changes in this proposal.

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

Justification for no cost impact:

This proposal is editorial.

RB251-25

RB252-25

IRC: TABLE R905.1.1(1), TABLE R905.1.1(2), TABLE R905.1.1(3)

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

2024 International Residential Code

Revise as follows:

TABLE R905.1.1(1) UNDERLAYMENT TYPES

ROOF COVERING	SECTION	AREAS OUTSIDE HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~	AREAS WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~
Asphalt shingles	R905.2	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Clay and concrete tile	R905.3	ASTM D226 Type II ASTM D1970 ASTM D2626 ASTM D6380 Class M ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D8257
Metal roof shingles	R905.4	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Mineral-surfaced roll roofing	R905.5	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Slate and slate-type shingles	R905.6	ASTM D226 Type I ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
Wood shingles	R905.7	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Wood shakes on solid sheathing	R905.8	ASTM D226 Type I or II ASTM D4869 Type I, II, III or IV	ASTM D226 Type II ASTM D4869 Type III or IV
Metal panels on solid sheathing	R905.10	ASTM D226 Type I or II ASTM D4869 Type I, II III or IV	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257
BIPV roof coverings	R905.15	ASTM D226 Type I or II ASTM D1970 ASTM D4869 Type I, II, III or IV ASTM D6757 ASTM D8257	ASTM D226 Type II ASTM D1970 ASTM D4869 Type III or IV ASTM D8257

For SI: 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(2) UNDERLAYMENT APPLICATION

ROOF COVERING	SECTION	AREAS OUTSIDE HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~	AREAS WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~

ROOF COVERING	SECTION	AREAS OUTSIDE HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~	AREAS WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~
Asphalt shingles	R905.2	Underlayment shall be one of the following: 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full-width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be one of the following: 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. 2. A minimum 4-inch-wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4-inch- wide membrane strips. 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full-width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Clay and concrete tile	R905.3	Underlayment shall be one of the following: 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet. 1. For roof slopes from $2^1/_2$ units vertical in 12 units horizontal ($2^1/_2$:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full-width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be one of the following: 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. 2. A minimum 4-inch-wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide membrane strips. 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment felt that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortionsin the underlayment shall not interferewith the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.
Metal roof shingles	R905.4		Underlayment shall be be one of the following: 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. 2. A minimum 4-inch-wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide membrane strips. 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10	Apply in accordance with the manufacturer's installation instructions.	

ROOF COVERING	SECTION	AREAS OUTSIDE HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~	AREAS WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~
BIPV roof coverings	R905.15	Underlayment shall be one of the following: 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. 2. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be one layer applied in the following manner: underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet. 1. For roof slopes from 2 units vertical in 12 units horizontal (2:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be two layers applied in the following manner: apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.	Underlayment shall be one of the following: 3. A single layer of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the underlayment and roof covering manufacturer's installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. 2. A minimum 4-inch-wide strip of self-adhering polymer modified bitumen underlayment complying with ASTM D1970, installed in accordance with the manufacturer's installation instructions for the deck material, shall be applied over all joints in the roof decking. An approved underlayment complying with Table R905.1.1(1) for the applicable roof covering shall be applied over the entire roof over the 4-inch-wide membrane strips. 1. Two layers of mechanically fastened underlayment applied in the following manner: Apply a strip of underlayment that is half the width of a full sheet parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply full width sheets of underlayment, overlapping successive sheets half the width of a full sheet plus 2 inches. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be 4 inches and shall be offset by 6 feet.

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

TABLE R905.1.1(3) UNDERLAYMENT ATTACHMENT

ROOF COVERING	SECTION	AREAS OUTSIDE HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~	AREAS WITHIN HURRICANE-PRONE REGIONS ~~WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1~~
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	Mechnically fastened underlayment shall be fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturers' installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3		
BIPV roof covering	R905.15		
Metal roof shingles	R905.4	Manufacturer's installation instructions.	Mechnically fastened underlayment shall be fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturers' installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. **Exception:** Self-adhering polymer modified bitumen underlayment shall not be installed under wood shakes or wood shingles.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

Attached Files

- **Reroof SRD Cost Impact.pdf**
  https://www.cdpaccess.com/proposal/10963/34923/files/download/9050/
- **New Roof SRD Cost Impact.pdf**
  https://www.cdpaccess.com/proposal/10963/34923/files/download/9049/
- **ICWE14_ID02149.pdf**
  https://www.cdpaccess.com/proposal/10963/34923/files/download/9017/
- **Auburn_Home Innovation_WindstormDamageDataset.pdf**
  https://www.cdpaccess.com/proposal/10963/34923/files/download/9016/

Reason: This proposal expands the requirements for improved roof covering underlayment from the Wind Design Required Region to the Hurricane-prone Region. This effectively expands the secondary roof underlayment strategies recommended by the IBHS Fortified Home - Hurricane program (sealed roof deck) from areas where the design wind speed is 130 mph and greater to areas where the design wind speed is 115 mph and greater.

Damage due to water intrusion continues to be a significant problem for buildings impacted by hurricanes. Water entry can occur where it is able to infiltrate through the roof, walls, vents, windows, and/or doors, or at interfaces between these items. The roof deck, where the roof covering is lost or damaged, is particularly susceptible. Water intrusion can cause extensive damage to interior finishes, furnishings, and other contents, and can lead to ceiling collapse when attic insulation is saturated. When power is lost and/or a building cannot otherwise be dried out within 24–48 hours, additional issues such as mold can develop, potentially extending the period during which the property may not be available for use.

Tests performed by IBHS at the Research Center have consistently shown that a sealed roof deck as recommended by the IBHS Fortified Home - Hurricane program consistently show significantly reduced water intrusion rates when one of these strategies was employed. A summary of the results of the demonstration can be viewed at the following link:

http://ibhstest.wpengine.com/ibhsnews- releases/ibhs-hurricane-demonstration-illustrates-importance-of-sealed-roof-deck-3/.

The wind driven rain demonstration can be viewed at the following link:

https://disastersafety.org/thunderstorms/winddriven-rain-demo/.

These underlayment strategies required reduce water entry into the attic space by 70% or more.

This expansion is being proposed primarily for 2 reasons. The adoption of ASCE 7-22 in the 2024 IRC resulted in numerous changes to the wind design requirements including changes to the wind speed maps. While some wind speeds in the hurricane-prone region are increasing, notably, the 130 mph contour, which is the Wind Design Required Region trigger in the Hurricane-prone Region, is being reduced in many areas near the Gulf coast and North Atlantic coast. The following figures overlays the ASCE 7-22 design wind speeds for Risk Category II over the ASCE 7-16 design wind speeds for Risk Category II near the Gulf and Atlantic coasts. The areas shaded in blue indicate where the 130 mph contour has shifted more towards the coast effectively reducing wind speeds in these areas. As shown, the North Atlantic coast has been completely removed from the Wind Design Required Region. Without this proposed expansion, these areas would non longer be required to use the improved underlayment strategies.

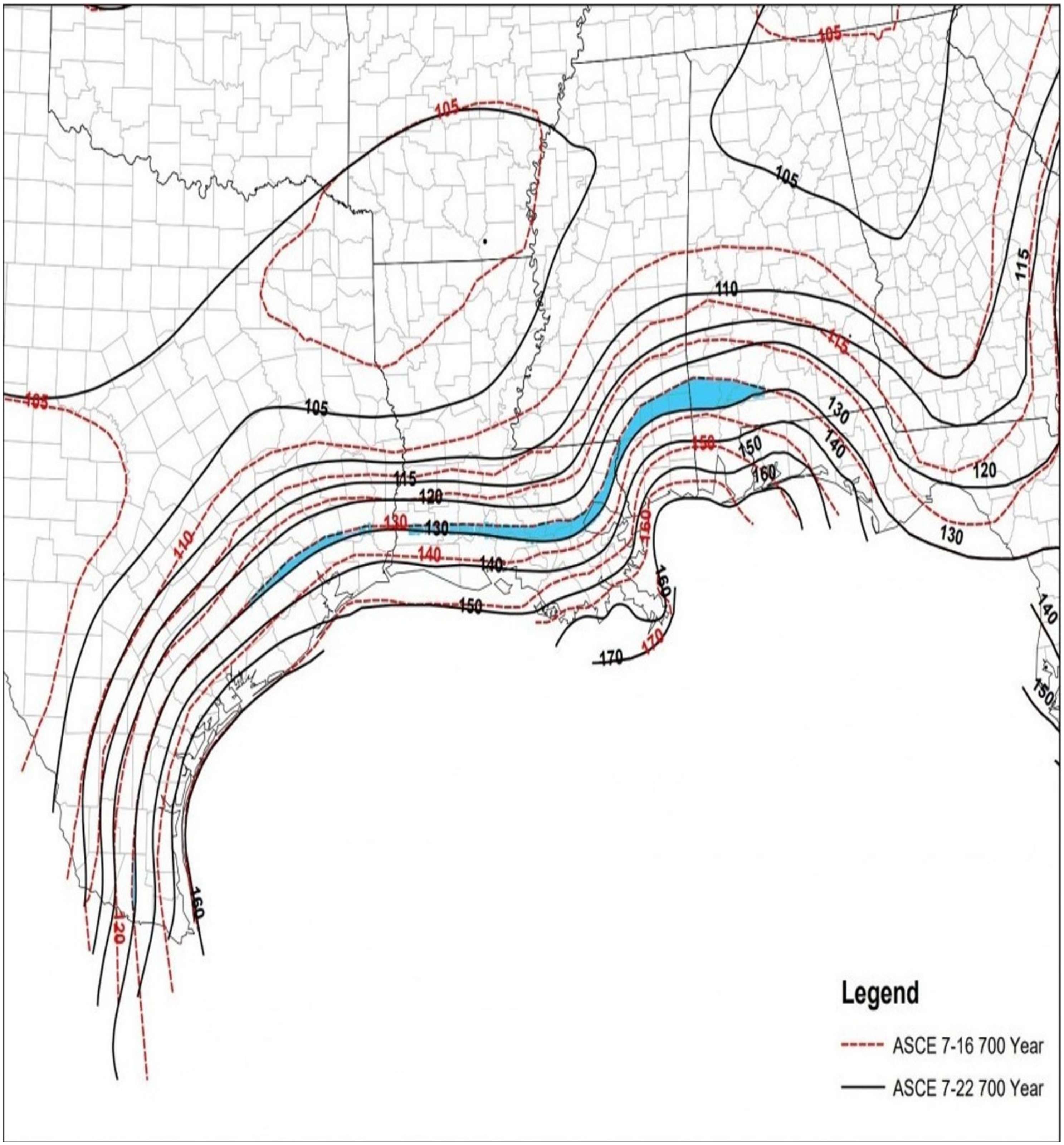


Figure 1
Loss of Wind Design Required Region in the Gulf Region Due to ASCE 7-22 Wind Speed Updates

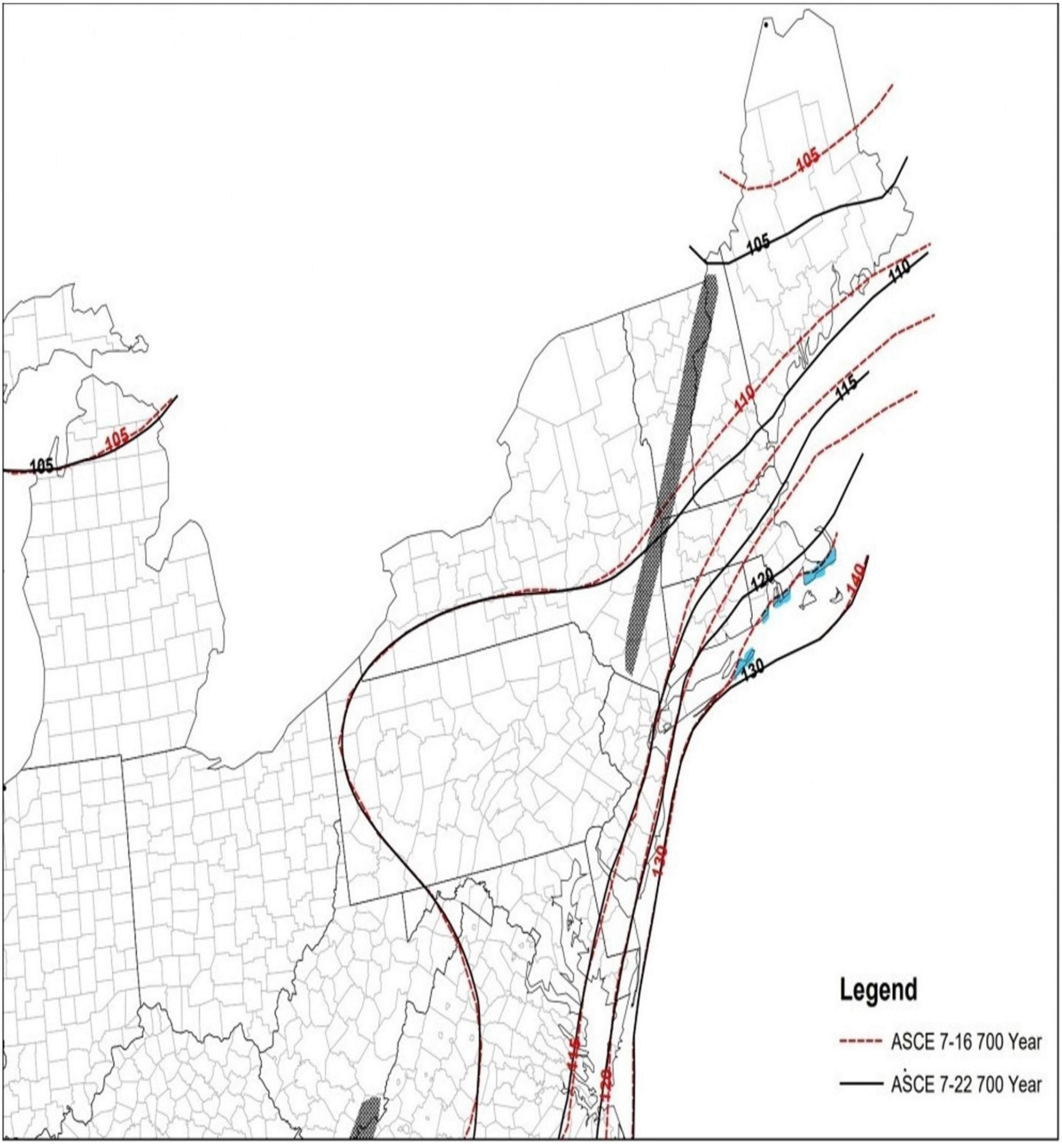


Figure 2
Loss of Wind Design Required Region in the North Atlantic Region Due to ASCE 7-22 Wind Speed Updates

Additionally, a recent report published by David Roueche with Auburn University for Home Innovation Research Labs shows that roof covering damage is by far the most common cladding damage and that even at lower wind speeds roof covering damage is frequently observed. The full report is attached to this proposal. The report is a curation of the windstorm building performance dataset collected by the StEER (Structural Extreme Events Reconnaissance) network. The dataset quantifies common wind damage patterns from recent windstorms. The following windstorm events were included in the dataset:

Joplin Tornado
Garland Tornado
Hurricane Harvey
Hurricane Irma
Hurricane Michael
Nashville/Cookeville Tornadoes
Hurricane Laura

When stratified by hazard intensity, the data shows for wind speeds between 116 mph and 140 mph the frequency of roof covering damage is near 80%. Even for wind speeds between 91 mph and 115 mph the frequency of roof covering damage is near 70%.

The report notes that "considering all hazard intensities and years of construction, 26-50% of the roof cover on a single-family home is typically damaged in an extreme windstorm."

It should also be noted that the 7th Edition (2020) and the 8th Edition (2023) Florida Building Code adopted these underlayment strategies for the entire state. For Risk Category II buildings, design wind speeds in the state of Florida range from approximately 115 mph to 180 mph.
Installing a sealed roof deck is the most cost effective method for reducing water intrusion through the roof deck where the primary roof covering has been damaged or lost.

Bibliography: Brown, T.M., Quarles, S.L., Giammanco, I.M., Brown, R., Insurance Institute for Business and Home Safety, "Building Vulnerability to Wind-Driven Rain Entry and Effectiveness of Mitigation Techniques." 14th International Conference on Wind Engineering (ICWE).

Roueche, D.B., Nakayama, J., Department of Civil Engineering, Auburn University Ginn Colege of Engineering, "Quantification of Common Wind Damage Patterns in Recent Windstorms." May 202

Cost Impact: Increase

Estimated Immediate Cost Impact:

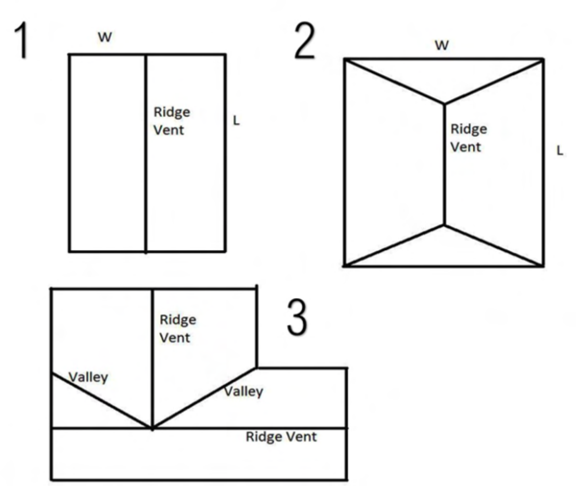
For our cost impact estimates, we used Xactimate which is a construction cost estimating software program. Select markets that would be affected by this code change were analyzed in all the hurricane-prone states.

Two sealed roof deck options were analyzed –

Option 1: Installing 4-inch-wide strips of self-adhering polymer modified bitumen over all joints in the roof deck and covering the strips with a 30# (ASTM D226 Type II, ASTM D4869 Type III or IV) felt underlayment and fastened as specified in the code.

Option 2: Installing a self-adhering polymer modified bitumen underlayment over the entire roof deck.

Three roof configurations were analyzed – 3 gable, 2 gable, and hip. Additionally, we estimated the cost impacts for large roofs (2800 square feet to 3016 square feet) and small roofs (1575 square feet to 1696 square feet). Estimated costs were developed for an asphalt shingle roof.



A copy of the Xactimate report for this analysis is attached to this code change.

The cost for either option varies according to the markets analyzed but are within close ranges.

Option 1 – (taped joints with 30# underlayment over the taped joints)

For large roofs the increased cost for Option 1 ranges from a low of $917.32 in Dothan, AL to a high of $1714.83 on Long Island, NY. For new construction, these costs represent increases of 9.5% and 9.1% respectively of the total cost of the roof (roof covering, underlayment, ventilation components, etc). For reroofing, these costs represent increases of 8.1% and 7.6% respectively of the total cost of the reroofing job.

For small roofs the increased cost for Option 1 ranges from a low of $512.29 in Dothan, AL to a high of $959.66 on Long Island, NY. For new construction, these costs represent increases of 8.9% and 8.3% respectively of the total cost of the roof (roof covering, underlayment, ventilation components, etc). For reroofing, these costs represent increases of 7.6% and 7.6% respectively of the total cost of the reroofing job.

Option 2 – (self-adhering polymer modified bitumen underlayment over the entire roof deck)

For large roofs the increased cost for Option 2 ranges from a low of $1428.39 in Florence, SC to a high of $1909.49 in Stamford, CT. For new construction, these costs represent increases of 13.4% and 10.4% respectively of the total cost of the roof (roof covering, underlayment, ventilation components, etc). For reroofing, these costs represent increases of 11.5% and 8.9% of the total cost of the reroofing job.

For small roofs the increased cost for Option 2 ranges from a low of $793.41 in Dover, DE to a high of $1065.74 in Stamford, CT. For new construction, these costs represent increases of 9.3% and 9.5% respectively of the total cost of the roof (roof covering, underlayment, ventilation components, etc). For reroofing, these costs represent increases of 8.2% and 8.2% respectively of the total cost of the reroofing job.

Estimated Immediate Cost Impact Justification (methodology and variables):

Xactimate, which is a construction cost estimating software program, was used to analyze the cost impacts of this proposal.

RB252-25

RB253-25

IRC: TABLE R905.1.1(3)

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

2024 International Residential Code

Revise as follows:

TABLE R905.1.1(3) UNDERLAYMENT ATTACHMENT

Portions of table not shown remain unchanged.

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	Fastened sufficiently to hold in place	Mechnically fastened underlayment shall be fastened at 6 inches on center 3 inches from the eave and 6 inches on center at all side and end laps. ~~with corrosion-resistant fasteners~~ Underlayment shall be fastened in a grid pattern of not greater than 12 inches on center horizontally and vertically between side laps ~~with a 6-inch spacing at side and end laps~~. Underlayment shall be attached using corrosion-resistant annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturers' installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3		
BIPV roof covering	R905.15		
Metal roof shingles	R905.4	Manufacturer’s installation instructions.	Mechnically fastened underlayment shall be fastened at 6 inches on center 3 inches from the eave and 6 inches on center at all side and end laps. ~~with corrosion-resistant fasteners~~ Underlayment shall be fastened in a grid pattern of not greater than 12 inches on center horizontally and vertically between side laps ~~with a 6-inch spacing at side and end laps~~. Underlayment shall be attached using corrosion-resistant annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturers' installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. **Exception:** Self-adhering polymer modified bitumen underlayment shall not be installed under wood shakes or wood shingles.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

Reason: This code change proposal intends to clarify fastening requirements for underlayment at eave locations in areas prone to high winds and hurricanes. The code currently requires corrosion-resistant fasteners in a grid pattern no greater than 12 inches horizontally and vertically, with a 6-inch spacing at side and end laps. However, it does not specifically state how to properly fasten the underlayment at the eave edge, where wind pressures can be significantly higher than on the roof field.

The roof underlayment methods required in high wind areas (V ≥ 130 mph in hurricane-prone regions, and V ≥ 140 mph outside hurricane-prone regions) are intended to provide a secondary barrier against water infiltration through the roof deck if the primary roofing material fails. Given its importance, properly securing underlayment is vital to this function For many roof configurations, wind pressures are highest along the eave edge, particularly the eave edge corners, due to the wind’s interaction with the roof structure.

Considering that underlayment is installed shingle fashion, inadequate fastening at the edge can lead to underlayment failure at the eave during high-wind events, potentially causing a cascading failure across other rows of underlayment and compromise the entire underlayment system. This proposal addresses this vulnerability by specifically requiring the first course of underlayment to be fastened at 6 inches on center 3 inches from the eave edge.

Cost Impact: The 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 primarily a clarification and is not expected to add any meaningful cost to construction.

RB254-25

IRC: TABLE R905.1.1(3)

Proponents: Mark S. Graham, representing National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2024 International Residential Code

Revise as follows:

TABLE R905.1.1(3) UNDERLAYMENT ATTACHMENT

Portions of table not shown remain unchanged.

ROOF COVERING	SECTION	AREAS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1	AREAS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1
Asphalt shingles	R905.2	~~Fastened sufficiently to hold in place~~ Apply in accordance with the manufacturer's installation instructions.	Mechnically fastened underlayment shall be fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturers' installation instructions for the deck material, roof ventilation configuration, and climate exposure of the roof covering.
Clay and concrete tile	R905.3		
BIPV roof covering	R905.15		
Metal roof shingles	R905.4	~~Manufacturer's installation instructions~~. Apply in accordance with the manufacturer's installation instructions.	Mechnically fastened underlayment shall be fastened with corrosion-resistant fasteners in a grid pattern of 12 inches between side laps with a 6-inch spacing at side and end laps. Underlayment shall be attached using annular ring or deformed shank nails with 1-inch-diameter metal or plastic caps. Metal caps shall have a thickness of not less than 32-gage sheet metal. Power-driven metal caps shall have a minimum thickness of 0.010 inch. Minimum thickness of the outside edge of plastic caps shall be 0.035 inch. The cap nail shank shall be not less than 0.083 inch. The cap nail shank shall have a length sufficient to penetrate through the roof sheathing or not less than $^3/_4$ inch into the roof sheathing. Self-adhering polymer modified bitumen underlayment shall be installed in accordance with the underlayment and roof covering manufacturers' installation instructions for the deck material, roof ventilation configuration and climate exposure of the roof covering. **Exception:** Self-adhering polymer modified bitumen underlayment shall not be installed under wood shakes or wood shingles.
Mineral-surfaced roll roofing	R905.5		
Slate and slate-type shingles	R905.6		
Wood shingles	R905.7		
Wood shakes	R905.8		
Metal panels	R905.10		

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

Reason: This code change proposal is intended to add clarity to the code by consistently addressing underlayment attachment where conventional underlayment attchment applies--that is, areas where wind design is not required. Section R905.1 already requires installation in accordance with the manufacturer's instalaltion instructions. The current notations in Table R905.1.1(3)-Underlayment Attachment differ from that slightly. These are made consistent with this code change proposal.

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

Justification for no cost impact:

The code change proposal is clarifying in nature and does not change the code's technical requirements or stringency. As a result, there is no increase or decrease in the cost of construction.

RB254-25

RB255-25

IRC: R905.1.1.1 (New)

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

2024 International Residential Code

Add new text as follows:

R905.1.1.1 Underlayment installation at hips and ridges. *Underlayment* shall lap over hips and ridges a minimum of 6 inches.

Exception: Hips and ridges where ventilation openings in accordance with Section R806 are provided.

Reason: This proposal seeks to provide an additional level of water intrusion protection for minimal effort in the event part of the roof covering is blown off. If approved, this proposal will align the code with IBHS's FORTIFIED Roof™ designation regarding underlayment application at hips and ridges. The FORTIFIED Home™ program was developed to reduce avoidable suffering and financial loss caused by hurricanes, high winds, and hail. The program requirements provide a systems-based, multi tiered approach for improving the resistance of homes and their contents to damage caused by wind, wind-driven rain, and hail. There are three designation levels—FORTIFIED Roof™, FORTIFIED Silver™, and FORTIFIED Gold™—that build on each other and address different systems of the home.

Roof covering damage is typically the most observed damage in post-windstorm investigations. This has been observed in damage investigations by IBHS and FEMA Mitigation Assessment Team (MAT) deployments. While widespread roof covering damage was observed and documented in the Hurricane Ian MAT report, the report noted that the failure of hip and ridge roof coverings was the most common damage observed for all roof covering types. The following paragraph is an excerpt from Section 4.2.4 in the FEMA Hurricane Ian MAT Report (https://www.fema.gov/sites/default/files/documents/fema_rm-hurriance-ian-mat-report-12-2023.pdf):

“Although roof covering damage was widespread at all sites visited by the MAT, the degree of roof covering damage varied across the sites. The most common damage observed by the MAT for all roof coverings was displacement of hip and ridge roof coverings.”

The FEMA Hurricane Michael in Florida MAT Report (https://www.fema.gov/sites/default/files/2020-07/mat-report_hurricane-michael_florida.pdf) also noted that the failure of hip and ridge asphalt shingles was prevalent (see Section 4.2.1.1).

Figure 4-11 (see below) from the FEMA Hurricane Ian in Florida MAT Report shows typical examples of hip and ridge failures observed in Hurricane Ian.

Figure 4-11: Hip and ridge damage on four residences with different roof types: a tile roof (top left), asphalt shingle roof (top right), metal panel roof (bottom left), and cedar shake roof (bottom right)

When hip and ridge roof coverings are blown off, the interior of the building is at risk of water intrusion due to gaps in the roof framing and decking. This water intrusion can result in costly damage to interior contents and furnishings. The observations from the FEMA Hurricane Ian in Florida MAT led to the report recommending the following in Recommendation FL-10c:

FEMA should consider submitting code change proposals or supporting code change proposals from other stakeholders—such as IBHS, ARMA, NRCA, and other aligned groups to the IBC, IRC, and the FBC—to require a minimum of 6 inches overlap of the roof underlayment to hip and ridges that do not have ventilation components. Wrapping underlayment over hips and ridges that don't have ventilation components will improve the roof's resistance to water intrusion in the event the hip and ridge coverings are damaged or blown off.

This proposal, if approved, would implement this recommendation by requiring roof underlayment to be lapped over hips and ridges a minimum of 6 inches from both sides and would also be consistent with IBHS requirements for a Fortified Roof designation. An exception to this required lapping is provided for hips and ridges that have ventilation components. According to discussions with the Asphalt Roofing Manufacturer's Association (ARMA), many of its members already recommend this practice in their installation instructions. This proposal would codify this requirement for asphalt shingles and expand this practice to all roof covering types

Cost Impact: The 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 expected to create an increase in construction costs because it is a common practice for many roof coverings and the cost to extend underlayment at hips and ridges for the required 6" lap is negligible.

RB255-25

RB256-25

IRC: R905.1.2, R905.16.4

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

R905.1.2 Ice barriers. In areas where there has been a history of ice forming along the eaves causing a backup of water as designated in Table R301.2, an ice barrier shall be installed <u>where required for the type of roof covering installed.</u> ~~for asphalt shingles, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles and wood shakes.~~ The ice barrier shall consist of not fewer than two layers of *underlayment* cemented together, or a self-adhering polymer-modified bitumen sheet shall be used in place of normal *underlayment* and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the *building*.

On roofs with slope equal to or greater than 8 units vertical in 12 units horizontal (67-percent slope), the ice barrier shall be applied not less than 36 inches (914 mm) measured along the roof slope from the eave edge of the *building*.

Exception: Detached *accessory structures* not containing *conditioned floor area*.

Delete without substitution:

~~**R905.16.4 Ice barrier.** In areas where there has been a history of ice forming along the eaves causing a backup of water, as designated in Table R301.2, an ice barrier that consists of not less than two layers of *underlayment* cemented together or of a self-adhering polymer-modified bitumen sheet shall be used in lieu of normal *underlayment* and extend from the lowest edges of all roof surfaces to a point not less than 24 inches (610 mm) inside the exterior wall line of the *building*.~~

~~**Exception:** Detached *accessory structures* that do not contain *conditioned floor area*.~~

Reason: In the 2015 IRC, individual sections describing ice barrier installations were deleted and replaced with references to a "general" section for ice barriers, now found in Section R905.1.2 of the 2024 IRC. However, a "laundry list" of types of roof covering that may require ice barriers was included in the language of the "general" section. In the 2018 IRC, a new subsection was added for a new roof covering, BIPV panels. This inclusion ended up with both a reference to the "general" Ice barrier section followed by subsection about ice barriers under the specific roofing type, as was last seen in the format of the 2012 IRC.

This proposal achieves two goals of better presentation of the same information.

1) it eliminates the laundry list of roofing types under the general section about ice barriers. This is not necessary, as each subsection for each roof covering type has it's own reference to this section. If additional subsections for new roofing types are added in the future, the "general" ice barrier section will not need to be modified to add the new type to the "list". This is what happened when BIPV panels were added but never added to the "list" in the general ice barrier section.

2) It eliminates the unnecessary duplicity in Section R905.16 for BIPV panels where both a reference to the general section is provided, followed by a specific section of the same subject.

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

Justification for no cost impact:

This proposal is for better interpretation of the existing intent and purpose and thus has no impact on the cost of construction.

RB256-25

RB257-25

IRC: R905.7.1.1, R905.8.1.1

Proponents: Nav Koonar, representing Cedar Shake and Shingle Bureau, Director of Operations (nav.koonar@cedarbureau.org); David Roodvoets, DLR Consultants, representing Cedar Shake and Shingle Bureau (davelee@ix.netcom.com)

2024 International Residential Code

Revise as follows:

R905.7.1.1 Solid sheathing required. ~~In areas where the average daily temperature in January is 25°F (-4°C) or less,~~ *Wood structural panels* or solid lumber sheathing shall be required on that portion of the roof deck requiring the application of an ice barrier.

R905.8.1.1 Solid sheathing required. ~~In areas where the average daily temperature in January is 25°F (-4°C) or less,~~ *Wood structural panels* or solid lumber sheathing shall be required on that portion of the roof deck requiring an ice barrier.

Reason: The IRC wood shingle and wood shake sections in this proposal contain a trigger for ice barrier provisions (i.e., average daily temperature in January is 25°F or less) which conflicts with the ice barrier trigger in R905.1.2. This proposal resolves the conflict by removing the trigger from R905.7.1.1 and R905.8.1.1.

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

Justification for no cost impact:

Editorial

RB257-25

RB258-25

IRC: R905.7.6

Proponents: Nav Koonar, representing Cedar Shake and Shingle Bureau, Director of Operations (nav.koonar@cedarbureau.org); David Roodvoets, DLR Consultants, representing Cedar Shake and Shingle Bureau (davelee@ix.netcom.com)

2024 International Residential Code

Revise as follows:

R905.7.6 Application. Wood shingles shall be installed in accordance with this chapter and the manufacturer's instructions. Wood shingles shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in courses, and two joints shall not be in direct alignment in any three adjacent courses. Spacing between shingles shall be not less than $^1/_4$ inch to $^3/_8$ inch (6.4 mm to 9.5 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.6(1). Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Table R905.7.6(2). Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized <u>after fabrication</u> with a coating weight of ASTM A153 Class D or ASTM A641 Class 3S (1.0 oz/ft^2). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shingles in accordance with Section R902 or pressure-impregnated-preservative-treated shingles of *naturally durable wood* in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). For sheathing less than $^3/_4$ inch in (19.1 mm) thickness, each fastener shall penetrate through the sheathing. Wood shingles shall be attached to the roof with two fasteners per shingle, positioned in accordance with the manufacturer's installation instructions. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

Reason: After Fabrication more clearly specifies the product that shall be used in installing cedar shingles. Fasteners that are hot dipped prior to fabrication are subject to corrosion at their tips and heads due to the impact of fabrication eliminating some of the galvanizing and exposing bare carbon steel.

Cost Impact: The 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 post fabrication hot dipped galvanized fastener has been the traditional product used to install cedar shingles. Recently products that use hot dipped coils of wire are used to form the fasteners. These pre hot dipped fasteners are more subject to premature failure due to corrosion.

RB258-25

RB259-25

IRC: R905.8.7

Proponents: Nav Koonar, representing Cedar Shake and Shingle Bureau, Director of Operations (nav.koonar@cedarbureau.org); David Roodvoets, DLR Consultants, representing Cedar Shake and Shingle Bureau (davelee@ix.netcom.com)

2024 International Residential Code

Revise as follows:

R905.8.7 Application. Wood shakes shall be installed in accordance with this chapter and the manufacturer's installation instructions. Wood shakes shall be laid with a side lap not less than $1^1/_2$ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be $^3/_8$ inch to $^5/_8$ inch (9.5 mm to 15.9 mm) including tapersawn shakes. Weather exposures for wood shakes shall not exceed those set in Table R905.8.7. Fasteners for untreated (naturally durable) wood shakes shall be box nails in accordance with Table R905.7.6(2). Nails shall be stainless steel Type 304, or Type 316 or hot-dipped after fabrication with a coating weight of ASTM A153 Class D or ASTM A641 Class 3S (1.0 oz/ft^2). Alternatively, two 16-gage Type 304 or Type 316 stainless steel staples, with crown widths $^7/_{16}$ inch (11.1 mm) minimum, $^3/_4$ inch (19.1 mm) maximum, shall be used. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Wood shakes shall be attached to the roof with two fasteners per shake positioned in accordance with the manufacturer's installation instructions. Fasteners for fire-retardant-treated (as defined in Section R902) shakes or pressure-impregnated-preservative-treated shakes of *naturally durable wood* in accordance with AWPA U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of $^3/_4$ inch (19.1 mm). Where the sheathing is less than $^3/_4$ inch (19.1 mm) thick, each fastener shall penetrate through the sheathing. Fastener packaging shall bear a *label* indicating the appropriate grade material or coating weight.

Reason: After Fabrication more clearly specifies the product that shall be used in installing cedar shakes. Fasteners that are hot dipped prior to fabrication are subject to corrosion at their tips and heads due to the impact of fabrication eliminating some of the galvanizing and exposing bare carbon steel.

Cost Impact: The 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 hot dipped after fabrication is the traditional method for galvanizing fastener used for cedar shakes. This wording more clearly defines the product traditionally used. Fasteners that are hot dipped after fabrication are more corrosion resistant than fasteners that are fabricated after the hot dipped galvanization is applied.

RB259-25

RB260-25

IRC: R905.10.5, R905.10.5.1 (New), R905.10.5.1.1 (New), R905.10.5.1.2 (New), R905.10.5.1.2.1 (New), R905.10.5.1.2.2 (New), MCA (New)

Proponents: Robert A. Zabcik, Z-tech Consulting LLC, representing Metal Construction Association (bob@ztech-consulting.com)

2024 International Residential Code

Revise as follows:

R905.10.5 Wind resistance of metal roof panels. *Metal roof panels* shall be installed to resist the component and cladding loads specified in Table R301.2.1(1), adjusted for height and exposure in accordance with Table R301.2.1(2). *Metal roof panels* applied to a solid or closely fitted deck shall be tested for wind resistance in accordance with Section R905.10.5.1~~FM 4474, UL 580, or UL 1897~~. Structural standing seam metal panel roof systems shall be tested for wind resistance in accordance with ASTM E1592 or FM 4474. Structural through-fastened metal panel roof systems shall be tested for wind resistance in accordance with ASTM E1592, FM 4474 or UL 580.

Exceptions:

1. Metal roofs constructed of cold-formed steel shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2208.1 of the *International Building Code*.
2. Metal roofs constructed of aluminum shall be permitted to be designed and tested in accordance with the applicable referenced structural design standard in Section 2002.1 of the *International Building Code*.

Add new text as follows:

R905.10.5.1 Metal roof panel systems over deck. *Metal roof panel* systems applied to a solid or closely fitted deck shall be tested in accordance with this section. Wind resistance shall be taken as the average result from a minimum of two tests. A minimum 2 to 1 margin of safety shall apply for allowable stress design and a strength reduction factor of no more than 0.7 shall apply for load and resistance factor design.

R905.10.5.1.1 Non-Hurricane-prone regions. *Metal roof panels* in non-*hurricane-prone* regions shall be tested in accordance with FM 4474, UL 580 or Part I of UL 1897.

R905.10.5.1.2 Hurricane-prone regions. *Metal roof panels* and edge systems in *hurricane-prone regions* shall be tested in accordance with Section R905.10.5.1.2.1 and R905.10.5.1.2.2

R905.10.5.1.2.1 Metal roof panels. *Metal roof panels* shall be tested in accordance with FM 4474 or UL 580. When UL 580 is used and wind resistance in excess of that provided by Class 90 is required for design, UL 1897 Part I shall be used to determine wind load resistance as follows:

1. The positive pressure applied below the assembly shall be held at 48.5 psf (240 kPa) throughout the test.
2. The negative pressure applied above the assembly shall be 63.5 psf (310 kPa) initially and increased in intervals of 15 psf (75 kPa). Each interval shall be held for at least one minute.
3. The wind resistance shall be taken as the average of the highest completed interval of no fewer than two samples subsequent to completing Phase 5 of the Class 90 test sequence of UL 580.

R905.10.5.1.2.2 Metal Edge Systems. Metal hip, ridge and edge systems, excluding gutters, shall be tested for uplift resistance in accordance with ANSI/MCA FTS-1.

MCA

Metal Construction Association
1061 American Lane Suite 310
Schaumburg, IL 60173

ANSI/MCA FTS-1 2019 Test Method for Wind Load Resistance of Flashings Used with Metal Roof Systems

Reason: The purpose of this proposal is to clarify existing and add new requirements to determination of wind load resistance values of metal roof panel assemblies over solid or closely fitted deck, especially in hurricane-prone regions. These changes are consistent with the recommendations of FEMA P-2342 and also align with the Florida Building Code (FBC) Test Application Standard TAS-125, which is widely used in the metal roofing industry and is considered the best testing practice of these systems. However, it does NOT require any third-party listing like FBC. The technical changes fall into four general areas and are discussed in detail as shown below:

1. Stipulations for the required number of tests and applicable margin of safety for allowable stress design
2. Providing a strength reduction coefficient (a.k.a. phi factor) needed for the application of load and resistance factor design.
3. Introduction of new test requirements for edge, hip and roof systems to address issues observed by FEMA in their Hurricane Ian investigation.
4. Provide a test methodology consistent with TAS-125, addressing limitations of UL 580, which terminates at 105 psf instead of progressing to failure.

Items 1 and 2

Item 1 is self-explanatory. The proposed margin of safety of 2.0 is consistent with TAS-123 and Industry practice. Item 2 is similar to Item 1 and is needed because ASCE 7, the cited load standard in Chapter 16 if IBC, has been positioning to remove allowable stress design provisions for some time and it seems that load and resistance factor design is the future. The proposed value for the strength reduction coefficient comes from AISI S100 Section K2.1.1 to align with a margin of safety of 2. These items apply in both hurricane prone and non-hurricane prone regions.

Item 3

Item 3 only applies within hurricane-prone regions, as defined by IBC and adds requirements for testing of ridge, hip and edge metal systems similar to those currently in place for low-slope built-up, modified bitumen and single-ply roof systems in Section 1504.6. It is being put forth to address issues observed by the Roofing Industry Committee on Weather Issues (RICOWI) through their Windstorm Investigation Program (WIP) as well as FEMA's Hurricane Ian investigation. The test standard cited, ANSI/MCA FTS-1-2019, was developed by MCA through the Single Ply Roofing Institute's (SPRI) ANSI-accredited canvassing process. The RICOWI and FEMA WIP field studies revealed instances where metal ridge, hip and/or edge system were torn from the perimeter of a building with a metal roof, exposing a longer leading edge of the incorporated roof panel and initiating a partial failure of the roof system, particularly near the corners and gable edges of the roof. Although the damage was very localized, it did allow water to enter the building and in cases, the edge metal became a wind-borne debris threat. Most commonly, this occurred in two situations:

- Where a multi-piece edge trim assembly incorporating cleats deformed enough to disengage from the cleat.
- Where the metal edge trim assembly was fastened to a non-metal substrate such as wood or masonry, leaving to question the appropriateness of the fastener used since it would often not be provided by the edge system manufacturer for non-metal substrates.

The figures in the attachment depict these conditions. These tendencies were also observed by FEMA in their Mitigation Assessment Team Report for Hurricane Ian. (https://tinyurl.com/mmrstxju) Section 6.3 of this report includes Conclusion FL-10, recommending that FEMA support industry stakeholders in supporting code change proposals to requiring testing of hip and ridge roof coverings. (FEMA P-2342, Page 6-9 see excerpt)

Item 4

Item 4 also only applies in hurricane-prone regions and clarifies application of UL 580 and UL 1897 to determine appropriate wind load resistance values as represented by common industry practice and in a manner consistent with FBC TAS-125. UL 580 and 1897 are very different tests. UL 1897 utilizes steady-state load sequencing progressing until system failure and often takes less than 20 minutes to complete. However, UL 580 is designed to evaluate overall system integrity using a cyclic load sequence and yields a performance rating (Classification) from a fixed set of options. UL 580 involves two separate hour-long periods of cyclic loading and is generally considered the more rigorous test, but the test standard does not allow for additional testing to failure once the highest classification (Class 90) is achieved. Class 90 provides a net uplift value of 105 psf, which equates to a safe working load of 52.5 psf. With the current version of ASCE 7 Chapter 30, this result is not useful in the extreme edge or corner zones of roofs in hurricane-prone regions of the US.

This issue is addressed by the proposed additions, which are based on the Florida Test Application Standard TAS-125. This standard uses UL 580 as a base qualification test but then allows the metal roof panel manufacturer to perform additional testing using a modified UL 1897 sequence until failure is observed. This process is repeated at least once more and a margin of safety of two is applied to the average result for the purposes of allowable stress design. This qualifies the panel for wind load resistance higher than the 105 psf net load given by Class 90 of UL 580 and ensures repeatability. Although TAS-125 listing is only a requirement in the High Velocity Hurricane Zone as defined by the Florida Building Code, the underlying methodology has become the de-facto way to derive allowable design loads within the metal roofing industry for all locales.

MCA

This proposal is being brought forward by The Metal Construction Association. (MCA) Founded in 1983, the MCA is a 501(c)(6) organization promoting the use of metal in the building envelope by bringing together manufacturers and suppliers of metal products used in structures throughout the world to collaborate on marketing, education and advocacy. For more information, see the MCA website at www.metalconstruction.org.

- **Figures and Excerpt for Proposal 11124.pdf**
  https://www.cdpaccess.com/proposal/11124/35663/documentation/184882/attachments/download/9762/

Bibliography:

1. American Iron and Steel Institute (AISI); North American Specification for the Design of Cold-Formed Steel Structural Members, 2016 Version (AISI S-100 2016), Reaffirmed 2020.
2. Federal Emergency Management Association (FEMA); Mitigation Assess Team Report Hurricane Ian in Florida; FEMA P-2342, December 2023; Page 6-9.
3. Roofing Industry Committee on Weather Issues (RICOWI); Wind Investigation Report: Hurricane Ian; September 2023; Pages 87-90.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The increase over the total building cost is $38/50,000, or 0.8%. This change would increase the cost of construction indirectly as the cost of the testing would presumably be passed to the consumer for those products to be approved for use in hurricane-prone regions of the US. However, the impact is miniscule, conservatively estimated as less than 0.5% of initial building cost. This estimate ignores the benefit of any lowered operating costs, such as insurance, as well as any benefit over time, such as longer asset life.

Estimated Immediate Cost Impact Justification (methodology and variables):

ANSI/MCA FTS-1 testing is estimated to be $1,500/test and most manufacturers carry 4-8 styles of edge metal systems different enough to test separately. Thus, total cost is estimated to be $36,000. Similarly, additional UL 580/1897 testing required for wind resistance of the panel system is estimated as $2,500 per test over a product line of 8 profiles for $40,000. This is a total of $76,000 to carry both. If this cost is accrued over the life of the product lines, assumed to be at least 2,000 buildings, it results in a nominal increase of at most $38 per building. A typical building of this construction is 2,500 square feet of roof area at $6/square foot and 300 lineal feet of edge/hip/ridge materials valued at $5/lineal foot, this represents a total cost of $16,500 installed. At a total cost of $20/square foot, the building would be $50,000, making the roof 33% of the total cost, which is consistent with industry estimation practices. The increase over the total building cost is $38/50,000, or 0.8%.

Note: Cost estimates are based on general experience of industry stakeholders and are not available publicly due to antitrust restrictions.

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
ANSI/MCA FTS-1 2019 Test Method for Wind Load Resistance of Flashings Used with Metal Roof Systems

RB260-25

RB261-25

IRC: TABLE R906.2, ASTM Chapter 44

Proponents: Marcin Pazera, representing Polyisocyanurate Insulation Manufacturers Association (mpazera@pima.org); Richard Justin Koscher, representing Polyisocyanurate Insulation Manufacturers Association (jkoscher@pima.org)

2024 International Residential Code

Revise as follows:

TABLE R906.2 MATERIAL STANDARDS FOR ROOF INSULATION

MATERIAL	STANDARD
Cellular glass board	ASTM C552 **or ASTM C1902**
Composite polyisocyanurate boards	ASTM C1289, Type III, IV, V or VI
Expanded polystyrene	ASTM C578
Extruded polystyrene board	ASTM C578
Fiber-reinforced gypsum board	ASTM C1278
Glass-faced gypsum board	ASTM C1177
High-density polyisocyanurate board	ASTM C1289, Type II, Class 4 or 5
Mineral wool board	ASTM C726
Perlite board	ASTM C728
Polyisocyanurate board	ASTM C1289, Type I or II
Wood fiberboard	ASTM C208

ASTM

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

C1289—~~22~~25 Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board

Reason: The proposed code change includes several changes to Table 1508.2 that lists material standards for roof insulation. The high-density polyisocyanurate board is added to Table R906.2. Type II, Class 4 high-density polyisocyanurate board are already recognized and have been included in the International Building Code (IBC) Table 1508.2 but have not been added to the International Residential Code (IRC). This aligns the requirements in the IRC with the IBC. A new class (Type II, Class 5) of high-density polyisocyanurate board is added to reflect the change in the ASTM C1289 standard. The Type II, Class 5 high-density polyisocyanurate board has glass fiber-reinforced cellulosic facer, and has been recently added to the ASTM C1289 standard along with general requirements for physical properties. The addition of requirements to ASTM C1289 for Type II, Class 5 high-density polyisocyanurate cover boards as well as addition of referenced standard to the IBC's Table 1508.2 will help ensure that products manufactured and installed in roof systems comply with required standards. Additionally, clarification is added that composite boards refer to polyisocyanurate insulation as this is already intended by the referenced ASTM C1289 standard.

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

Justification for no cost impact:

The code change proposal has no cost impact. This proposal provides additional option for high-density polyisocyanurate board in certain roofing applications.

RB261-25

RB262-25

IRC: R908.3.1 (New), R908.3.1.1 (New), TABLE R908.3.1.1 (New), R908.3.1.2 (New)

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

2024 International Residential Code

Add new text as follows:

R908.3.1 Wood roof deck attachment. Where the roof covering is removed down to the roof deck in *hurricane-prone regions*, the attachment of the roof deck shall be in accordance with Section R908.3.1.1 or R908.3.1.2.

R908.3.1.1 Wood structural panel roof sheathing attachment. The attachment of wood structural panel roof decks shall comply with Table R908.3.1.1. Supplemental fasteners, where required, shall be RSRS-01 (2 3/8" x 0.113" x 0.281" head) ring shank nails.

TABLE R908.3.1.1 SUPPLEMENTAL ROOF DECK FASTENERS AT PANEL EDGES AND INTERMEDIATE FRAMING

Existing Fasteners	Existing Fastener Spacing at Panel Edges or Intermediate Framing	Maximum Supplemental Fastener Spacing at Panel Edges or Intermediate Framing		
		115 mph < V_{ULT} ≤ 140 mph	140 mph < V_{ULT} ≤ 160 mph	160 mph < V_{ULT} ≤ 180 mph
Staples or 6d (2" x 0.113" x 0.266" head)	Any	6 inches on center[a]	6 inches on center[a]	4 inches on center[a]
8d (2 1/2" x 0.131" x 0.281" head) clipped head or round head smooth shank or round head ring shank	6 inches on center or less	None Necessary	None Necessary	4 inches on center[b]
8d (2 1/2" x 0.131" x 0.281" head) clipped head or round head smooth shank or round head ring shank	Greater than 6 inches on center	6 inches on center[b]	6 inches on center[b]	4 inches on center[b]

a. Maximum spacing determined based on supplemental fasteners only.

b. Maximum spacing determined based on existing fasteners and supplemental fasteners

R908.3.1.2 Solid sawn lumber or wood plank roof decking attachment. Roof decks consisting of sawn lumber or wood planks up to 12 inches wide shall be fastened with at least two 8d (2 1/2" x 0.131" x 0.281" head) nails at each roof framing member. For sawn lumber or wood plank decking attached with smaller fasteners or with fewer than two fasteners, additional fasteners shall be added so that the roof decking is attached wth at the 2 fasteners with a minimum size of 8d (2 1/2" x 0.131" x 0.281" head) nails at each roof framing member.

Attached Files

- **Renailing the roof deck cost impacts.pdf**
  https://www.cdpaccess.com/proposal/11186/35372/files/download/9121/

Reason: Performing wind mitigation on existing older buildings to make them more resilient and resistant to wind loads specified by modern building codes can often be challenging and expensive. However, mitigation on one of the most vulnerable elements can be performed rather effortlessly and inexpensively during a roof replacement. The attachment of the roof deck to the roof framing is one of the more critical connections for typical buildings covered by the IRC. Wind loads on the roof deck are typically the largest loads imparted on the building during a windstorm. When windows or doors fail or are breached by wind-borne debris, the wind loads on roof decking are even higher. Failure of the roof decking can result in significant wind and water intrusion into the building causing significant damage to the interior contents and furnishings. Additionally, failure of the roof decking can also result in progressive failure of the roof framing and gable ends due to a lack of support. A securely attached roof deck is critical to the resilience of buildings impacted by windstorms.

When a roof covering is replaced, the existing roofing materials including the underlayment are removed down to the roof deck. This is an opportune and particularly convenient time to evaluate the attachment of the roof deck and add supplemental fasteners as necessary to strengthen the roof deck attachment.The nail spacings shown in Table R903.1.1 are derived from Appendix C Table C202.1.2 in the 2024 International Existing Building Code with some simplifications. They are derived from research conducted in the 1990's at Clemson University tempered by the requirements for roof sheathing attachment for high winds in the Wood Frame Construction Manual. They differ somewhat from the requirements for new construction. Blindly applying the same fastening requirements where fasteners already exist could potentially compromise performance because of damage to roof decking or framing members. The assumption is that there is an optimum spacing of existing and new fasteners that is a function of the number and type of existing connectors. Adding fasteners where fasteners already exist is different than installing fasteners in new construction because of the greater potential for damaging sheathing or framing members. Smaller diameter fasteners such as staples damage framing members less than larger diameter fasteners and they provide significantly lower uplift resistance. Consequently, in these situations supplemental fasteners can be installed at typical new construction spacing without concern for splitting the structural members. The addition of supplemental fasteners will approach fastening requirements in the current code to approach a similar performance level. This code change provides the guidance that is needed when adding fasteners where fasteners already exist.This code change will align the IRC with the requirements for an IBHS Fortified designation and is also supported by FEMA's post-disaster assessments of residential buildings. The FEMA Hurricane Michael MAT report noted several instances of severe roof sheathing failures pre-FBC (buildings built before the effective date of the FBC) with asphalt shingles that were recovered with metal roof panels. The report recommended that when reroofing, the existing layer of roof covering be removed down to the deck and the roof sheathing attachment be evaluated. If the sheathing attachment was inadequate, supplemental fasteners should be added to strengthen the roof deck.

The FORTIFIED Home™ program was developed to reduce avoidable suffering and financial loss caused by hurricanes, high winds, and hail. The program requirements provide a systems-based, multi tiered approach for improving the resistance of homes and their contents to damage caused by wind, wind-driven rain, and hail. There are three designation levels—FORTIFIED Roof™, FORTIFIED Silver™, and FORTIFIED Gold™—that build on each other and address different systems of the home.
The Florida Building Code has required renailing of the roof deck during roof replacements for pre-FBC buildings since the 2007 Florida Building Code.

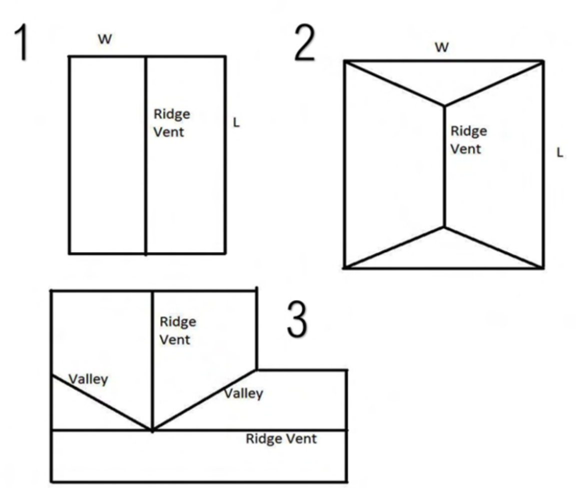
Cost Impact: Increase

Estimated Immediate Cost Impact:

$284.92 to $679.48 see justification.

For our cost impact estimates, we used Xactimate which is a construction cost estimating software program. Select markets in the following states within the hurricane-prone region were analyzed: Texas, Louisiana, Mississippi, Alabama, Georgia, South Carolina, North Carolina, Delaware, Connecticut, New Jersey, and New York.

Three roof configurations were analyzed – 3 gable, 2 gable, and hip. Additionally, we estimated the cost impacts for large roofs (2800 square feet to 3016 square feet) and small roofs (1575 square feet to 1696 square feet).



This cost estimate is a "worst-case" scenario for re-nailing the roof deck at 6 inches on center. It assumes that the entire deck has to be re-nailed at 6 inches on center. Depending on the existing fastener type and spacing, this may not be necessary.

A copy of the Xactimate report for this analysis is attached to this code change.

The cost varies according to the markets analyzed but are within close ranges.

Large Roofs – (2800 square feet to 3016 square feet)

For large roofs the cost for re-nailing the roof deck ranges from a low of $506.52 in Alabama to a high of $1208.32 in Connecticut for the markets analyzed. These costs represent increases of 4.4% and 6.4% respectively of the total cost of the roof replacement (roof covering, underlayment, ventilation components, etc.) for the markets analyzed.

Small Roofs – (1575 square feet to 1696 square feet)

For small roofs the cost for re-nailing the roof deck ranges from a low of $284.92 in Alabama to a high of $679.48 in Connecticut for the markets analyzed. These costs represent increases of 4.2% and 5.2% respectively of the total cost of the roof replacement (roof covering, underlayment, ventilation components, etc.) for the markets analyzed.

Although this code change will increase roof replacement costs, the additional costs are modest and will significantly reduce the likelihood of failure under anticipated wind loads, and thus will decrease future costs associated with repairs and rebuilding after high wind events.

Estimated Immediate Cost Impact Justification (methodology and variables):

Xactimate, which is a construction cost estimating software program, was used to analyze the cost impacts of this proposal.

RB262-25

RB263-25

IRC: R908.4

Proponents: Mark S. Graham, representing National Roofing Contractors Association (NRCA) (mgraham@nrca.net)

2024 International Residential Code

Revise as follows:

R908.4 Roof recover. The installation of a new *roof covering* over an existing *roof covering* shall be permitted where any of the following conditions occur:

1. Where the new *roof covering* is installed in accordance with the roof covering manufacturer's *approved* instructions.
2. Complete and separate roofing systems, such as standing-seam metal roof systems, that are designed to transmit the roof loads directly to the *building*'s structural system and do not rely on existing roofs and *roof coverings* for support, shall not require the removal of existing *roof coverings*.
3. Metal panel, metal shingle and concrete and clay tile *roof coverings* shall be permitted to be installed over existing wood shake roofs where applied in accordance with Section R908.4.1.
4. The application of a new ~~protective~~ *roof coating* over an existing ~~protective~~ *roof coating*, *metal roof panel*, *metal roof shingle*, mineral surfaced roll roofing, built-up roof, modified bitumen roofing, thermoset and thermoplastic single-ply roofing and spray polyurethane foam roofing system shall be permitted without tear-off of existing *roof coverings*.

Exceptions: A *roof recover* shall not be permitted where any of the following conditions occur:

1. Where the existing roof or *roof covering* is water soaked or has deteriorated to the point that the existing roof or *roof covering* is not adequate as a base for the additional roofing.
2. Where the existing *roof covering* is slate, clay, cement or asbestos-cement title.
3. Where the existing roof has two or more applications of any type of *roof covering*.

Reason: This code change proposal is intended to clarify the existing code.

This code change proposal strikes the word "protective" from references to the term "roof coating" in Section R908.4.4. The word "protective" is unnecessary as the term "roof coating" is already defined in Section 202-Definitions and specific requirements for roof coatings are provided in Section R909-Roof Coatings. This change will not have an impact on the strigency of the residential 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 code change proposal is editorial in nature and will not increase or decrease the cost of construction.

RB263-25

RB264-25

IRC: R1001.11

Proponents: DANIEL FREEMAN, Freeman Fire Inspectors, representing National Chimney Sweep Guild (dan@freemanfire.com)

2024 International Residential Code

Revise as follows:

R1001.11 Fireplace clearance. Wood beams, joists, studs and other *combustible material* shall have a clearance of not less than 2 inches (51 mm) from the front faces and sides of masonry fireplaces and not less than 4 inches (102 mm) from the back faces of masonry fireplaces. The airspace shall not be filled, except by <u>one-quarter-inch (6.4 mm) cement-based billboard as listed in R302.11 or by a site-built metal firestop spacer at least 24 gauge in thickness but not to exceed 1/8" thick(3.2 mm). The non-combustible material or firestop shall not be more than 1/8 inch (3.2 mm) away from the outside of the chimney. Beyond the air space clearance</u> *fireblocking* in accordance with Section R1001.12 shall be provided.

Exceptions:

1. <u>Modular masonry</u> ~~Masonry~~ fireplaces *listed* and *labeled* for use in contact with combustibles in accordance with UL 127 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces <u>only as specified in the manufacturer instructions</u>.
2. Where masonry fireplaces are part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete walls less than 12 inches (306 mm) from the inside surface of the nearest firebox lining.
3. Exposed combustible *trim* and the edges of sheathing materials such as wood siding, flooring and *gypsum board* shall be permitted to abut the masonry fireplace sidewalls and hearth extension in accordance with Figure R1001.11, provided that such combustible *trim* or sheathing is not less than 8 inches (203 mm) from the inside surface of the nearest firebox lining. Where the fireplace opening is 6 square feet (0.6 m^2) or larger, such combustible *trim* or sheathing shall be permitted to abut the masonry fireplace sidewalls and hearth extension provided that such combustible *trim* or sheathing is not less than 12 inches (305 mm) from the inside surface of the nearest firebox lining.
4. Exposed combustible mantels or *trim* is permitted to be placed directly on the masonry fireplace front surrounding the fireplace opening providing such *combustible materials* are not placed within 6 inches (152 mm) of a fireplace opening. *Combustible material* within 12 inches (306 mm) of the fireplace opening shall not project more than $^1/_8$ inch (3 mm) for each 1-inch (25 mm) distance from such an opening.

Reason: This is just to clarify the allowed "noncombustible material" as it cannot simply be more full thickness masonry. This is not clear and could allow masons to simply consider the exterior masonry structure the fireblocking in the air space as there is no limitation on what can be used. Or this could allow improper materials to be used in thicker quantities where heat is trapped and transferred to adjacent combustibles. The fireblocking or firestop filling the air space should still allow heat disipation in much the same way as a listed firestop spacer does around a factory built chimney. For this reason I believe it should be limited to the only non-combustible method 1/4" cement based billboard included in 302.11 or the same metal thicknesses allowed and limited for firestop spacers around factory built chimneys and vents.

In our industry we have begun to differentiate between the materials used to cover the air space clearance around a masonry chimney a firestop, and the rest of the opening beyond that air space as fireblocking following 302.11. The distinction is necessary as sheetmetal can be used as a firestop but not to cover an entire fireblocking opening as during a fire large metal fireblocking could bucklet or warp and allow heat out prematurely. This needs to be clarified that the use of metal applies only to the airspace, and not the entire opening of the chase enclosure or void space.

1. in exceptions below the main paragraph should also be clarified that the area around modular masonry fireplaces (proper term) are permitted to have combustible materials in contact with their exterior surfaces only as permitted in the manufacturers instructions as many still have clearance requirements and only portions of these systems may allow combustibles to touch their exterior. For example in the case of Isokern fireplaces some allow combustibles to touch the face of the smoke chamber however the sides and rear of the firebox

have a clearance requirement, and when built on a combustible floor may have additional protection and materials necessary to provide an air space between the base of the appliance and supporting combustibles.

Bibliography: 2024 International Residential Code
UL103 Standard for Safety for Factory-Built Chimneys for Residential Type and Building Heating Appliances, UL 103, Eleventh Edition, Dated October 15, 2010

Cost Impact: The 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 to clarify requirements surrounding masonry systems for contractors and chimney professionals alike. No real difference should arise in cost as this is the intention of these sections all along.

RB264-25

RB265-25

IRC: R1001.12, R1003.18, R1003.19

Proponents: DANIEL FREEMAN, Freeman Fire Inspectors, representing National Chimney Sweep Guild (dan@freemanfire.com)

2024 International Residential Code

Revise as follows:

R1001.12 Fireplace fireblocking. Fireplace *fireblocking* shall comply with the provisions of <u>Section Sections</u> R602.8 <u>and R302.11. Materials used in the airspace clearance shall comply with the provisions of Section R1001.11.</u>

R1003.18 Chimney clearances. Any portion of a *masonry chimney* located in the interior of the *building* or within the exterior wall of the *building* shall have a minimum airspace clearance to combustibles of 2 inches (51 mm). Chimneys located entirely outside the exterior walls of the *building*, including chimneys that pass through the soffit or cornice, shall have a minimum airspace clearance of 1 inch (25 mm). The airspace shall not be filled, except <u>by one-quarter-inch cement-based billboard or by a site-built metal firestop at least 24 gauge in thickness but not to exceed 1/8-inch (3.18 mm) thick. The non-combustible material or firestop shall not be more than 1/8</u>-inch (3.18 mm) <u>away from the outside of the chimney. Beyond the airspace clearance fireblocking</u> ~~to provide fire blocking~~ in accordance with Section R1003.19 <u>shall be provided</u>.

Exceptions:

1. *Masonry chimneys* equipped with a chimney lining system *listed* and *labeled* for use in chimneys in contact with combustibles in accordance with UL 1777 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with <u>the</u> ~~their~~ exterior surfaces <u>of the masonry chimney where the minimum thickness requirements specified in the liner manufacturer instructions are met or exceeded</u>.
2. Where *masonry chimneys* are constructed as part of masonry or concrete walls, *combustible materials* shall not be in contact with the masonry or concrete wall less than 8 inches (203 mm) from the inside surface of the nearest flue lining.
3. *Combustible materials* shall be permitted to abut the *masonry chimney* side walls, in accordance with Figure R1003.18, provided such combustible material is not less than 8 inches (203 mm) from the inside surface of the nearest flue lining.

R1003.19 Chimney fireblocking. ~~Spaces between chimneys and floors and ceilings through which chimneys pass shall be fireblocked with *noncombustible material* securely fastened in place. The *fireblocking* of spaces between chimneys and wood joists, beams or headers shall be self-supporting or be placed on strips of metal or metal lath laid across the spaces between *combustible material* and the chimney.~~ <u>Chimney fireblocking shall comply with the provisions of Sections R602.8 and R302.11. Materials used in the airspace clearance shall comply with the provisions of Section R1003.18.</u>

Reason: This is to clarify the difference between materials permitted within the airspace clearance of the fireplace or chimney and the materials permitted for the rest of the void space outside of the airspace clearance surrounding the fireplace or chimney.
The fireblocking or firestop filling the air space should still allow heat disipation in much the same way as a listed firestop spacer does around a factory built chimney. For this reason I believe it should be limited to the only non-combustible method 1/4" cement based billboard included in 302.11 or the same metal thicknesses allowed and limited for firestop spacers around factory built chimneys and vents. In our industry we have begun to differentiate between the materials used to cover the air space clearance around a masonry chimney a firestop, and the rest of the opening beyond that air space as fireblocking following 302.11. The distinction is necessary as sheetmetal can be used as a firestop but not to cover an entire fireblocking opening as during a fire large metal fireblocking could bucklet or warp and allow heat out prematurely. This needs to be clarified that the use of metal applies only to the airspace, and not the entire opening of the chase enclosure or void space.

1. in the exceptions was modified to inform installers that manufacturers of liners require a specified masonry thickness and insulation in order to qualify for the reduction in clearances. Its not just the requirement of a masonry structure. It must be nominally solid 4" of masonry and be installed the required insulation per the manufacturer installation instructions.

Bibliography: 2024 International Residential Code

UL103 Standard for Safety for Factory-Built Chimneys for Residential Type and Building Heating Appliances, UL 103, Eleventh Edition, Dated October 15, 2010

UL1777 Standard for Safety for Chimney Liners, UL 1777, Fifth Edition, Dated October 2, 2015

Cost Impact: The 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 clarification and more direction regarding firestops and fireblocking around fireplaces and chimneys and when specific products are permitted. This is to clarify existing requirements for contractors and should not impact the cost of construction much. It is just a clarification of materials required or prohibited.

RB265-25

RB266-25

IRC: R1001.12

Proponents: Glenn Mathewson, BuildingCodeCollege.com, representing Self (glenn@glennmathewson.com)

2024 International Residential Code

Revise as follows:

R1001.12 Fireplace fireblocking. Fireplace *fireblocking* shall comply with ~~the provisions of~~ Section R302.11 ~~R602.8~~.

Reason: Section R602.8 simply references R302.11. So why not just reference R302.11 directly from 1001.12. I suggested deleting "the provisions of" as a bonus to simplify this further.

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

Justification for no cost impact:

This proposal only simplifies the use of the references within the IRC.

RB266-25

RB267-25

IRC: R1003.18

Proponents: Charles Clark Jr, Brick Industry Association, representing Masonry Alliance for Codes and Standards (cclark@bia.org)

2024 International Residential Code

Revise as follows:

R1003.18 Chimney clearances. Any portion of a *masonry chimney* located in the interior of the *building* or within the exterior wall of the *building* shall have a minimum airspace clearance to combustibles of 2 inches (51 mm). Chimneys located entirely outside the exterior walls of the *building*, including chimneys that pass through the soffit or cornice, shall have a minimum airspace clearance of 1 inch (25 mm). The airspace shall not be filled, except to provide fire blocking in accordance with Section R1003.19.

Exceptions:

1. *Masonry chimneys* equipped with a chimney lining system *listed* and *labeled* for use in chimneys in contact with combustibles in accordance with UL 1777 and installed in accordance with the manufacturer's instructions are permitted to have *combustible material* in contact with their exterior surfaces.
2. ~~Where masonry chimneys are constructed as part of masonry or concrete walls, combustible materials shall not be in contact with the masonry or concrete wall less than 8 inches (203 mm) from the inside surface of the nearest lining.~~ <u>Masonry chimneys with chimney walls at least 8 inches (203mm) thick are permitted to have combustible material in contact with their exterior surface.</u>
3. *Combustible materials* shall be permitted to abut the *masonry chimney* side walls, in accordance with Figure R1003.18, provided such combustible material is not less than 8 inches (203 mm) from the inside surface of the nearest flue lining.

Reason: Referring to "masonry or concrete walls" can be ambiguous and confusing. What matters is that combustible materials should be not less than 8 inches (203 mm) from the inside surface of the nearest flue lining. This code change proposal simplifies and clarifies the code consistent with Exception 3 and the old Exception 2 and is supported by the engineering study at https://www.rumford.com/code/EightInchThickTestReport.pdf

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

Justification for no cost impact:

The code change proposal will not increase or decrease the cost of construction. This change is just a clarification.

RB267-25

RB268-25

IRC: R1004.6 (New), UL Chapter 44 (New)

Proponents: Jonathan Roberts, representing UL Solutions (jonathan.roberts@ul.com)

2024 International Residential Code

Add new text as follows:

R1004.6 Fireplace inserts. Fireplace inserts installed in factory-built fireplaces shall be listed and labeled for such use in accordance with UL1391.

Add new standard(s) as follows:

UL

UL LLC
333 Pfingsten Road
Northbrook, IL 60062

ANSI/CAN/UL/ULC 1391-2024 Solid-Fuel Space Heaters for Installation into Factory-Built Fireplaces

Reason: ANSI/CAN/UL/ULC 1391 is new UL/ANSI standard which is nearing publication and is being created to address the hazards associated with the installation of fireplace inserts in a factory-built fireplace. This proposal correlates with M53-24 which was approved for the IMC during Group A. A consensus draft has been circulated by UL Standards and Engagement (ULSE) and may be publicly accessed via the ULSE Collaborative Standards Development System (CSDS) website at the following URL: https://csds.ul.com/Search/Standard/1390/Results

Cost Impact: The 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 editorial in nature and correlates with M53-24 which was approved for the IMC during Group A.

Staff Analysis: A review of the following standard proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025:
ANSI/CAN/UL/ULC 1391-2024 Solid-Fuel Space Heaters for Installation into Factory-Built Fireplaces

RB268-25

RB269-25

IRC: R1004.4

Proponents: DANIEL FREEMAN, Freeman Fire Inspectors, representing National Chimney Sweep Guild (dan@freemanfire.com)

2024 International Residential Code

Revise as follows:

R1004.4 ~~Unvented gas log heaters~~Inserted Appliances. An unvented gas log heater or a fireplace insert shall not be installed in a factory-built *fireplace* unless the *fireplace* system has been specifically tested, *listed* and *labeled* for such use in accordance with UL 127.

Reason: With the addition in the 2024 addition of "or a fireplace insert" the section title should be updated to apply to Appliances, not just unvented gas log heaters. Unvented gas log heaters and fireplace inserts are not specifically tested for installation into factory-built fireplaces at this time. The section title should reflect this is not only limited to "unvented gas log heaters". Some information from the UL standards surrounding inserts are included below.

UL1482 Standard for Solid-Fuel Type Room Heaters

- With regard to solid-fuel room heaters tested under this standard... In the recent June 15, 2022 -7th Edition the following was added to the marking instructions by the UL Technical Committee to the document.
  - 53.3 Each room heater shall be marked with the following:
    o) “To be installed as a freestanding room heater with the clearances in the manufacturer’s installation instructions. Not to be installed in any factory-built fireplace.”

UL127 Factory Built Fireplaces

- Since before 1996 this section is included in UL127 and thus in all factory-built fireplace manuals. The quote is pulled from the November 21, 2024- 10th Edition: "60.14 A fireplace shall be marked with the following or equivalent statement: "Do not use a fireplace insert or other products not specified for use with this product." When the fireplace has been investigated and found to be capable of being used with a specified fireplace insert, or other specified product, the statement shall be modified as appropriate."
- The effect of installing inserts into factory-built fireplaces is NOT tested under the UL127 standard and therefore has unknown consequences on the heat signature of the appliance and its required clearances at this time. Until the UL127 standard is updated to include testing for specific inserts and their weight on the factory-built fireplace itself this practice should continue to be precluded.

Bibliography: 2024 International Residential Code
UL Standard for Safety for Factory-Built Fireplaces, UL 127, Tenth Edition, Dated November 21, 2024
UL Standard for Safety for Solid-Fuel Type Room Heaters, UL 1482, Seventh Edition, Dated April 25, 2011

Cost Impact: The 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 the intent of the newly added wording in the 2024 addition.

RB269-25

RB270-25

IRC: R1005.7

Proponents: Shane Nilles, representing Self (snilles@awc.org)

2024 International Residential Code

Delete without substitution:

~~**R1005.7 Factory-built chimney offsets.** Where a *factory-built chimney* assembly incorporates offsets, no part of the *chimney* shall be at an angle of more than 30 degrees (0.52 rad) from vertical at any point in the assembly and the chimney assembly shall not include more than four elbows.~~

Reason: The new Section R1005.9 was added by code change proposal RM22-21 which should have included removal of Section R1005.7 but was overlooked. This proposal removes Section R1005.7 to correct the accidental oversight and conflicting provisions.

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

Justification for no cost impact:

There are no technical changes proposed. This code change only removes duplicated language.

RB270-25

RB271-25

IRC: R1006.1.1

Proponents: DANIEL FREEMAN, Freeman Fire Inspectors, representing National Chimney Sweep Guild (dan@freemanfire.com)

2024 International Residential Code

Revise as follows:

R1006.1.1 Factory-built fireplaces. ~~Exterior c~~*ombustion* *Combustion* *air* inlet ducts for factory-built fireplaces shall be ~~a *listed* component of the~~ constructed and installed in accordance with the fireplace manufacturer instructions.

Reason: Combustion air ducts and their materials are not specifically listed with the fireplaces under UL127. The materials composing them during testing is specified in UL127 7.2.1 however they are not listed components of the system and may be produced by other manufacturers. The only component usually manufactured by the factory-built fireplace manufacturer is the component "employed to connect a combustion air inlet system to the exterior of the fire chamber" as shown below from UL127 in 62.2.3 q). This is to remove the conflict in the IRC that combustion air components must be a listed component of the fireplace. While the air duct connector may be a listed component of the fireplace the rest of the air inlet ducts can only meet the materials specifications or use the components listed under others standards as specified in the listing.

I will be making proposals to clarify the text in UL127 62.2.3 q) as well so that it is specified that they must provide instruction not just for the "methods and parts to be employed to connect a combustion air inlet system to the exterior of a fire chamber" but from the exterior of the fire chamber to the exterior of the structure.

Additionally I am proposing changing the text from "exterior combustion air ducts" to "combustion air inlet ducts" as that is the way those components are referenced in the UL127 standard.

From UL127

7.2 Air duct system7.2.1 The air duct system portion of:

a) Circulating warm air ducts; and
b) Combustion air inlet ducts shall be constructed entirely of corrosion-resistant sheet metal having a minimum thickness as shown in Table 7.5. See 8.12.1 and 8.12.2.

Exception: Lesser thickness materials classified as Class 0 or Class 1 air ducts, as defined in NFPA 90B, and in the requirements in UL 181, is used when:
a) They comply with the requirements of NFPA 90B and UL 181; and
b) They have been investigated for the intended application.

8.12 Air duct system

8.12.1 The combustion air inlet system shall have zero clearance to combustible construction.
8.12.2 The combustion air inlet shall prevent material from dropping into the inlet and also prevent rodents from entering from the outside by use of a minimum 20 gauge wire mesh having openings not larger than 1/4 by 1/4 inch (6.4 by 6.4 mm).

62.2 Installation instructions

62.2.3 The instructions shall include particular details concerning:
q) The methods and parts to be employed to connect a combustion air inlet system to the exterior of a fire chamber, and any limitations with respect to installation and use of a combustion air inlet system.

Bibliography: 2024 International Residential Code
UL Standard for Safety for Factory-Built Fireplaces, UL 127, Tenth Edition, Dated November 21, 2024

Cost Impact: The 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 does not impact the cost of construction as the same materials will generally be used. This clarifies what materials should be used as the exterior combustion air ducts for a factory built fireplace are not listed components of the fireplace system.

RB271-25

RB272-25

IRC: R1006.3

Proponents: DANIEL FREEMAN, Freeman Fire Inspectors, representing National Chimney Sweep Guild (dan@freemanfire.com)

2024 International Residential Code

Revise as follows:

R1006.3 Clearance. Unlisted *combustion air* ducts serving masonry fireplaces shall be installed with a minimum 1-inch (25 mm) clearance to combustibles for all parts of the duct within 5 feet (1524 mm) of the duct outlet.

Reason: Limiting this clearance requirement to combustion air ducts serving masonry fireplaces in this chapter as combustion air ducts serving factory-built fireplaces are actually not listed... but built to specifications within the UL127 standard using common materials. The combustion air ducts are not actually listed with the fireplace or components that carry a listing. Manufacturers may specify those materials in their manuals however. I have already made a comment on that section to use the materials requirements from the UL127 standard within the code itself as that is how they are all tested... and in the standard they are tested with a 0" clearance to the combustion air duct. Sections follow below.

7.2 Air duct system
7.2.1 The air duct system portion of:
a) Circulating warm air ducts; and
b) Combustion air inlet ducts shall be constructed entirely of corrosion-resistant sheet metal having a minimum thickness as shown in Table 7.5. See 8.12.1 and 8.12.2.
Exception: Lesser thickness materials classified as Class 0 or Class 1 air ducts, as defined in NFPA 90B, and in the requirements in UL 181, is used when:
a) They comply with the requirements of NFPA 90B and UL 181; and
b) They have been investigated for the intended application.

8.12 Air duct system
8.12.1 The combustion air inlet system shall have zero clearance to combustible construction.
8.12.2 The combustion air inlet shall prevent material from dropping into the inlet and also prevent rodents from entering from the outside by use of a minimum 20 gauge wire mesh having openings not larger than 1/4 by 1/4 inch (6.4 by 6.4 mm).

7.2 Air duct system

7.2.1 The air duct system portion of:

a) Circulating warm air ducts; and

b) Combustion air inlet ducts

shall be constructed entirely of corrosion-resistant sheet metal having a minimum thickness as shown in Table 7.5. See 8.12.1 and 8.12.2.

Exception: Lesser thickness materials classified as Class 0 or Class 1 air ducts, as defined in NFPA 90B, and in the requirements in UL 181, is used when:

a) They comply with the requirements of NFPA 90B and UL 181; and

b) They have been investigated for the intended application.

Table 7.5
Minimum Thickness of Sheet Metal Ducts

Diameter or width	Galvanized steel			Aluminum		Tin plate
	Nominal thickness	Minimum thickness		Minimum thickness		Minimum weight per base box
inches	inches	inches	(mm)	inches	(mm)	pounds
	(a) Round Ducts and Enclosed Rectangular Ducts:					
14 or less	0.016	0.013	(0.330)	0.016	(0.406)	135
Over 14	0.019	0.016	(0.406)	0.020	(0.508)	–
	(b) Exposed Rectangular Ducts:					
14 or less	0.019	0.016	(0.406)	0.020	(0.508)	–
Over 14	0.022	0.019	(0.483)	0.023	(0.584)	–

7.2.2 Asbestos material shall not be used.

7.2.3 Fibrous insulation materials used in an air handling compartment shall comply with the Erosion Test specified in the requirements in UL 181.

8.12 Air duct system

8.12.1 The combustion air inlet system shall have zero clearance to combustible construction.

8.12.2 The combustion air inlet shall prevent material from dropping into the inlet and also prevent rodents from entering from the outside by use of a minimum 20 gauge wire mesh having openings not larger than 1/4 by 1/4 inch (6.4 by 6.4 mm).

Bibliography: 2024 International Residential Code
UL127 Standard for Safety for Factory-Built Fireplaces, UL 127, Tenth Edition, Dated November 21, 2024

Cost Impact: The 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 to clarify requirements and bring them into alignment with how UL127 fireplaces are tested. This should not have a cost to construction as materials have not changed.

RB272-25

RB273-25

IRC: APPENDIX AB, SECTION AB101, AB101.1, TABLE AB101.1

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

Delete without substitution:

~~APPENDIX AB~~
~~PERMIT FEES~~

~~SECTION AB101~~
~~GENERAL~~

~~**AB101.1 Permit fee schedule.** *Permit* fees shall be in accordance with Table AB101.1.~~

~~TABLE AB101.1 PERMIT FEE SCHEDULE~~

~~TOTAL VALUATION~~	~~FEE~~
~~$1 to $500~~	~~$24~~
~~$501 to $2,000~~	~~$24 for the first $500; plus $3 for each additional $100 or fraction thereof, up to and including $2,000~~
~~$2,001 to $40,000~~	~~$69 for the first $2,000; plus $11 for each additional $1,000 or fraction thereof, up to and including $40,000~~
~~$40,001 to $100,000~~	~~$487 for the first $40,000; plus $9 for each additional $1,000 or fraction thereof, up to and including $100,000~~
~~$100,000 to $500,000~~	~~$1,027 for the first $100,000; plus $7 for each additional $1,000 or fraction thereof, up to and including $500,000~~
~~$500,001 to $1,000,000~~	~~$3,827 for the first $500,000; plus $5 for each additional $1,000 or fraction thereof, up to and including $1,000,000~~
~~$1,000,001 to $5,000,000~~	~~$6,327 for the first $1,000,000; plus $3 for each additional $1,000 or fraction thereof, up to and including $5,000,000~~
~~$5,000,001 and over~~	~~$18,327 for the first $5,000,000; plus $1 for each additional $1,000 or fraction thereof~~

Reason: ADM27-19 removed fees schedules from being inserted at the time of adoption into the IMC, IPC, IPMC, IFGC and ISPSC. If the jurisdiction is on a code for 3 to 6 years, this would prohibit them from adjusting their fees. Adoption of an appendix with fees (IRC) would have the same effect. This appendix should be deleted. A similar change to remove the fees appendix from the IPC and IMC was approved in P159-24 Part I and II.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).

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

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

Justification for no cost impact:

This is editorial. See reason statement.

RB273-25

RB274-25

IRC: BE101.1, FIGURE BE101.1, TABLE BE101.1

Proponents: Thomas Bowles, representing USEPA (bowles.thomas@epa.gov); Jane Malone, representing Indoor Environments Association (janemalonedc@gmail.com); Kevin Stewart, Director, Environmental Health, representing American Lung Association (kevin.stewart@lung.org); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Joshua Kerber, Minnesota Department of Health, representing Minnesota Department of Health and CRCPD E25 Committee on Radon (joshua.kerber@state.mn.us); Ruth McBurney, representing Conference of Radiation Control Program Directors, Inc. (rmcburney@crcpd.org)

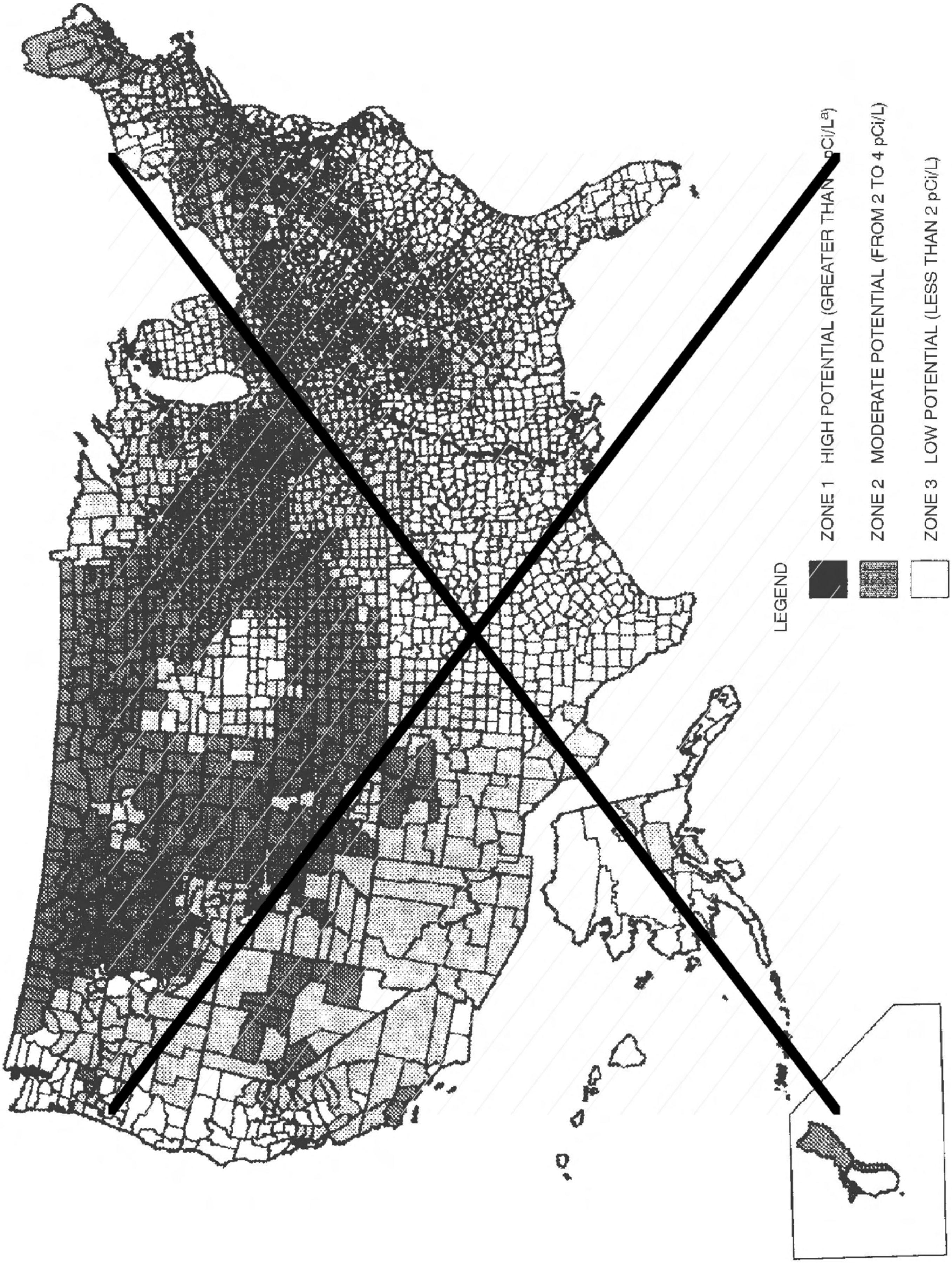
2024 International Residential Code

APPENDIX BE
RADON CONTROL METHODS

Revise as follows:

BE101.1 General. This appendix contains requirements for new construction in jurisdictions where radon-resistant construction is required. ~~Inclusion of this appendix by *jurisdictions*shall be determined through the use of locally available data or determination of Zone 1 designation in Figure AF101.1 and Table AF101.1.~~

Delete without substitution:


LEGEND
ZONE 1 HIGH POTENTIAL (GREATER THAN pCi/L[a])
ZONE 2 MODERATE POTENTIAL (FROM 2 TO 4 pCi/L)
ZONE 3 LOW POTENTIAL (LESS THAN 2 pCi/L)

a. ~~pCi/L stands for picocuries per liter of radon gas. The US Environmental Protection Agency (EPA) recommends that homes that measure 4 pCi/L and greater be mitigated.~~

~~The EPA and the US Geological Survey have evaluated the radon potential in the United States and have developed a map of radon zones designed to assist building officials in deciding whether radon-resistant features are applicable in new construction.~~

~~The map assigns each of the 3,141 counties in the United States to one of three zones based on radon potential. Each zone designation reflects the average short-term radon measurement that can be expected to be measured in a *building* without the implementation of radon-control methods. The radon zone designation of highest priority is Zone 1. Table BE101.1 lists the Zone 1 counties illustrated on the map. More detailed information can be obtained from state-specific booklets (EPA-401-R-93-021 through 070) available through the State Radon Offices or from the EPA Regional Offices.~~

~~FIGURE BE101.1 EPA MAP OF RADON ZONES~~

~~TABLE BE101.1 HIGH RADON-POTENTIAL (ZONE 1) COUNTIES~~[a]

~~ALABAMA~~
~~Calhoun~~
~~Clay~~
~~Cleburne~~
~~Colbert~~
~~Coosa~~
~~Franklin~~
~~Jackson~~
~~Lauderdale~~
~~Lawrence~~
~~Limestone~~
~~Madison~~
~~Morgan~~
~~Talladega~~
~~CALIFORNIA~~
~~Santa Barbara~~
~~Ventura~~
~~COLORADO~~
~~Adams~~
~~Arapahoe~~
~~Baca~~
~~Bent~~
~~Boulder~~
~~Chaffee~~
~~Cheyenne~~
~~Clear Creek~~
~~Crowley~~
~~Custer~~
~~Delta~~
~~Denver~~
~~Dolores~~
~~Douglas~~
~~El Paso~~
~~Elbert~~
~~Fremont~~
~~Garfield~~
~~Gilpin~~
~~Grand~~
~~Gunnison~~
~~Huerfano~~
~~Jackson~~
~~Jefferson~~
~~Kiowa~~
~~Kit Carson~~
~~Lake~~
~~Larimer~~
~~Las Animas~~
~~Lincoln~~

~~Logan~~

~~Mesa~~
~~Moffat~~
~~Montezuma~~
~~Montrose~~
~~Morgan~~
~~Otero~~
~~Ouray~~
~~Park~~
~~Phillips~~
~~Pitkin~~
~~Prowers~~
~~Pueblo~~
~~Rio Blanco~~
~~San Miguel~~
~~Summit~~
~~Teller~~
~~Washington~~
~~Weld~~
~~Yuma~~
~~CONNECTICUT~~
~~Fairfield~~
~~Middlesex~~
~~New Haven~~
~~New London~~
~~GEORGIA~~
~~Cobb~~
~~De Kalb~~
~~Fulton~~
~~Gwinnett~~
~~IDAHO~~
~~Benewah~~
~~Blaine~~
~~Boise~~
~~Bonner~~
~~Boundary~~
~~Butte~~
~~Camas~~
~~Clark~~
~~Clearwater~~
~~Custer~~
~~Elmore~~
~~Fremont~~
~~Gooding~~
~~Idaho~~
~~Kootenai~~
~~Latah~~
~~Lemhi~~
~~Shoshone~~
~~Valley~~
~~ILLINOIS~~
~~Adams~~
~~Boone~~
~~Brown~~
~~Bureau~~
~~Calhoun~~
~~Carroll~~
~~Cass~~
~~Champaign~~
~~Coles~~
~~De Kalb~~
~~De Witt~~
~~Douglas~~
~~Edgar~~
~~Ford~~
~~Fulton~~
~~Greene~~
~~Grundy~~
~~Hancock~~
~~Henderson~~
~~Henry~~

~~Iroquois~~
~~Jersey~~
~~Jo Daviess~~
~~Kane~~
~~Kendall~~
~~Knox~~
~~La Salle~~
~~Lee~~
~~Livingston~~
~~Logan~~
~~Macon~~
~~Marshall~~
~~Mason~~
~~McDonough~~
~~McLean~~
~~Menard~~
~~Mercer~~
~~Morgan~~
~~Moultrie~~
~~Ogle~~
~~Peoria~~
~~Piatt~~
~~Pike~~
~~Putnam~~
~~Rock Island~~
~~Sangamon~~
~~Schuyler~~
~~Scott~~
~~Stark~~
~~Stephenson~~
~~Tazewell~~
~~Vermilion~~
~~Warren~~
~~Whiteside~~
~~Winnebago~~
~~Woodford~~
~~INDIANA~~
~~Adams~~
~~Allen~~
~~Bartholomew~~
~~Benton~~
~~Blackford~~
~~Boone~~
~~Carroll~~
~~Cass~~
~~Clark~~
~~Clinton~~
~~De Kalb~~
~~Decatur~~
~~Delaware~~
~~Elkhart~~
~~Fayette~~
~~Fountain~~
~~Fulton~~
~~Grant~~
~~Hamilton~~
~~Hancock~~
~~Harrison~~
~~Hendricks~~
~~Henry~~
~~Howard~~
~~Huntington~~
~~Jay~~
~~Jennings~~
~~Johnson~~
~~Kosciusko~~
~~LaGrange~~
~~Lawrence~~
~~Madison~~
~~Marion~~
~~Marshall~~
~~Miami~~

~~Monroe~~
~~Montgomery~~
~~Noble~~
~~Orange~~
~~Putnam~~
~~Randolph~~
~~Rush~~
~~Scott~~
~~Shelby~~
~~St. Joseph~~
~~Steuben~~
~~Tippecanoe~~
~~Tipton~~
~~Union~~
~~Vermillion~~
~~Wabash~~
~~Warren~~
~~Washington~~
~~Wayne~~
~~Wells~~
~~White~~
~~Whitley~~
~~IOWA~~
~~All Counties~~
~~KANSAS~~
~~Atchison~~
~~Barton~~
~~Brown~~
~~Cheyenne~~
~~Clay~~
~~Cloud~~
~~Decatur~~
~~Dickinson~~
~~Douglas~~
~~Ellis~~
~~Ellsworth~~
~~Finney~~
~~Ford~~
~~Geary~~
~~Gove~~
~~Graham~~
~~Grant~~
~~Gray~~
~~Greeley~~
~~Hamilton~~
~~Haskell~~
~~Hodgeman~~
~~Jackson~~
~~Jewell~~
~~Johnson~~
~~Kearny~~
~~Kingman~~
~~Kiowa~~
~~Lane~~
~~Leavenworth~~
~~Lincoln~~
~~Logan~~
~~Marion~~
~~Marshall~~
~~McPherson~~
~~Meade~~
~~Mitchell~~
~~Nemaha~~
~~Ness~~
~~Norton~~
~~Osborne~~
~~Ottawa~~
~~Pawnee~~
~~Phillips~~
~~Pottawatomie~~
~~Pratt~~
~~Rawlins~~

~~Republic~~
~~Rice~~
~~Riley~~
~~Rooks~~
~~Rush~~
~~Saline~~
~~Scott~~
~~Sheridan~~
~~Sherman~~
~~Smith~~
~~Stanton~~
~~Thomas~~
~~Trego~~
~~Wallace~~
~~Washington~~
~~Wichita~~
~~Wyandotte~~
~~KENTUCKY~~
~~Adair~~
~~Allen~~
~~Barren~~
~~Bourbon~~
~~Boyle~~
~~Bullitt~~
~~Casey~~
~~Clark~~
~~Cumberland~~
~~Fayette~~
~~Franklin~~
~~Green~~
~~Harrison~~
~~Hart~~
~~Jefferson~~
~~Jessamine~~
~~Lincoln~~
~~Marion~~
~~Mercer~~
~~Metcalfe~~
~~Monroe~~
~~Nelson~~
~~Pendleton~~
~~Pulaski~~
~~Robertson~~
~~Russell~~
~~Scott~~
~~Taylor~~
~~Warren~~
~~Woodford~~
~~MAINE~~
~~Androscoggin~~
~~Aroostook~~
~~Cumberland~~
~~Franklin~~
~~Hancock~~
~~Kennebec~~
~~Lincoln~~
~~Oxford~~
~~Penobscot~~
~~Piscataquis~~
~~Somerset~~
~~York~~
~~MARYLAND~~
~~Baltimore~~
~~Calvert~~
~~Carroll~~
~~Frederick~~
~~Harford~~
~~Howard~~
~~Montgomery~~
~~Washington~~
~~MASS.~~

~~Essex~~
~~Middlesex~~
~~Worcester~~
~~**MICHIGAN**~~
~~Branch~~
~~Calhoun~~
~~Cass~~
~~Hillsdale~~
~~Jackson~~
~~Kalamazoo~~
~~Lenawee~~
~~St. Joseph~~
~~Washtenaw~~
~~**MINNESOTA**~~
~~Becker~~
~~Big Stone~~
~~Blue Earth~~
~~Brown~~
~~Carver~~
~~Chippewa~~
~~Clay~~
~~Cottonwood~~
~~Dakota~~
~~Dodge~~
~~Douglas~~
~~Faribault~~
~~Fillmore~~
~~Freeborn~~
~~Goodhue~~
~~Grant~~
~~Hennepin~~
~~Houston~~
~~Hubbard~~
~~Jackson~~
~~Kanabec~~
~~Kandiyohi~~
~~Kittson~~
~~Lac Qui Parle~~
~~Le Sueur~~
~~Lincoln~~
~~Lyon~~
~~Mahnomen~~
~~Marshall~~
~~Martin~~
~~McLeod~~
~~Meeker~~
~~Mower~~
~~Murray~~
~~Nicollet~~
~~Nobles~~
~~Norman~~
~~Olmsted~~
~~Otter Tail~~
~~Pennington~~
~~Pipestone~~
~~Polk~~
~~Pope~~
~~Ramsey~~
~~Red Lake~~
~~Redwood~~
~~Renville~~
~~Rice~~
~~Rock~~
~~Roseau~~
~~Scott~~
~~Sherburne~~
~~Sibley~~
~~Stearns~~
~~Steele~~
~~Stevens~~
~~Swift~~
~~Todd~~

~~Traverse~~
~~Wabasha~~
~~Wadena~~
~~Waseca~~
~~Washington~~
~~Watonwan~~
~~Wilkin~~
~~Winona~~
~~Wright~~
~~Yellow Medicine~~
~~**MISSOURI**~~
~~Andrew~~
~~Atchison~~
~~Buchanan~~
~~Cass~~
~~Clay~~
~~Clinton~~
~~Holt~~
~~Iron~~
~~Jackson~~
~~Nodaway~~
~~Platte~~
~~**MONTANA**~~
~~Beaverhead~~
~~Big Horn~~
~~Blaine~~
~~Broadwater~~
~~Carbon~~
~~Carter~~
~~Cascade~~
~~Chouteau~~
~~Custer~~
~~Daniels~~
~~Dawson~~
~~Deer Lodge~~
~~Fallon~~
~~Fergus~~
~~Flathead~~
~~Gallatin~~
~~Garfield~~
~~Glacier~~
~~Granite~~
~~Hill~~
~~Jefferson~~
~~Judith Basin~~
~~Lake~~
~~Lewis and Clark~~
~~Madison~~
~~McCone~~
~~Meagher~~
~~Missoula~~
~~Park~~
~~Phillips~~
~~Pondera~~
~~Powder River~~
~~Powell~~
~~Prairie~~
~~Ravalli~~
~~Richland~~
~~Roosevelt~~
~~Rosebud~~
~~Sanders~~
~~Sheridan~~
~~Silver Bow~~
~~Stillwater~~
~~Teton~~
~~Toole~~
~~Valley~~
~~Wibaux~~
~~Yellowstone~~
~~**NEBRASKA**~~
~~Adams~~

~~Boone~~
~~Boyd~~
~~Burt~~
~~Butler~~
~~Cass~~
~~Cedar~~
~~Clay~~
~~Colfax~~
~~Cuming~~
~~Dakota~~
~~Dixon~~
~~Dodge~~
~~Douglas~~
~~Fillmore~~
~~Franklin~~
~~Frontier~~
~~Furnas~~
~~Gage~~
~~Gosper~~
~~Greeley~~
~~Hamilton~~
~~Harlan~~
~~Hayes~~
~~Hitchcock~~
~~Hurston~~
~~Jefferson~~
~~Johnson~~
~~Kearney~~
~~Knox~~
~~Lancaster~~
~~Madison~~
~~Nance~~
~~Nemaha~~
~~Nuckolls~~
~~Otoe~~
~~Pawnee~~
~~Phelps~~
~~Pierce~~
~~Platte~~
~~Polk~~
~~Red Willow~~
~~Richardson~~
~~Saline~~
~~Sarpy~~
~~Saunders~~
~~Seward~~
~~Stanton~~
~~Thayer~~
~~Washington~~
~~Wayne~~
~~Webster~~
~~York~~
~~NEVADA~~
~~Carson City~~
~~Douglas~~
~~Eureka~~
~~Lander~~
~~Lincoln~~
~~Lyon~~
~~Mineral~~
~~Pershing~~
~~White Pine~~
~~NEW HAMPSHIRE~~
~~Carroll~~
~~NEW JERSEY~~
~~Hunterdon~~
~~Mercer~~
~~Monmouth~~
~~Morris~~
~~Somerset~~
~~Sussex~~
~~Warren~~

~~**NEW MEXICO**~~
~~Bernalillo~~
~~Colfax~~
~~Mora~~
~~Rio Arriba~~
~~San Miguel~~
~~Santa Fe~~
~~Taos~~
~~**NEW YORK**~~
~~Albany~~
~~Allegany~~
~~Broome~~
~~Cattaraugus~~
~~Cayuga~~
~~Chautauqua~~
~~Chemung~~
~~Chenango~~
~~Columbia~~
~~Cortland~~
~~Delaware~~
~~Dutchess~~
~~Erie~~
~~Genesee~~
~~Greene~~
~~Livingston~~
~~Madison~~
~~Onondaga~~
~~Ontario~~
~~Orange~~
~~Otsego~~
~~Putnam~~
~~Rensselaer~~
~~Schoharie~~
~~Schuyler~~
~~Seneca~~
~~Steuben~~
~~Sullivan~~
~~Tioga~~
~~Tompkins~~
~~Ulster~~
~~Washington~~
~~Wyoming~~
~~Yates~~
~~**N. CAROLINA**~~
~~Alleghany~~
~~Buncombe~~
~~Cherokee~~
~~Henderson~~
~~Mitchell~~
~~Rockingham~~
~~Transylvania~~
~~Watauga~~
~~**N. DAKOTA**~~
~~All Counties~~
~~**OHIO**~~
~~Adams~~
~~Allen~~
~~Ashland~~
~~Auglaize~~
~~Belmont~~
~~Butler~~
~~Carroll~~
~~Champaign~~
~~Clark~~
~~Clinton~~
~~Columbiana~~
~~Coshocton~~
~~Crawford~~
~~Darke~~
~~Delaware~~
~~Fairfield~~
~~Fayette~~

~~Franklin~~
~~Greene~~
~~Guernsey~~
~~Hamilton~~
~~Hancock~~
~~Hardin~~
~~Harrison~~
~~Holmes~~
~~Huron~~
~~Jefferson~~
~~Knox~~
~~Licking~~
~~Logan~~
~~Madison~~
~~Marion~~
~~Mercer~~
~~Miami~~
~~Montgomery~~
~~Morrow~~
~~Muskingum~~
~~Perry~~
~~Pickaway~~
~~Pike~~
~~Preble~~
~~Richland~~
~~Ross~~
~~Seneca~~
~~Shelby~~
~~Stark~~
~~Summit~~
~~Tuscarawas~~
~~Union~~
~~Van Wert~~
~~Warren~~
~~Wayne~~
~~Wyandot~~
~~PENNSYLVANIA~~
~~Adams~~
~~Allegheny~~
~~Armstrong~~
~~Beaver~~
~~Bedford~~
~~Berks~~
~~Blair~~
~~Bradford~~
~~Bucks~~
~~Butler~~
~~Cameron~~
~~Carbon~~
~~Centre~~
~~Chester~~
~~Clarion~~
~~Clearfield~~
~~Clinton~~
~~Columbia~~
~~Cumberland~~
~~Dauphin~~
~~Delaware~~
~~Franklin~~
~~Fulton~~
~~Huntingdon~~
~~Indiana~~
~~Juniata~~
~~Lackawanna~~
~~Lancaster~~
~~Lebanon~~
~~Lehigh~~
~~Luzerne~~
~~Lycoming~~
~~Mifflin~~
~~Monroe~~
~~Montgomery~~

~~Montour~~
~~Northampton~~
~~Northumberland~~
~~Perry~~
~~Schuylkill~~
~~Snyder~~

~~Sullivan~~
~~Susquehanna~~
~~Tioga~~
~~Union~~
~~Venango~~
~~Westmoreland~~
~~Wyoming~~
~~York~~
~~RHODE ISLAND~~
~~Kent~~
~~Washington~~
~~S. CAROLINA~~
~~Greenville~~
~~S. DAKOTA~~
~~Aurora~~
~~Beadle~~
~~Bon Homme~~
~~Brookings~~
~~Brown~~
~~Brule~~
~~Buffalo~~
~~Campbell~~
~~Charles Mix~~
~~Clark~~
~~Clay~~
~~Codington~~
~~Corson~~
~~Davison~~
~~Day~~
~~Deuel~~
~~Douglas~~
~~Edmunds~~
~~Faulk~~
~~Grant~~
~~Hamlin~~
~~Hand~~
~~Hanson~~
~~Hughes~~
~~Hutchinson~~
~~Hyde~~
~~Jerauld~~
~~Kingsbury~~
~~Lake~~
~~Lincoln~~
~~Lyman~~
~~Marshall~~
~~McCook~~
~~McPherson~~
~~Miner~~
~~Minnehaha~~
~~Moody~~
~~Perkins~~
~~Potter~~
~~Roberts~~
~~Sanborn~~
~~Spink~~
~~Stanley~~
~~Sully~~
~~Turner~~
~~Union~~
~~Walworth~~
~~Yankton~~
~~TENNESSEE~~
~~Anderson~~
~~Bedford~~

~~Blount~~
~~Bradley~~
~~Claiborne~~
~~Davidson~~
~~Giles~~
~~Grainger~~
~~Greene~~
~~Hamblen~~
~~Hancock~~
~~Hawkins~~
~~Hickman~~
~~Humphreys~~
~~Jackson~~
~~Jefferson~~
~~Knox~~
~~Lawrence~~
~~Lewis~~
~~Lincoln~~
~~Loudon~~
~~Marshall~~
~~Maury~~
~~McMinn~~
~~Meigs~~
~~Monroe~~
~~Moore~~
~~Perry~~
~~Roane~~
~~Rutherford~~
~~Smith~~
~~Sullivan~~
~~Trousdale~~
~~Union~~
~~Washington~~
~~Wayne~~
~~Williamson~~
~~Wilson~~
~~UTAH~~
~~Carbon~~
~~Duchesne~~
~~Grand~~
~~Piute~~
~~Sanpete~~
~~Sevier~~
~~Uintah~~
~~VIRGINIA~~
~~Alleghany~~
~~Amelia~~
~~Appomattox~~
~~Augusta~~
~~Bath~~
~~Bland~~
~~Botetourt~~
~~Bristol~~
~~Brunswick~~
~~Buckingham~~
~~Buena Vista~~
~~Campbell~~
~~Chesterfield~~
~~Clarke~~
~~Clifton Forge~~
~~Covington~~
~~Craig~~
~~Cumberland~~
~~Danville~~
~~Dinwiddie~~
~~Fairfax~~
~~Falls Church~~
~~Fluvanna~~
~~Frederick~~
~~Fredericksburg~~
~~Giles~~
~~Goochland~~

~~Harrisonburg~~
~~Henry~~
~~Highland~~
~~Lee~~
~~Lexington~~
~~Louisa~~
~~Martinsville~~
~~Montgomery~~

~~Nottoway~~
~~Orange~~
~~Page~~
~~Patrick~~
~~Pittsylvania~~
~~Powhatan~~
~~Pulaski~~
~~Radford~~
~~Roanoke~~
~~Rockbridge~~
~~Rockingham~~
~~Russell~~
~~Salem~~
~~Scott~~
~~Shenandoah~~
~~Smyth~~
~~Spotsylvania~~
~~Stafford~~
~~Staunton~~
~~Tazewell~~
~~Warren~~
~~Washington~~
~~Waynesboro~~
~~Winchester~~
~~Wythe~~
~~WASHINGTON~~
~~Clark~~
~~Ferry~~
~~Okanogan~~
~~Pend Oreille~~
~~Skamania~~
~~Spokane~~
~~Stevens~~
~~W. VIRGINIA~~
~~Berkeley~~
~~Brooke~~
~~Grant~~
~~Greenbrier~~
~~Hampshire~~
~~Hancock~~
~~Hardy~~
~~Jefferson~~
~~Marshall~~
~~Mercer~~
~~Mineral~~
~~Monongalia~~
~~Monroe~~
~~Morgan~~
~~Ohio~~
~~Pendleton~~
~~Pocahontas~~
~~Preston~~
~~Summers~~
~~Wetzel~~
~~WISCONSIN~~
~~Buffalo~~
~~Crawford~~
~~Dane~~
~~Dodge~~
~~Door~~
~~Fond du Lac~~
~~Grant~~
~~Green~~

~~Green Lake~~
~~Iowa~~
~~Jefferson~~
~~Lafayette~~
~~Langlade~~
~~Marathon~~
~~Menominee~~
~~Pepin~~
~~Pierce~~
~~Portage~~
~~Richland~~
~~Rock~~
~~Shawano~~
~~St. Croix~~
~~Vernon~~
~~Walworth~~
~~Washington~~
~~Waukesha~~
~~Waupaca~~
~~Wood~~
~~**WYOMING**~~
~~Albany~~
~~Big Horn~~
~~Campbell~~
~~Carbon~~
~~Converse~~
~~Crook~~
~~Fremont~~
~~Goshen~~
~~Hot Springs~~
~~Johnson~~
~~Laramie~~
~~Lincoln~~
~~Natrona~~
~~Niobrara~~
~~Park~~
~~Sheridan~~
~~Sublette~~
~~Sweetwater~~
~~Teton~~
~~Uinta~~
~~Washakie~~

a. ~~The EPA recommends that this county listing be supplemented with other available state and local data to further understand the radon potential of a Zone 1 area.~~

Reason: The EPA map and Zone 1 county list are based in part on a 1993 survey that measured radon in 5694 homes, less than two per each of the 3141counties in the US. As more recent data have been compiled by states and the US Centers for Disease Control and Prevention, it is evident that more counties' have homes that exceed the EPA action level.

Radon Zone 1 counties are defined as having a predicted year-round average indoor radon screening level in the lowest livable area of a structure greater than or equal to four picocuries per liter of air (pCi/L). Relying on an average radon level does not address the full range of risk within a given county. Levels greater than 4 have been found in 85% of US counties tested.

Restricting localities as to when or how they may include the appendix("shall be determined through") can cause this appendix to conflict with local authority.

While opponents may suggest otherwise, deleting the county information does not impose a requirement for adoption in Zones 2 and 3.Appendix BE will remain an optional appendix that is only in effect where the jurisdiction has adopted it.

The purpose of the EPA radon zone map, since its inception, has been to show potential of risk not ACTUAL risk. While it is still a useful tool, the map unintentionally creates a false sense of security for those in Zone 2 and Zone 3 that risk in those areas is nonexistent. The fact remains that radon is found in all zones and to truly protect against radon you need to test regardless of zone.

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

Justification for no cost impact:

Removing a reference will have no impact on cost. Appendix BE is an optional requirement that can be adopted by a jurisdiction.

RB274-25

RB275-25

IRC: BE103.1, SECTION BE105 (New), BE105.1 (New), TABLE 105.1 (New)

Proponents: Jane Malone, representing Indoor Environments Association (janemalonedc@gmail.com); Kevin Stewart, Director, Environmental Health, representing American Lung Association (kevin.stewart@lung.org); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Thomas Bowles, representing USEPA (bowles.thomas@epa.gov); Joshua Kerber, Minnesota Department of Health, representing Minnesota Department of Health and CRCPD E25 Committee on Radon (joshua.kerber@state.mn.us); Ruth McBurney, representing Conference of Radiation Control Program Directors, Inc. (rmcburney@crcpd.org); Kyle Hoylman, representing Indoor Environments Association

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APPENDIX BE
RADON CONTROL METHODS

Revise as follows:

BE103.1 General. The following construction techniques are intended to resist radon entry and prepare the *building* for post-construction radon mitigation, if necessary (see Figure BE103.1). These techniques are required in areas where designated by the *jurisdiction*. Radon control systems shall comply with Sections BE103.2 through BE103.12 or ANSI/AARST RRNC.

Add new text as follows:

SECTION BE105
REFERENCED STANDARDS

BE105.1 General. See Table BE105.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference the standard.

TABLE 105.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ANSI/AARST RRNC 2020 Rev.10/22	Rough-in of Radon Control Components in New Construction of 1 and 2 Family Dwellings and Townhouses	BE103.1

Reason: Adding the ANSI/AARSTRRNC standard asan alternative method allowsthe builderto fulfill a jurisdictional requirementfor radoncontrolby followinganEPA-recommendedvoluntary consensus standardfor radoncontrolsystem components innewdwelling units. Its moredetailedguidancecanassist builders inthe successfulinstallationof radonsystems, preventinghighradonlevels and reducing buyer callbacks.

Thestandardhasbeendevelopedandismaintainedbyadiversegroupof stakeholdersrepresentingnot onlyradonexpertsbut also home builders,design professionals,state government,federal agencies,and public health leadership.

TheCommonwealthofMassachusettsallows a similar ANSI/AARST new construction standard asanalternativetoitsstatewidebuildingcode's versionof IRC AppendixBE.

ANSI/AARSTRRNC supports code officials, building inspectors,and otherpartieswho inspectsystem componentsinstalledunderthestandardwitha visual review checklist inthecompanionguidance.

Thisstandardcanbeviewed atnocostontheStandardsConsortium'swebsite.

The full name and address of the promulgator is: American Association of Radon Scientists and Technologists, 527 N. Justice Street, Hendersonville NC 28739

Bibliography:

RRNC 2020 Rev. 10/22 ***Rough-in of Radon Control Components in New Construction of 1 & 2 family dwellings and townhouses***

https://standards.aarst.org/RRNC-2020-1022/index.html#zoom=z

US Environmental Protection Agency - *Current Standards of Practice*
https://www.epa.gov/radon/radon-standards-practice

Massachusetts State Board of Building Regulation and Standards - *Building Code*
https://www.mass.gov/doc/bbrs-10th-edition-building-code/download

Cost Impact: The 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 alternative method would not be required, there is no inherent change in the cost of construction.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
ANSI/AARST RRNC 2020 Rev.10/22 Rough-in of Radon Control Components in New Construction of 1 & 2 family dwellings and townhouses

RB275-25

RB276-25

IRC: BE103.5.2

Proponents: Tom Marks, Stego Industries, LLC, representing Stego Industries

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APPENDIX BE
RADON CONTROL METHODS

Revise as follows:

BE103.5.2 Soil-gas-retarder. The soil in *crawl spaces* shall be covered with a continuous ~~layer of minimum 6-mil (0.15 mm) polyethylene~~ *soil-gas-retarder* complying with vapor retarder requirements in Section R408.3. The ground cover shall be lapped not less than 12 inches (305 mm) at joints and shall extend to all foundation walls enclosing the *crawl space* area.

Reason: Section BE103.3 for the soil-gas-retarder beneath concrete slabs currently references Section R506.3.3 for the vapor retarder beneath concrete floors on ground. In a practical sense, the water vapor retarder beneath the concrete floor slab will be serving as the soil-gas-retarder for radon control, so this makes sense. Thus, the proposed change would simply be the same rationale applied to the soil-gas-retarder in a crawl space.

Cost Impact: The 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 harmonizes related code text and categories to remove ambiguity amongst code text for the same or similar application requirements across multiple code categories.

RB276-25

RB277-25

IRC: BE103.6.1, BE103.5.3

Proponents: Joshua Kerber, Minnesota Department of Health, representing Minnesota Department of Health and CRCPD E25 Committee on Radon (joshua.kerber@state.mn.us); Jane Malone, representing Indoor Environments Association (janemalonedc@gmail.com); Thomas Bowles, representing USEPA (bowles.thomas@epa.gov); Kevin Stewart, Director, Environmental Health, representing American Lung Association (kevin.stewart@lung.org); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Ruth McBurney, representing Conference of Radiation Control Program Directors, Inc. (rmcburney@crcpd.org)

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APPENDIX BE
RADON CONTROL METHODS

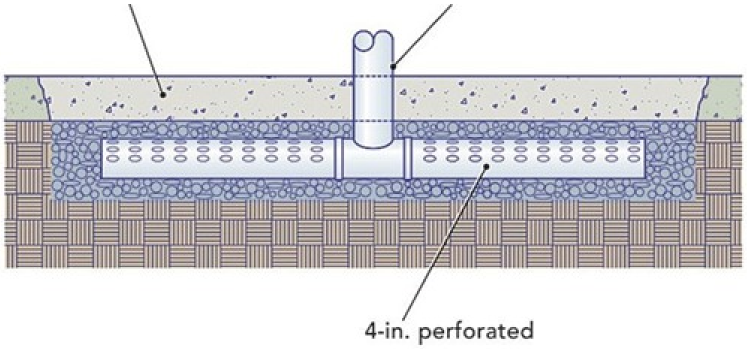
Revise as follows:

BE103.6.1 Vent pipe. A minimum 3-inch-diameter (76 mm) ABS, PVC or equivalent gastight pipe shall be embedded vertically into the subslab aggregate or other permeable material before the slab is cast. A “T” fitting or equivalent method shall be used to ensure that the pipe opening remains within the subslab permeable material, and not less than 5 feet (127 cm) of perforated pipe or geotextile matting shall be connected to each of the horizontal openings of the tee fitting. Alternatively, the 3-inch (76 mm) pipe shall be inserted directly into an interior perimeter *drain tile loop* or through a sealed sump cover where the sump is exposed to the subslab aggregate or connected to it through a drainage system.The pipe shall be extended up through the building floors, and terminate not less than 12 inches (305 mm) above the surface of the roof in a location not less than 10 feet (3048 mm) away from any window or other opening into the *conditioned spaces* of the *building* that is less than 2 feet (610 mm) below the exhaust point, and 10 feet (3048 mm) from any window or other opening in adjoining or adjacent *buildings*. Above ground pipe material shall comply with Section P3002.1.

BE103.5.3 Vent pipe. A plumbing tee or other *approved* connection shall be inserted horizontally beneath the sheeting and connected to a 3- or 4-inch-diameter (76 or 102 mm) fitting with a vertical vent pipe installed through the sheeting, and not less than 5 feet (127 cm) of perforated pipe or geotextile matting shall be connected to each of the horizontal openings of the tee fitting. The vent pipe shall be extended up through the building floors, and terminate not less than 12 inches (305 mm) above the roof in a location not less than 10 feet (3048 mm) away from any window or other opening into the *conditioned spaces* of the *building* that is less than 2 feet (610 mm) below the exhaust point, and 10 feet (3048 mm) from any window or other opening in adjoining or adjacent *buildings*.Above ground pipe material shall comply with Section P3002.1.

Reason: This proposal provides a soil gas collector and keeps open the horizontal openings in the tee fitting for both sub-slab and sub-membrane (crawl space) installations. The tee fitting is a suction point through which radon gas is pulled from below the building into the vertical vent pipe. If no pipe is present to protect the side openings in the tee fitting from filling with concrete (when the slab is cast) or aggregate, the above ground pipe cannot vent radon from below the structure to the outside.
This proposal also clarifies that the material requirement shall be consistent with Chapter 30.

Attaching five foot long perforated piping to tee fittings is required by the USEPA recommended CCAH 2020 Rev 5/23 for both sub-slab and sub-membrane systems.


4-in. perforated

Bibliography:
CCAH 2020 Rev. 05/23 *Reducing Radon in New Construction of 1 & 2 Family Dwellings and Townhouses*
https://standards.aarst.org/CCAH-2020-0523/index.html#zoom=z
US Environmental Protection Agency - *Current Standards of Practice*
https://www.epa.gov/radon/radon-standards-practice

Cost Impact: Increase

Estimated Immediate Cost Impact:

The typical cost for a ten-foot long perforated pipe with a four-inch diameter is $16-20. This pipe will be cut in half and each half attached to a horizontal opening in the tee fitting.

Estimated Immediate Cost Impact Justification (methodology and variables):

Pricing Research 1-10-25
https://www.homedepot.com/p/Advanced-Drainage-Systems-4-in-x-10-ft-Triplewall-Perforated-Drain-Pipe-4520010/100191022 $19.99
https://www.lowes.com/pd/ADS-4-in-x-10-ft-Corrugated-Perforated-Pipe/3221925 $16.90-19.88
https://www.menards.com/main/plumbing/pipe-fittings/pvc-pipe-fittings/poly-3-wall-reg-4x-10-perforated-sewer-and-drain-pipe-4-6-8-astm-f810/04tw10pf3-lb/p-1444424878508-c-8571.htm $15.99

RB278-25

IRC: BE103.8

Proponents: Joshua Kerber, Minnesota Department of Health, representing Minnesota Department of Health and CRCPD E25 Committee on Radon (joshua.kerber@state.mn.us); Thomas Bowles, representing USEPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, Director, Environmental Health, representing American Lung Association (kevin.stewart@lung.org); Jane Malone, representing Indoor Environments Association (janemalonedc@gmail.com); Ruth McBurney, representing Conference of Radiation Control Program Directors, Inc. (rmcburney@crcpd.org)

2024 International Residential Code

APPENDIX BE
RADON CONTROL METHODS

Revise as follows:

BE103.8 Vent pipe accessibility. Radon vent pipes shall be accessible for future fan installation through an *attic* or other area outside the *habitable space*. The pipe shall be centered in an unobstructed cylindrical space having a height of not less than 36 inches (91 cm) and a diameter of not less than 21 inches (53 cm) in the location where the fan would be installed.

> **Exception:** The radon vent pipe need not be accessible ~~in~~ within an *attic* space where an *approved* ~~roof top~~ electrical supply is provided for future use on the roof top or other area outside the habitable space.

Reason: This change reserves adequate space in the attic for future installation of a radon fan. This language allows for easier system activation as it requires ample working room to install a fan and eliminate the abandonment of existing vent pipes that are inaccessible due to their location in an outside wall or near the gable end of a house. This is a common field failure where the pipe is run too close to the eave or outside walls. If the existing pipe system needs to be abandoned, then an additional roof penetration will be necessary and the old penetration closed and sealed.

Similar language has been part of the Minnesota Building Code (MN Code 1303.2402 subpart 5 (D)) for over a decade and has allowed for many thousands of passive radon control systems to be installed with far fewer complaints from contractors needing to add a fan. The proposed language solved one of the most common complaints our radon program would receive from our radon contractors. Having to spend less time installing the fan because of these new yet simple accessibility requirements ultimately saves fan installation costs. This language also appears in the USEPA Recommended CCAH 2020 Rev 5/2023.

Bibliography: Minnesota State Building Code 1303.2402 Subpart 5 (D): https://www.revisor.mn.gov/rules/1303.2402/

CCAH 2020 Rev. 05/23 *Reducing Radon in New Construction of 1 & 2 Family Dwellings and Townhouses*
https://standards.aarst.org/CCAH-2020-0523/index.html#zoom=z
US Environmental Protection Agency - *Current Standards of Practice*
https://www.epa.gov/radon/radon-standards-practice

Cost Impact: The 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 defines a volume of space in an attic location where a radon fan can be installed, if necessary. No new material costs are added, however, the defined volume space requirement assists with proper pipe layout design to facilitate any future fan installation. This can lead to future costs savings for the occupant.

RB278-25

RB279-25

IRC: BE103.8

Proponents: Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov); Daniel Carroll, New York State Department of State, representing Division of Building Standards and Codes (daniel.carroll@dos.ny.gov); Christopher Jensen, representing NYS DOS - Division of Building Standards and Codes (christopher.jensen@dos.ny.gov); Kevin Duerr-Clark, representing NYSDOS (kevin.duerr-clark@dos.ny.gov); Stephen Van Hoose, representing NYS DOS (stephen.vanhoose@dos.ny.gov); China Clarke, representing New York State Dept of State (china.clarke@dos.ny.gov); Brian Tollisen, representing NYS Department of State, Division of Building Standards and Codes (brian.tollisen@dos.ny.gov); Chad Sievers, NYS, representing NYS Dept of State (chad.sievers@dos.ny.gov); Larissa DeLango, representing NYSDOS (larissa.delango@dos.ny.gov)

2024 International Residential Code

APPENDIX BE
RADON CONTROL METHODS

Revise as follows:

BE103.8 Vent pipe access ~~accessibility~~. Ready access shall be provided to radon ~~Radon~~ vent pipes ~~shall be accessible~~ for future fan installation through an *attic* or other area outside the *habitable space*.

Exception: The radon vent pipe need not be ~~accessible~~ provided with ready access in an *attic* space where an *approved* roof-top electrical supply is provided for future use.

Reason: The term "accessibility" is generally used to refer to provisions which allow people with physical disabilities to access buildings and building elements. The sections included in this proposal do not include provisions regarding access for people with physical disabilities - instead the term "accessibility" is used to refer to the ability of anyone to access the building element. To avoid confusion, this proposal changes the word "accessibility" to "access" to provide clarity as to the content of the section, and includes some slight necessary revisions to correct grammar inconsistencies arising from this 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:

This is an editorial change uses a correct defined term.

RB279-25

RB280-25

IRC: BE103.12

Proponents: Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

APPENDIX BE
RADON CONTROL METHODS

Revise as follows:

BE103.12 Power source. To provide for future installation of an active submembrane or *subslab depressurization system*, a~~n electrical~~ branch circuit terminated in a~~n~~ ~~*approved*~~ junction box shall be installed during construction in the *attic* or other anticipated location of vent pipe fans. ~~An electrical supply shall be accessible in anticipated locations of system failure alarms.~~

Reason: The change is intended to clarify that an electrical circuit is required only at the location of the future fan installation so it's possible to convert a passive system to an active, without additional expensive wiring. It is not necessary to provide an electrical circuit specifically for radon fan monitoring, as many alarms on the market today use a multi-year long life battery. And it's likely in most installations that an electrical outlet is readily available near the location of a future alarm, should a 120v system be selected.

This proposal is submitted by the ICC Building Code Action Committee (BCAC).
BCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 and 2024 the BCAC has held several virtual meetings open to any interested party. In addition, there were numerous virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the BCAC website at BCAC webpage.

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

Justification for no cost impact:

Removes ambiguous requirement with no clear path for requirements.

RB280-25

RB281-25

IRC: BF106.4.1, FIGURE BF106.4.1

Proponents: Stephen Thomas, representing ICC Code Correlation Committee (sthomas@coloradocode.net)

2024 International Residential Code

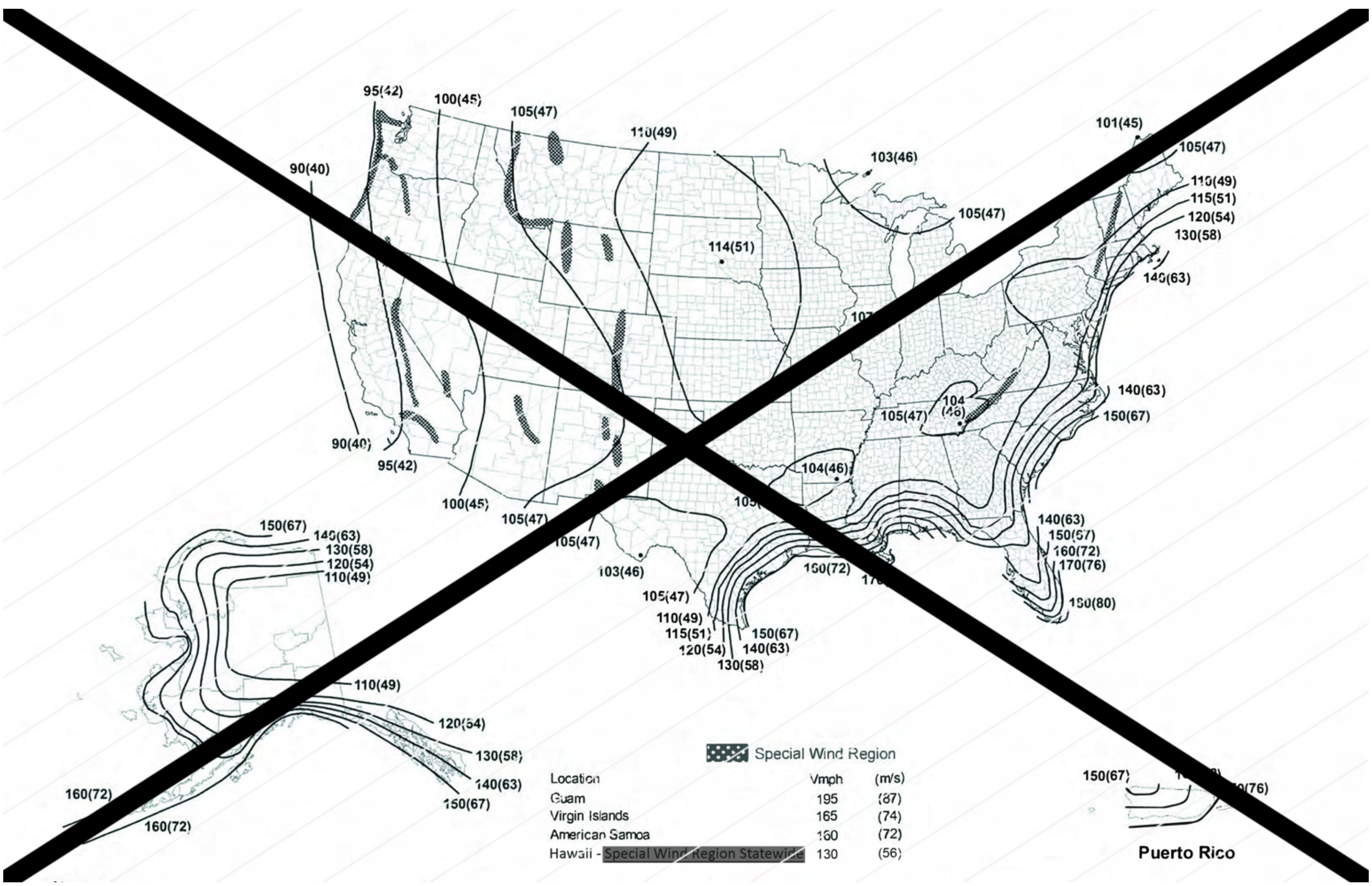
APPENDIX BF
PATIO COVERS

SECTION BF106
SPECIAL PROVISIONS FOR ALUMINUM SCREEN ENCLOSURES IN HURRICANE-PRONE REGIONS

Revise as follows:

BF106.4.1 Wind load. Structural members supporting screen enclosures shall be designed to support the minimum wind loads given in Tables BF106.4.1(1) and BF106.4.1(2) for the ultimate design wind speed, V_{ult}, determined from Figure ~~BF106.4.1~~ R302.1.2(2) . Where any value is less than 10 pounds per square foot (psf) (0.479 kN/m^2) use 10 pounds per square foot (0.479 kN/m^2).

Delete without substitution:



~~For SI: 1 foot = 304.8 mm, 1 mph = 0.447 m/s.~~
~~Notes:~~

1. ~~Values are nominal design 3-second gust wind speeds in miles per hour (m/s) at 33 feet above ground for Exposure C category.~~
2. ~~Linear interpolation between contours is permitted.~~
3. ~~Islands and coastal areas outside the last contour shall use the last wind speed contour of the coastal area.~~
4. ~~Mountainous terrain, gorges, ocean promontories and special wind regions shall be examined for unusual wind conditions.~~
5. ~~Wind speeds correspond to approximately a 7-percent probability of exceedance in 50 years (Annual Exceedance Probability = 0.00143, MRI = 700 years).~~

~~FIGURE BF106.4.1 ULTIMATE DESIGN WIND SPEEDS FOR PATIO COVERS AND SCREEN ENCLOSURES~~

Reason: Figure R302.1.2(2) for wind loads was updated/replaced in proposal RB35-22 AS. The table in Figure BF106.4.1 was the same, but no one proposed to update this figure. Be deleting Figure BF106.4.1 and replacing it with a reference to Figure R302.1.2(2), this will remain coordinated over time.

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

Justification for no cost impact:

This is a coordination item. See the reason statement.

RB281-25

RB282-25

IRC: APPENDIX BH, BH101.1, SECTION BH103, BH103.1, BH103.2, BH103.3 (New), TABLE BH104.1

Proponents: Catherine Mills-Reynolds, American Fence Association, representing AFA (catherine@americanfenceassociation.com); Ben Shirley, Ameristar Perimeter Security, representing ASTM F14 (ben.shirley@assaabloy.com); Dave Monsour, Thomas Associates, representing DASMA (dmonsour@thomasamc.com); Richard Sedivy, DoorKing, Inc., representing DASMA (rsedivy@doorking.com); Kevin Ward, Miller Edge Inc, representing American Fence Association (kward@milleredge.com); Don Jeppson, representing City of San Rafael (don.jeppson@cityofsanrafael.org); Scott Kinney, D&D Technologies, representing ASTM F14.15 Gates (skinney@ddtechusa.com); Eric Quanbeck, representing The Hummingbird Alliance (eric.m.quanbeck@gmail.com); Jeff Grove, Chair, representing BCAC (bcac@iccsafe.org)

2024 International Residential Code

Revise as follows:

APPENDIX BH
~~AUTOMATIC VEHICULAR~~ GATES

BH101.1 General. The provisions of this appendix shall control the design and construction of horizontal, swing or automatic vehicular gates, installed on the *lot* of a one- or two-family dwelling or a *townhouse*.

SECTION BH103
HORIZONTAL, SWING AND ~~AUTOMATIC~~ VEHICULAR GATES

Add new text as follows:

BH103.1 General. A horizontal slide gate or a swing gate installed in an opening more than 48 inches (1219 mm) measured horizontally or 84 inches (2134 mm) or greater measured vertically shall comply with this section. *Vehicular gates* of any size shall comply with this section.

BH103.2 Slide gates. A gate that slides in the plane of the gate shall be designed, constructed, and installed in accordance with ASTM F1184.

BH103.3 Swing gates. A hinged or swing gate shall be designed, constructed, and installed in accordance with ASTM F900.

Revise as follows:

BH103.4 ~~BH103.1~~ Vehicular gates intended for automation. *Vehicular gates* intended for automation shall be designed, constructed and installed to comply with the requirements of ASTM F2200.

BH103.5 ~~BH103.2~~ Vehicular gate openers. *Vehicular gate* openers, where provided, shall be *listed* in accordance with UL 325.

SECTION BH104
REFERENCED STANDARDS

BH104.1 General. See Table BH104.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that reference the standard.

TABLE BH104.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED
ASTM F1184-23	*Standard Specification for Industrial and Commercial Horizontal Slide Gates*	BH103.1.2
ASTM F900-24	*Standard Specification for Industrial and Commercial Swing Gates*	BH103.1.3
ASTM F2200—20	*Standard Specification for Automated Vehicular Gate Construction*	BH103.1
UL 325—2017	*Door, Drapery, Gate, Louver and Window Operations and Systems—with Revisions through February 2020*	BH103.2

Reason: Gates are used, and depended on for our safety and security, throughout our society. Be it for residential use, at a sports arena, on schoolgrounds, a public park, in a parking garage, at a factory, in a multi-family dwelling or countless other applications, people are potentially in contact with a gate every day. Gates are so commonplace that most people don't think twice about their ability to operate safely until something goes wrong.

This is why it is of paramount importance that gates are designed and installed to the highest safety standard. The need for safe, functioning gates has been underscored in recent years with stories like that of, Alex Quanbeck, the 7-year-old child who was killed by a poorly maintained gate in his school yard at recess in San Rafael, California. Under deeper review, it has been discovered that numerous fatalities and life-altering injuries have occurred in the United States because of these gate issues. A map of known gate fatalities and serious injuries from gates is provided from the Hummingbird Alliance

(www.thehummingbirdalliance.com).

Having knowledge of the scope of this problem, ASTM International's F14 Committee on Fences, (which also holds jurisdiction for gate standards) updated their manual gate standards to reflect new safety requirements on slide gates (ASTM F1184) and swing gates (ASTM F900). ASTM had already updated its electric gate standard (ASTM F2200) to meet new requirements in 2002.

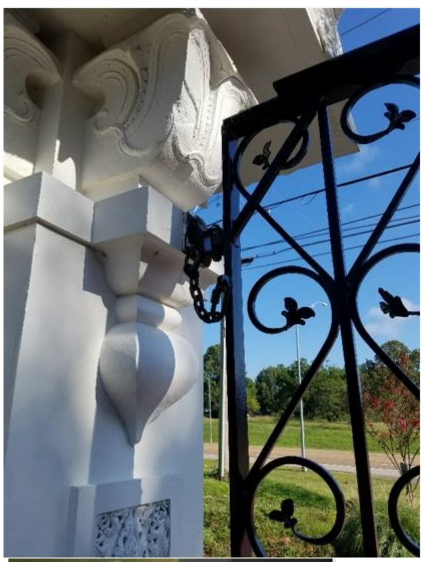
Cal/OSHA is currently reviewing these standards as well, to potentially include them in their own rules. While they do have a rule on gates, (Title 8 section 3324) it does not currently contain the provisions laid out in our proposal. In assessing these potential new standards, they reviewed some of their own accident data and found that their data from 1990 through 2005, showed that 15 out of 31 incidents (48%) involved failed or missing end stops/positive stops of gates. They then compared this data from data collected from 2014 through 2024 and found that 13 out of 16 incidents (81%) involved failed or missing end-stops/positive-stops of gates.

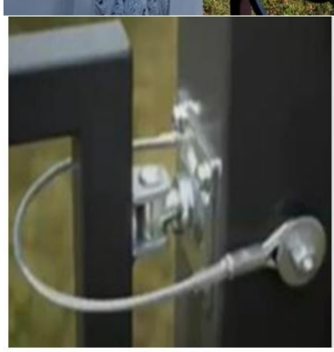
Because of these factors, they determined that, "The relatively low decrease in serious injuries and fatalities per year of only 8.2 percent after the promulgation of section 3324 in 2007 illustrates the need to amend and improve section 3324 to better protect California workers" (DOSH Evaluation, 2024).

The standards we are requesting be adopted would in no way impede first responders in accessing a property, in fact ensuring a gate is functioning properly would only provide them with safer and easier ingress and/or egress. It is when these gates go without the proper safety requirements, they are likely to fail to operate as intended or run the risk of injuring those who use them. The ICC/AFA Gate Safety Code Development Work Group consists of a wide range of gate and security experts, consumers and code enforcement officials, who have diligently reviewed ASTM standards, current safety standards and the I-Codes to confirm that this addition to the I-Codes is needed and non-duplicative. The work group decided to alter the existing section 3110 to include all gates as well as maintaining the provision currently in place for automatic vehicular gates. The new provision would only apply to gates that are 7' (84 inches) in height or greater OR 4' (48") in length or greater. The code change references industry approved national standards for gate design and construction ASTM F900 for Swing Gates and ASTM F1184 for Slide Gates. The code also includes two new standards to be referenced in Chapter

35 that are necessary for the code change. The group also looked at where gates are required for permitting and inspection and discovered that gates are not specifically referenced in the permit exemption list in Section 105. The group decided to clarify that fences and gates are unique in their own application and as such both need specific permit exceptions.

The general requirements for Swing Gates require a keeper in accordance with ASTM F900. The gate keeper is a mechanical device for securing the free end of the gate when in the fully open position. The compliance for swing gates could be a chain connected to both the gate frame and the end post (or column/structure to which the gate is attached), see the pictures below.





The general requirements for slide gates in accordance with ASTM F1184 include:

A performance statement that gates that are installed shall not fall over more than 45 degrees from the vertical plane;

· Positive stops to limit travel;

- Weight bearing rollers are covered;
- Gap no greater then 2-1/4”;
- Gates designed for lateral stability; and
- Gates design that will not move under the force of gravity.

Please see pictures below of ASTM 1184 compatible gates. Two options for fall post are shown. The first is the standard post cemented in the ground; it is the post with the yellow cap. The second is of an upside-down J bracket that has been welded on.


(Receiver Guide/ Gate Stop Below)

These standards and the code change proposal only address swing and slide gates. Overhead roll down (or up) doors, roll down security type doors (like those at the tenant space and the mall circulation areas), and parking garage entry, exit or point of sale barrier arms are not within the scope of the proposed code change or within the scope of the two reference standards. In addition, we believe that these requirements in no way negatively impact building egress required by Chapter 10 of this code. Any swing or slide gate installed within the means of egress should be in compliance with chapter 10, as well as any other technical provision of the code and compliance with any other code application is referenced in 3110.1, as proposed.

Compliance with the ASTM standards will greatly improve safety in and around the built environment by incorporating these simple changes, (like adding fall over protection and gate stops) lives like Alex’s, can be saved. Alex’s father, Eric Quanbeck was an active participant in this work group, as well as the local building official from the city where the tragedy occurred, along with representatives from the American Fence Association, ASTM International, DASMA and UL. After thorough review, we see a need to incorporate these standards through adoption into the I-Codes.

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

Cost Impact: Increase

Estimated Immediate Cost Impact:

Compared to the overall cost of these large gates, which can run anywhere from a couple thousand dollars to tens of thousands of dollars, depending on the size, material used, and whether they have an electric operator, the safety requirement costs are negligible. The material costs for the safety parts mentioned average $50.00, with many being less than that amount. For instance, a metal gate stop can be just a few dollars. Items like a Gate Keeper and the safety chain for swing gates can be found at several retailers, including on Amazon, both for under $50.00. Labor would depend on geographical area, but overall, it would average somewhere between $150.00 to $250.00.

Estimated Immediate Cost Impact Justification (methodology and variables):

Posts for this type of application typically run $50.00 a piece or less.
Example of some product costs on Amazon:

Amazon.com: OKG Heavy Duty Security Chain, 3.9ft x 5/16" Thick Outdoor Gate Chain, Cut Proof Chain Made of Hardened Alloy Steel Chain, Ideal for Fence Gates, Bicycles, Moped, Trailers, Generator, etc : Sports & Outdoors

Amazon.com: Chain Link Fence GATE HOLD BACK: Duck Bill Gate Holdback (1-5/8" to 2-3/8"). Holds The gate open for You while You work! : Tools & Home Improvement

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
ASTM F1184-23 Standard Specification for Industrial and Commercial Horizontal Slide Gates
ASTM F900-24 Standard Specification for Industrial and Commercial Swing Gates

RB282-25

RB283-25

IRC: SECTION 202, FIGURE BJ103.8 (New), BJ103.8, BJ104.2, BJ105.4.1, BJ105.6.2, BJ106.2

Proponents: David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Martin Hammer, representing Martin Hammer - Architect (mfhammer@pacbell.net); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Arkin, AIA, representing Arkin Tilt Architects (david@arkintilt.com); Dan Smith, representing DSA Architects

2024 International Residential Code

APPENDIX BJ
STRAWBALE CONSTRUCTION

Revise as follows:

LAID FLAT. The orientation of a *bale* with its largest faces horizontal, its longest dimension parallel with the wall plane, its *ties* concealed in the unfinished wall and its *straw* lengths oriented predominantly across the thickness of the wall. See Figure ~~BJ102.1~~BJ103.8.
ON-EDGE. The orientation of a *bale* with its largest faces vertical, its longest dimension horizontal and parallel with the wall plane, its *ties* on the face of the wall and its *straw* lengths oriented predominantly vertically. See Figure ~~BJ102.1~~BJ103.8.
ON-END. The orientation of a *bale* with its longest dimension vertical. For use in *nonstructural strawbale* walls only. See Figure ~~BJ102.1~~BJ103.8.

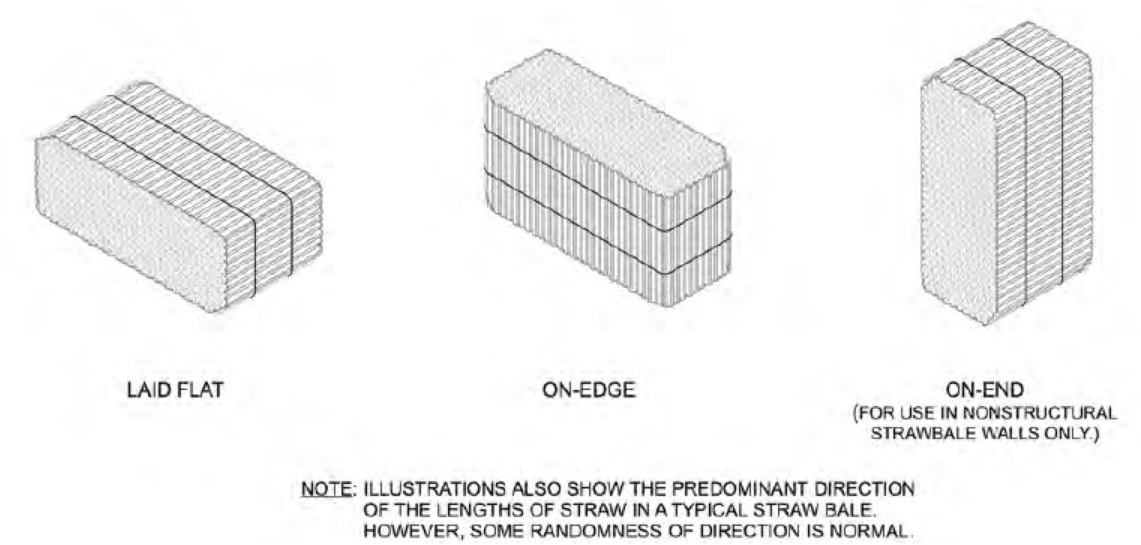


FIGURE ~~BJ102.1~~ BJ103.8 BALE ORIENTATION

BJ103.8 Orientation of bales. Straw bales shall be placed *laid flat*, *on-edge* or *on end* in accordance with this appendix. See Figure BJ103.8.

BJ104.2 Purpose, and where required. *Strawbale* walls shall be finished ~~so as~~ to provide mechanical protection, fire resistance and protection from weather and to restrict the passage of air through the ~~*bales*~~ bale walls, Vertical *strawbale* wall surfaces shall receive a coat of *plaster* not less than $^3/_8$ inch (10 mm) thick, or greater where required elsewhere in this appendix, or shall fit tightly against a solid wall panel or dense-packed cellulose insulation with a density of not less than 3.5 pounds per cubic foot (56 kg/m^3) blown into an adjacent framed wall. The tops of *strawbale* walls shall receive a coat of *plaster* not less than $^3/_8$ inch (10 mm) thick or be tightly covered by *gypsum board* or a *roof-bearing assembly*.

BJ105.4.1 Determination of out-of-plane loading. Calculating out ~~Out~~ of-plane loading ~~for the use of~~ using Table BJ105.4 shall be ~~in terms of~~ based on the ultimate design wind speed and *seismic design category* as determined by and in accordance with Sections

R301.2.1 and R301.2.2~~, respectively~~. An *approved* engineered design for out-of-plane load resistance in accordance with Section R301.2.1 shall be required ~~where~~when the *building* is located in a special wind region or ~~where~~when wind design is required in accordance with Figure ~~R301.2(2)~~R301.2.1.1 and Section R301.2.1.1 .

BJ105.6.2 Interior vapor retarders. Wall *finishes* shall have an equivalent vapor permeance rating of a Class III vapor retarder on the interior side of exterior *strawbale walls* in *Climate Zones* 5, 6, 7, 8 and Marine 4, as defined in Chapter 11. *Bale* walls enclosing ~~showers or~~ steam rooms or rooms containing showers shall be protected on the interior side by a Class I or Class II vapor retarder. See Table R702.7(1).

BJ106.2 Building limitations and requirements for use of strawbale structural walls. *Buildings* using *strawbale structural* walls shall be subject to the following limitations and requirements:

1. Number of *stories*: Not more than one, except that two *stories* shall be allowed with an *approved* engineered design.
2. Building height: Not more than 25 feet (7620 mm), except that greater heights shall be allowed with an *approved* engineered design.
3. Wall height: In accordance with Table BJ105.4, BJ106.13(2) or BJ106.13(3), as applicable, whichever is most restrictive.
4. *Braced wall panel* lengths: The greater of the values determined in accordance with Tables BJ106.13(2) and BJ106.13(3) for *buildings* using *strawbale braced wall panels*, or in accordance with Item 4 of Section BJ105.2 for *buildings* with ~~*load-bearing*~~ *strawbale walls* that ~~do not~~ use ~~*strawbale*~~ *braced wall panels*.

Reason: These proposed changes are all editorial in nature, correcting and/or adding section, figure or table reference numbers, simplifying or eliminating ambiguity in wording, but making no changes to the technical requirements or to where they apply. Below are specific notes about the proposed changes for each section.

Section BJ102: This corrects the figure reference number for the Bale Orientations figure as well as for the figure references in three defined terms related to bale orientation in Section BJ102.1.

Section BJ103.8 This adds the correct figure number for the Bale Orientation figure.

Section BJ104.2 This makes two minor changes to improve wording.

Section BJ105.4.1 This improves wording and corrects a reference number to a figure in the code.

Section BJ105.6.2 This improves the wording and adds a reference to a table in the code.

Section BJ106.2 This improves the wording of Item 4 of the section and adds a reference to a table in the code.

Section BJ107.2 This improves wording for consistency.

Cost Impact: The 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 only involve correcting and/or adding section, figure and table references and improving wording for clarity and consistency. Therefore the changes do not involve any technical changes to requirements or where they apply, and thus have no cost impact.

RB283-25

RB284-25

IRC: BJ104.1.1 (New)

Proponents: David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com)

2024 International Residential Code

APPENDIX BJ
STRAWBALE CONSTRUCTION

Revise as follows:

BJ104.1.1 ~~Exterior wall~~ Wall finishes. ~~Exterior wall~~ Wall finishes shall be plasters in accordance with Section BJ104.4, or nonplaster ~~exterior~~ wall coverings in accordance with ~~Section R703~~ Sections R702 and R703~~and other finish systems~~ and complying with ~~all of~~ the following:

1. ~~With *approved*~~ *Approved*specifications and details showing the *finish* system's means of attachment to the wall or its independent support. ~~, and~~ for
2. For exterior finish systems, a means of draining or evaporating water that penetrates the exterior *finish* to the exterior.

All finish systems must comply with the following:

~~2.~~ 1. The vapor permeance of ~~the combination of~~ *finish* material on each side of the wall shall be 5 perms or greater to allow the transpiration of water vapor through the wall.

~~3.~~ 2. *Finish* systems with combined weights greater than 10 or less than or equal to 20 pounds per square foot (> 48.9 and ≤ 97.8 kg/m) of wall area require a factor of 1.2 for minimum total length of *braced wall panels* in Table BJ106.13(3).

~~4.~~ 3. *Finish* systems with combined weights greater than 20 pounds per square foot (97.8 kg/m) of wall area require an engineered design.

Reason: This proposal changes the section title and reorganizes the content to cover both exterior and interior finish systems, and plaster and non-plaster finish systems, where applicable. The section already had provisions related to interior finishes and the reorganization separates them as they should be, clarifying the appropriate sections in the appendix and the code that apply to each. There are no technical changes or new requirements.

Because of the change to cover both interior and exterior finishes, it separates the need for addressing water penetration to only apply to the exterior for non-plaster finish systems, and eliminates ambiguity about the permeability requirements for finish materials. It also makes clear by adding the word "combined' to the weights of finish systems, that they include both interior and exterior finish systems for calculating additional requirements for walls with heavier finish systems.

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

Justification for no cost impact:

The proposal reorganizes the section recognizing that it already included some requirements for both exterior and interior finishes though it was labeled as exterior finishes. The proposal also removes abiguity in some of the provisions but does not add any new requirements that would impact costs.

RB284-25

RB285-25

IRC: BJ104.2.1 (New)

Proponents: David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Martin Hammer, representing Martin Hammer - Architect (mfhammer@pacbell.net); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Arkin, AIA, representing Arkin Tilt Architects (david@arkintilt.com); Dan Smith, representing DSA Architects (dan@dsaarch.com)

2024 International Residential Code

APPENDIX BJ
STRAWBALE CONSTRUCTION

Add new text as follows:

BJ104.2.1 **Strawbale walls and air barriers.** A continuous air barrier with breaks and joints sealed shall be required in accordance with Table N1102.5.1.1. Any plaster installed in accordance with Section BJ104, when sealed in accordance with Section BJ105.6.3, is an acceptable air barrier. Non-plaster finishes must include an acceptable air barrier as part of the finish system.

Reason: The requirement for an air barrier was already included in the appendix, but in more general language in the description of the purpose of the finish system in BJ104.2: "...to restrict the passage of air through the bales in accordance with this appendix and this code." This proposal adds a new section to BJ102 Finishes that includes missing specific language and a specific reference to the table in the code for air barriers. It also clarifies that plaster finishes installed in accordance with the finishes section, with penetrations sealed in accordance with Section BJ105.6.3, provide an acceptable air barrier. And, it confirms that non-plaster finishes are required to include an acceptable air barrier in the finish system. There are no new requirements in this proposal, rather this provides a clarification of the specific requirements.

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

Justification for no cost impact:

This proposal does not add or change any technical requirements in the appendix, but adds a new section with a reference to the appropriate table in the code for air barriers, and confirms that plaster finish systems installed in accordance with the requirements of the appendix provide an acceptable air barrier. And it also confirms that non-plaster finishes are required to include an acceptable air barrier. Thus the proposed changes have no cost impact.

RB285-25

RB286-25

IRC: BJ104.4.3.4, BJ104.4.3.5, BJ104.4.4.1, BJ104.4.4.3, BJ104.4.6.2

Proponents: David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Martin Hammer, representing Martin Hammer - Architect (mfhammer@pacbell.net); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Arkin, AIA, representing Arkin Tilt Architects (david@arkintilt.com); Jacob Racusin, representing New Frameworks (jacob@newframeworks.com); Dan Johnson, Streamline Green, representing self (dan@streamline-green.com); Dan Smith, representing DSA Architects (dan@dsaarch.com); Massey Burke, representing California Straw Building Association (massey.burke@gmail.com)

2024 International Residential Code

APPENDIX BJ
STRAWBALE CONSTRUCTION

Revise as follows:

BJ104.4.3.4 Rain-exposed. *Clay plaster,* where exposed to rain, shall be finished with lime wash, ~~lime *plaster*,~~ linseed oil or other *approved* erosion-resistant *finish*.

BJ104.4.3.5 Prohibited finish coat. *Plaster* containing Portland cement shall not be permitted as a *finish* coat over *clay plasters*. <u>Lime *plaster* shall not be permitted as an exterior *finish* coat over clay *plaster* unless a history of successful use in similar conditions is demonstrated to the building official.</u>

BJ104.4.4.1 General. Soil-cement *plaster* shall be composed of *clay subsoil*, sand and not less than 10 percent and not more than 20 percent Portland cement by volume, and shall be permitted to contain <u>lime and</u> reinforcing fibers.

BJ104.4.4.3 Thickness <u>and coats</u>. Soil-cement *plaster* shall be not less than 1-inch (25 mm) thick<u>, and is permitted to be installed in one coat</u>.

BJ104.4.6.2 Thickness and coats. Lime *plaster* shall be not less than $^7/_8$ inch (22 mm) thick, and shall be applied in not less than ~~three~~ <u>two</u> coats.

Reason: These proposed changes all relate to finishes on strawbale walls.The changes to sections BJ104.4.3.4 and BJ104.4.3.5 relate to use of lime plaster over clay plasters. Although lime plasters over clay plasters have been successfully used, de-lamination has also occurred, particularly on significantly rain-exposed walls. Thus the proposal removes lime plaster as a named acceptable finish in BJ104.4.3.4. Lime plaster is also added to BJ104.4.3.5 as a prohibited finish over clay plasters, but allows its use if evidence of successful use in similar conditions is submitted to the building official.
The changes to sections BJ104.4.4.1 and BJ104.4.4.3 relate to soil-cement plaster. BJ104.4.4.1 allows use of lime in soil-cement, typically used to increase vapor permeability. BK104.4.4.3 adds "and coats" to the title of the section and clarifies that soil-cement plaster is permitted to be installed in a single coat, which is typical for this type of plaster.

The change to Section BJ104.4.6.2 reduces the required minimum number of coats for lime plaster to two coats from the current three. Although three-coat lime plaster is more common, two-coat lime plaster also has a long successful history and is preferred by some practitioners.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

This proposal includes changes to several sections, three of which have no cost impact, one of which increases costs, and one that decreases costs. We chose Decrease because of the two changes with a cost impact, the one with a cost increase is significantly smaller than the one with a cost decrease.

The cost increase for the proposed change in BJ104.4.3.5 would range from $260 to $1800 to provide the documentation required to use lime plaster over clay plaster.

The cost decrease for the proposed change in BJ104.6.2 would be about $7700 for a 1500 sq.ft. house that uses a two-coat lime plaster instead of three coats.

Estimated Immediate Cost Impact Justification (methodology and variables):

For BJ104.4.3.4, the proposed change merely removes one option for finish plaster, leaving other acceptable options available, so there is no cost impact.

For BJ104.4.3.5, the design professional or the plaster contractor would likely charge for their time to demonstrate successful examples of lime plaster over clay plasters in similar conditions to the proposed project. The estimated time required ranges from 4 to 12 hours. Design professional rates vary widely by location and experience, from $50/hr to $250/hr. A plaster contractor's rate will vary as well, from $30/hr to $100/hr. Using an average of $150/hr for a design professional and an average of $65/hr for a plaster contractor, the cost increase would range from $260 to $1800. (4 hrs x $65/hr to 12 hrs x $150/hr.)

Sources for hourly rates and time estimates are from chatGPT, from co-proponents' experience, and interviews with contractors experienced with lime plaster and strawbale construction.

For BJ104.4.4.1, the proposed change allows the use of lime in soil-cement plaster as an option not a requirement. If used, lime would displace an equivalent amount of comparably priced Portland cement and thus would have no cost impact.

For BJ104.4.4.3, the proposed clarification that the typical application of a single coat of soil-cement plaster is acceptable has no cost impact.

For BJ104.6.2, Three-coat lime plaster over straw bales costs an average of $30/sq.ft., and a two-coat system costs about 20% less. This is based on interviews with contractors with extensive experience with lime plasters and strawbale construction (Jim Reiland, Many Hands Builders; James Henderson, NW Natural Homes). For example, for a 30'x50' residence with 1280 sq.ft. of exterior wall area (8 ft. high x160 lf) a three-coat lime plaster costs $38,400 ($30 x 1280 sq.ft.). A two-coat lime plaster would be about 20% less, or $30,700 for a cost decrease of $7700.

RB286-25

RB287-25

IRC: BJ105.9 (New), BJ105.9.1 (New), BJ105.9.2 (New)

Proponents: David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Arkin, AIA, representing Arkin Tilt Architects (david@arkintilt.com); Massey Burke, representing California Straw Building Association (massey.burke@gmail.com); Dan Johnson, Streamline Green, representing self (dan@streamline-green.com); Jacob Racusin, representing New Frameworks (jacob@newframeworks.com); Dan Smith, representing DSA Architects (dan@dsaarch.com)

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APPENDIX BJ
STRAWBALE CONSTRUCTION

Add new text as follows:

BJ105.9 Wood-based panel and fiberboard sheathing over straw bales. Wood-based panel and fiberboard sheathing shall be permitted over wood-framed walls that contain straw bales in accordance with this section.

BJ105.9.1 Exterior applications. Exterior applications shall comply with Section R702.7 for vapor retarders, Section R703.7.3 for water-resistive barriers, and Table N1102.5.1.1 for air barriers. The exterior sheathing and finish is exempt from the minimum 5 perm requirement in Section BJ104.1.1 in Climate Zones 0-4. In Climate Zones 5-8 the minimum 5 perm requirement shall apply unless a hygrothermal analysis is provided and *approved* by the building official. When the assembly includes an interior plaster finish applied directly to the straw bales, the plaster shall comply with the minimum 5 perm requirement in Section BJ104.1.1.

BJ105.9.2 Interior applications. Interior applications shall comply with Section BJ105.6.2 for vapor retarders, and Table N1102.5.1.1 for air barriers. When the assembly includes an exterior plaster finish applied directly to the straw bales, the plaster shall comply with the minimum 5 perm requirement in Section BJ104.1.1.

Reason: BJ105.9 is a new section for wood-based panel and fiberboard sheathing over wood-framed walls containing straw bales. This section was developed by the co-proponents, several of whom have extensive experience designing and building these wall systems, and three building science envelope professionals, to provide requirements for the growing use of strawbale infill in wood-framed wall systems with structural or non-structural wood-based panels. The panels can be installed on the exterior and/or interior side of the wall.

This section references and relies on the IRC sections for wall systems with conventional framing, panel sheathing, and insulation, that safely govern vapor retarders (R702.7), water-resistive barriers (R703.7.3), air barriers (Table N1102.5.1.1) and conventional wall coverings in the full range of climate zones. For exterior applications this new section specifies that the sheathing and associated exterior finish system is exempt from the minimum 5 perm requirement in Section BJ104.1.1, except in climate zones 5-8, where the exemption requires a hygrothermal analysis to be submitted to and approved by the building official.

For exterior panel applications, if a plaster finish is directly applied to the straw bales on the interior, the plaster must comply with the minimum 5 perm requirement in Section BJ104.1.1 to help ensure that moisture from the wet-applied plaster can adequately dry to the interior. For interior applications the wall assembly must comply with Section BJ105.6.2 for vapor retarders and Table N1102.5.1.1 for air barriers. For interior panel applications, if an exterior plaster finish is directly applied to the straw bales, the plaster must comply with the minimum 5 perm requirement in Section BJ104.1.1.

Cost Impact: Decrease

Estimated Immediate Cost Impact:

The estimated immediate cost impact for the use of wood-based or fiberboard panels over straw bales is a decrease of $9400 for a 30'x50' house, or about $7/sq.ft. of wall area.

Estimated Immediate Cost Impact Justification (methodology and variables):

The growing trend of strawbale infill into wood-framed wall systems with exterior sheathing, often as shear walls, is a result of time savings during construction, and the use of more conventional materials and systems contractors are familiar with. Though the plywood material and installation is an increased cost, the labor savings of applying plaster over plywood vs. straw bales yields a net cost decrease.

1/2"x4x8 CDX plywood costs $30/sheet. A 30'x50' residence requires 40 sheets for a cost of $1200. 2 person-hours for installation of 3 sheets, for a total installation cost of 2 people x 14 hrs x $65/hr = $1800. Total labor & materials = $1800 + $1200 = $3000Three-coat lime plaster over straw bales costs an average of $30/sq.ft. (bale prep & mesh included), and over plywood an average of $20/sq.ft. (bldg. paper and mesh included), based on interviews with contractors with extensive experience with lime plasters over straw bales and over plywood (Jim Reiland, Many Hands Builders; James Henderson, NW NaturalHomes).

For a 30'x50' residence with 1280 sq.ft. of exterior wall area(8ft high x 160 lf) a three-coat lime plaster over straw bales costs $38,400($30x 1280 sq.ft.). A three-coat lime plaster over plywood costs $25,600 + $3000 plywood labor and materials = $28,600.The decrease in cost of lime plaster over plywood vs. lime plaster over straw bales for a 30'x50 house is $28,600 - $38,000 = -$9400

In addition, a plywood substrate allows the use of non-plaster finishes that are typically less expensive than plaster (e.g., fiber-cement siding), and thus yields a similar cost savings.

RB287-25

RB288-25

IRC: BJ106.6.1, BJ106.2, BJ106.11

Proponents: David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Martin Hammer, representing Martin Hammer - Architect (mfhammer@pacbell.net); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Arkin, AIA, representing Arkin Tilt Architects (david@arkintilt.com); Massey Burke, representing California Straw Building Association; Dan Smith, representing DSA Architects (dan@dsaarch.com)

2024 International Residential Code

APPENDIX BJ
STRAWBALE CONSTRUCTION

Revise as follows:

BJ106.6.1 Compressive strength. For *plaster* on *strawbale* structural walls, the *building official* is authorized to require a 2-inch (51mm) cube test conforming to ASTM C109 to demonstrate a minimum compressive strength in accordance with Table BJ106.6.1. For natural hydraulic lime (NHL) plasters, the compressive strength in the NHL manufacturer's specifications is permitted to be used to satisfy the requirements in Table BJ106.6.1 where the *plaster* mix used for the project is identical to that in the manufacturer's specifications. The following modifications to Section 10.5 of ASTM C109 are required for the testing of soil-cement, clay-lime, and clay plasters:

1. Soil-cement and clay-lime plaster samples shall be stored in a moist environment, but shall not be immersed in lime-saturated water.
2. Clay-lime plaster samples shall be stored for a minimum of 7 days.
3. Clay plaster samples shall be dried to the approximate ambient moisture conditions of the project site and shall not be stored in a moist environment or immersed in lime-saturated water.

BJ106.2 Building limitations and requirements for use of strawbale structural walls. *Buildings* using *strawbale structural* walls shall be subject to the following limitations and requirements:

1. Number of *stories*: Not more than one, except that two *stories* shall be allowed with an *approved* engineered design.
2. Building height: Not more than 25 feet (7620 mm), except that greater heights shall be allowed with an *approved* engineered design.
3. Wall height: In accordance with Table BJ105.4, BJ106.13(2) or BJ106.13(3), as applicable, whichever is most restrictive.
4. *Braced wall panel* lengths: The greater of the values determined in accordance with Tables BJ106.13(2) and BJ106.13(3) for *buildings* using *strawbale braced wall panels*, or in accordance with Item 4 of Section BJ105.2 for *buildings* ~~with *load-bearing strawbale walls*~~ that do not use *strawbale braced wall panels*.

BJ106.11 Transfer of loads to and from plaster skins. ~~Where plastered~~ Plastered *strawbale* load-bearing walls ~~are used to support~~ shall transfer their superimposed vertical loads~~, such loads shall be transferred~~ to the *plaster skins* by continuous direct bearing in accordance with Figure BJ105.1(3) or ~~by~~with an *approved* engineered design. ~~Where plastered~~ Plastered *strawbale* braced wall~~s~~ panels shall transfer their~~are used to resist in-plane~~ lateral loads~~, such loads shall be transferred~~ to the reinforcing *mesh* from the structural member or assembly above in accordance with Figure BJ105.1(3) or BJ105.1(4), and to the foundation and sill plate in accordance with Figure BJ105.1(1) or BJ105.1(2) and with Table BJ106.13(1)as applicable.

Reason: The proposed changes for each section are clarifications. The proposal adds language in BJ106.6.1, clarifying appropriate storage (curing or drying) environments for test samples of soil-cement, clay-lime and clay plasters. The proposal strikes unneeded language in BJ106.2, Item 4, to more clearly convey its intended meaning. Lastly, the proposal simplifies and improves language in BJ106.11.

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

Justification for no cost impact:

The changes to each section in this proposal are clarifications with no cost impact. The proposed language in Sections BJ106.1 and BJ106.2 clarify the intended meaning. Language added to BJ106.6.1 simply clarifies the appropriate storing (curing or drying) of plaster test samples containing clay.

RB288-25

RB289-25

IRC: APPENDIX BJ, BJ107.1, BJ107.2

Proponents: David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Martin Hammer, representing Martin Hammer - Architect (mfhammer@pacbell.net); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Arkin, AIA, representing Arkin Tilt Architects (david@arkintilt.com); Dan Smith, representing DSA Architects (dan@dsaarch.com)

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APPENDIX BJ
STRAWBALE CONSTRUCTION

Revise as follows:

BJ107.1 Fire-resistance rating. *Strawbale* walls ~~shall not be considered to exhibit a~~do not have a fire-resistance rating, except for walls constructed in accordance with Section BJ107.1.1 or BJ107.1.2. ~~Alternately, fire~~Fire-resistance ratings of other *strawbale* wall ~~walls~~ assemblies shall be based on testing ~~determined~~ in accordance with ~~Section R302~~ASTM E119 or UL 263, or an analytical method in accordance with Section 703.2.2 of the International Building Code.

BJ107.2 Openings in rated walls. Openings and penetrations in strawbale ~~*bale*~~ walls required to have a fire-resistance rating shall satisfy the same requirements for openings and penetrations as prescribed in this code.

Reason: The proposed changes to Section BJ107.1 simplify the code language and add a reference to the standard testing required to establish a fire-resistance rating for unrated straw bale walls, using language identical to that in Section R302.3.2. This makes no changes to the technical requirements of the section.
The proposed change to Section BJ107.2 improves wording for consistency.

Cost Impact: The 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 to BJ107.1 simplify the code language, and add a reference to the standard requirements for fire-resistance ratings. They make no technical changes and have no impact on construction costs. The proposed change for BJ107.2 is for consistency of terminology and has no cost impact.

RB289-25

RB290-25

IRC: BL103.3.7, TABLE BL103.3.7, BL103.6.5.2

Proponents: Martin Hammer, representing Martin Hammer - Architect (mfhammer@pacbell.net); David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Timothy Callahan, representing Callahan Home Designs (t.l.callahan@icloud.com); Tom Rossmassler, representing Hempstone, LLC (tom@hempstone.net); Cameron McIntosh, representing Americhanvre LLC (cameron@americhanvre.com); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com)

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APPENDIX BL
HEMP-LIME (HEMPCRETE) CONSTRUCTION

Revise as follows:

BL103.3.7 Openings in walls. Doors, windows and similar openings in *hemp-lime* walls shall be in accordance with the following:

1. Rough framing for doors and windows shall be part of, or be fastened to, the wall framing in accordance with this code.
2. An *approved water-resistive barrier* shall be installed at openings in *hemp-lime* walls in accordance with Sections BL103.7.4 and BL104.5.1.
3. Header size and their maximum span above openings in bearing walls with *hemp-lime* infill shall be determined with Tables R602.7(1) and BL103.3.7 or an *approved* design by a *registered design professional*.
4. Cast-in-place *hemp-lime* ~~over and~~ overhanging the face of a header more than 3 inches (76 mm) shall require an *approved* design of its support by a *registered design professional*.
5. *Hemp-lime* blocks overhanging headers shall require an *approved* design of their support by a *registered design professional*.

TABLE BL103.3.7 ALLOWABLE HEADER SPAN ~~MULTIPLIER~~ADJUSTMENT FACTORS[a]

WALL HEIGHT ABOVE HEADER	UNIT WALL WEIGHT (psf)			
	15	30	45	65
1′-0″	1.00	1.00	1.00	1.00
1′-6″	1.00	1.00	0.90	0.90
2′-0″	1.00	0.90	0.90	0.85
2′-6″	1.00	0.90	0.90	0.85
3′-0″	1.00	0.90	0.90	0.80

For SI: 1 foot = 304.8 mm, 1 pound per square foot = 4.882 kg/m^2.

a. Multiply the maximum allowable spans from Table R602.7(1) by the applicable factor to determine the adjusted maximum allowable header span.

BL103.6.5.2 Casting. *Hemp-lime* blocks shall be cast in accordance with Sections BL103.6.1 through ~~BL103.6.6~~BL103.6.5, as applicable, or by other means that produce *approved* blocks.

Reason: This proposal improves code language in a section, improves the title of a table, and corrects a section number.

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

Justification for no cost impact:

This proposal improves code language and the title of a table, and corrects a section number, so there is no impact on the cost of construction.

RB291-25

IRC: BL105.1, BL105.1.1 (New)

Proponents: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Cameron McIntosh, representing Americhanvre LLC (cameron@americhanvre.com); Tom Rossmassler, representing Hempstone, LLC (tom@hempstone.net); Timothy Callahan, representing Callahan Home Designs (t.l.callahan@icloud.com); Matthew Mead, representing Hempitecture Inc. (mattie@hempitecture.com); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com)

2024 International Residential Code

APPENDIX BL
HEMP-LIME (HEMPCRETE) CONSTRUCTION

Revise as follows:

BL105.1 Fire-resistance rating. *Hemp-lime* walls do not have a fire-resistance rating, except for walls constructed in accordance with Sections BL105.1.1, BL105.1.2 or BL105.1.3. Fire-resistance ratings for other *hemp-lime* wall assemblies shall be determined by testing in accordance with ASTM E119 or UL 263, or an analytical method in accordance with Section 703.2.2 of the International Building Code .

Add new text as follows:

BL105.1.1 One-hour rated hemp-lime wall with center stud framing. One-hour fire-resistance rated load-bearing hemp-lime center stud walls shall comply with all of the following:

1. Shall be constructed with center stud framing per Figure BL103.1(2) with 2x4 studs at 16 inches (406 mm). The framed wall height shall not exceed 10 feet (3.05 m). Staggered 2x4 blocking shall be installed at mid-height between the studs.
2. Hemp-lime complying with Sections BL106.3.1, BL106.3.2 and BL107.1 shall be spray applied in accordance with Section BL103.6.4 to a thickness of 12 inches (305 mm).
3. Exterior and interior plaster shall be lime plaster complying with Section BL104.3.5, and shall be applied with 1/4-inch (6.4 mm) coats to a thickness of 3/4 inch (19 mm) on the exterior and 1/2 inch (12.7 mm) on the interior. Fiberglass stucco lath shall be embedded in the first exterior and interior coats.

BL105.1.2 One-hour rated hemp-lime wall with exterior stud framing. One-hour fire-resistance rated load-bearing hemp-lime exterior stud walls shall comply with all of the following:

1. Shall be constructed with exterior stud framing per Figure BL103.1(3) with 2x6 studs at 16 inches (406 mm). The framed wall height shall not exceed 10 feet (3.05 m). 2x4 on-edge blocking shall be installed at 5 feet (1.52 m) and 9 feet (2.74 m) between the studs and flush with their exterior face. 2x2 anchorage at 16 inches (406 mm) shall be fastened horizontally to inside face of the studs with 16d nails, and vertically at 16 inches (406 mm) to the horizontal anchorage.
2. A *vapor permeable* combined water-resistive and air barrier shall be stapled with lapped and taped joints at the 2x4 on-edge blocking.
3. A .06 inch x 2 3/8-inch (1.5 mm x 60mm) galvanized steel strap shall be installed diagonally from top plate to bottom plate and fastened to framing members per manufacturer's specifications.
4. 1x3 wood furring shall be installed vertically to each stud with 2 3/8 inch (60 mm) screws, and horizontally at 16 inches (406 mm) to the vertical furring.
5. 3/4-inch (19 mm) x 5 ½-inch (127 mm) vertical wood siding shall be fastened at each horizontal furring member.

6. Hemp-lime complying with Sections BL106.3.1, BL106.3.2, and BL107.1 shall be spray applied in accordance with Section BL103.6.4 to a thickness of 12 inches (305 mm).
7. Interior plaster shall be lime plaster complying with Section BL104.3.5, and applied with 1/4–inch (6.4 mm) coats to a thickness of ½ inch (12.7 mm). Fiberglass stucco lath shall be embedded in the first coat.

BL105.1.3 One-hour rated hemp-lime wall with double stud framing. One-hour fire-resistance rated load-bearing hemp-lime double stud walls shall comply with all of the following:

1. Shall be constructed with double stud framing per Figure BL103.1(4), with exterior load-bearing 2x4 studs at 16 inches (406 mm) and interior nonload-bearing 2x3 studs at 24 inches (610 mm). The framed wall height shall not exceed 10 feet (3.05 m). 2x4 on-edge blocking shall be installed at 5 feet (1.52 m) and 9 feet (2.74 m) between the exterior studs and flush with their exterior face. Horizontal 2x4 anchorage shall be fastened to the interior face of the 2x4 studs at 30, 60, and 90 inches (.76, 1.52, and 2.29 m).
2. A *vapor permeable* combined water-resistive and air barrier shall be stapled with lapped and taped joints at the 2x4 on-edge blocking.
3. A .06 inch x 2 3/8-inch (1.5 mm x 60mm) galvanized steel strap shall be installed diagonally from top plate to bottom plate and fastened to framing members per manufacturer's specifications.
4. 1x3 wood furring shall be installed vertically to each stud with 2 3/8 inch (60 mm) screws, and horizontally at 16 inches (406 mm) to the vertical furring.
5. 3/4-inch (19 mm) x 5 ½-inch (127 mm) vertical wood siding shall be fastened at each horizontal furring member.
6. Hemp-lime complying with Sections BL106.3.1, BL106.3.2, and BL107.1 shall be spray applied in accordance with Section BL103.6.4 to a thickness of 12 inches (305 mm).
7. Interior plaster shall be lime plaster complying with Section BL104.3.5, and applied with 1/4–inch (6.4 mm) coats to a thickness of ½ inch (12.7 mm). Fiberglass stucco lath shall be embedded in the first coat.

Attached Files

- **Hemp-Lime_ASTM-E119_TestA_07.10.24_IntertekReport_12.13.24.pdf**
https://www.cdpaccess.com/proposal/11989/35949/files/download/9794/
- **Hemp-Lime_ASTM-E119_TestB_12.18.24_IntertekReport_02.05.25.pdf**
https://www.cdpaccess.com/proposal/11989/35949/files/download/9793/
- **Hemp-Lime_ASTM-E119_TestC_01.24.25_IntertekReport_02.05.25..pdf**
https://www.cdpaccess.com/proposal/11989/35949/files/download/9791/
- **Hemp-Lime ASTM-E119 Wall Stud Structural Calcs_2025.02.10.pdf**
https://www.cdpaccess.com/proposal/11989/35949/files/download/9790/

Reason: This proposal modifies the current section on fire-resistance rating of hemp-lime walls to include three assemblies tested in accordance with ASTM E119, including a hose stream test, in July 2024, Dec 2024 and Jan 2025. The test reports state that the each assembly met the Conditions of Acceptance of ASTM E119 for a fire-resistance rating of 60 minutes. Accordingly this code proposal describes the construction of these tested hemp-lime walls required to assign them a 1-hour fire-resistance rating. (See attachments or contact the primary proponent for the test reports.)

Though the test reports state the use of select structural Douglas fir framing in the test specimens, the code language does not specify the framing lumber species or grade for two reasons: 1) the attached structural calculations demonstrate that commonly used and IRC-allowed Douglas fir-larch, Southern pine, Hem-fir, and Spruce-pine-fir No. 2 framing is capable of supporting the superimposed loads in these three ASTM E119 tests, and 2) the fire that these test specimens were subjected to did not reach the load-bearing framing.

Cost Impact: The 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 ASTM E119 tested wall assemblies described in the proposed code language simply take already acceptable (per Appendix BL) hemp-lime wall assemblies and state their newly assigned one-hour fire-resistance rating. Therefore the proposal has no cost impact.

RB291-25

RB292-25

IRC: BL106.1

Proponents: Martin Hammer, representing Martin Hammer - Architect (mfhammer@pacbell.net); David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Timothy Callahan, representing Callahan Home Designs (t.l.callahan@icloud.com); Tom Rossmassler, representing Hempstone, LLC (tom@hempstone.net); Cameron McIntosh, representing Americhanvre LLC (cameron@americhanvre.com); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com)

2024 International Residential Code

APPENDIX BL
HEMP-LIME (HEMPCRETE) CONSTRUCTION

Revise as follows:

BL106.1 Mass walls. Walls with *hemp-lime* infill shall be classified as mass walls in accordance with Section ~~N1102.2.5 (R402.2.5)~~ N1102.2.6 (R402.2.6) and shall meet the *R*-value requirements for mass walls in Table N1102.1.3 (R402.1.3), when their heat capacity (*C*) is greater than or equal to 6 Btu/ft^2 × °F (123 kJ/m^2 × K) in Equation BL-1, including the wall's exterior and interior plasters.

$C = (\rho_{HL} \times t_{HL} \times \cancel{0.299}\ \underline{0.34}$ Btu/lb x ºF$) + (101$ pcf x t_1 x 0.245 Btu/lb x ºF) + (107 pcfx t_2 x 0.24 Btu/lb x ºF)

(Equation BL-1)

where:

C = Heat capacity (Btu/ft^2 × °F).

ρ_{HL} = Density of *hemp-lime* infill (pounds per cubic foot).

t_{HL}= Thickness of *hemp-lime* infill (feet).

t_1= Thickness of lime plaster(s) (feet).

t_2= Thickness of clay plaster(s) (feet).

Reason: This proposal clarifies that the heat capacity of hemp-lime walls includes the heat capacity of its plasters, in calculating whether a wall reaches the heat capacity threshold of a mass wall classification. The associated Equation BL-1 is modified accordingly. A section number is also corrected in the opening sentence. (See below for justification of specific heat capacity and density values used.)

Specific Heat Capacity & Density of Hempcrete, Lime & Clay Plaster

1.31.25 Research by Tim Callahan, Callahan Home Designs

SOURCE: DeepSeek				
Material	WEIGHT (LB. FT.^{3})	MEDIAN WEIGHT	SPECIFIC HEAT CAPACITY	MEDIAN SHC
HEMPCRETE			0.29-0.38	0.335
LIME PLASTER	100-120	110	0.24-0.25	0.245
CLAY PLASTER	100-120	110	0.20-0.24	0.22

Source: ChatGPT				
Material	WEIGHT (LB. FT.^{3})	MEDIAN WEIGHT	SPECIFIC HEAT CAPACITY	MEDIAN SHC
HEMPCRETE			0.24-0.43	0.345
LIME PLASTER	75-110	92.5	0.22-0.26	0.24
CLAY PLASTER	70-120	105	0.22-0.30	0.26

Material	MEDIAN WEIGHT	MEDIAN SHC	
HEMPCRETE		0.34	
LIME PLASTER	101.25	0.2425	
CLAY PLASTER	107.5	0.24	

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

Justification for no cost impact:

This proposal simply clarifies that the heat capacity of hemp-lime walls includes the heat capacity of its plasters, when calculating whether a wall is considered a mass wall, and revises the specific heat capacity of hemp-lime with a more accurate value. Therefore there is no cost impact.

RB292-25

RB293-25

IRC: BL106.4

Proponents: Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing The Development Center for Appropriate Technology (strawnet@gmail.com); Cameron McIntosh, representing Americhanvre LLC (cameron@americhanvre.com); Timothy Callahan, representing Callahan Home Designs (t.l.callahan@icloud.com); Tom Rossmassler, representing Hempstone, LLC (tom@hempstone.net); Matthew Mead, representing Hempitecture Inc. (mattie@hempitecture.com); Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com)

2024 International Residential Code

APPENDIX BL
HEMP-LIME (HEMPCRETE) CONSTRUCTION

Revise as follows:

BL106.4 Compliance with Section R302.10.1. *Hemp-lime* ~~infill shall meet~~ meets the requirements for insulation materials in Section R302.10.1 for *flame spread index* and *smoke-developed index* as tested in accordance with ASTM E84.

Attached Files

- **Hemp-Lime_ASTM-E84_Test_Hempitecture_2.18.20.pdf**
  https://www.cdpaccess.com/proposal/11987/35950/files/download/9381/

Reason: This proposal corrects a significant error between the approved code language in the original proposal for this Appendix in 2022, and what was published in the 2024 IRC. Specifically, this proposal removes the word "shall", which was not in the approved code language. Removing the word "shall" restores the intended and approved meaning, that is, hemp-lime does meet the requirements for insulation in Section R302.10.1, because in 2020 it was tested in accordance with ASTM E84 with results of zero for both flame spread index and smoke-developed index (see attachment or contact the primary proponent for the test report). This proposal also makes two editorial changes, removing the word "infill" which is unnecessary, and changing the word "meet" to "meets" to be grammatically correct.

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

Justification for no cost impact:

This proposal only corrects and improves the code language and makes no changes with construction cost impacts.

RB293-25

RB294-25

IRC: BK101.5 (New), BL101.2 (New)

Proponents: Rebecca Quinn, RCQuinn Consulting, representing Association of State Floodplain Managers (rebecca@rcquinnconsulting.com); Chad Berginnis, representing Association of State Floodplain Managers (cberginnis@floods.org)

2024 International Residential Code

APPENDIX BK
COB CONSTRUCTION (MONOLITHIC ADOBE)

Add new text as follows:

<u>**BK101.5** **Flood hazard areas.** In flood hazard areas established in Table R301.2, buildings using cob construction shall meet the requirements of Section R306.</u>

APPENDIX BL
HEMP-LIME (HEMPCRETE) CONSTRUCTION

<u>**BL101.2** **Flood hazard areas.** In flood hazard areas established in Table R301.2, *buildings* using hemp-lime construction shall meet the requirements of Section R306.</u>

Reason: This proposal points users of IRC appendices to existing requirements in the IRC for buildings and structures in flood hazard areas. Section R306 contains requirements for dwellings in flood hazard areas. Similar pointers are already present in appendices BA (manufactured housing); BI (light straw-clay construction); BJ (strawbale construction; and BO (existing buildings).

Walls constructed using cob or hemp-lime materials that are inundated by floodwater could deteriorate, especially floodwater that remains high for more than a few hours. For these alternative building materials, the existing flood damage-resistant materials requirements are especially relevant. Section R306.1.8 requires materials used for walls to be flood damage-resistant materials that conform to FEMA Technical Bulletin 2, Flood Damage-Resistant Materials Requirements. Thus, referring to the flood-damage resistant materials requirement is not a new requirement. Similar “reminders” of the flood provisions related to materials appear in Appendix BI (light straw-clay construction) and Appendix BJ (strawbale construction).

We note that the current edition of TB 2 does not include cob or hemp-lime materials. However, ASTM E3075 Standard Test Method for Water Immersion and Drying for Evaluation of Flood Damage Resistance and ASTM E3369 Standard Specification for Determining the Flood Damage Resistance Rating of Building Materials are available and allow for testing materials that are not specifically listed in TB 2. Those standards are proposed to be referenced in a separate proposal for R306.1.6 Flood damage-resistant materials.

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

Justification for no cost impact:

This proposal adds pointers to existing requirements in the code. There is no change to the technical content of the provisions. By reminding users of existing applicable requirements there will be no cost impact when approving this proposal.

RB294-25

RB295-25

IRC: BO102.2, BO102.3, SECTION BO103, BO103.1, SECTION 202, BO105.5.1, BO105.5.3, BO105.6, BO105.8.5

Proponents: Jenifer Gilliland, representing Seattle Department of Construction & Inspections (jenifer.gilliland@seattle.gov); Ardel Jala, representing Seattle Department of Construction & Inspections (ardel.jala@seattle.gov)

2024 International Residential Code

APPENDIX BO
EXISTING BUILDINGS AND STRUCTURES

Delete without substitution:

~~**BO102.2 Identification of work.** The work shall be clearly identified on the *permits* issued under these provisions.~~

Revise as follows:

BO102.3 Structural. Structural elements and systems that are altered, repaired or replaced shall comply with Section R102.6.1 and the structural provisions of this appendix. ~~The work performed shall not cause the structure to become less compliant with this code than it was before the work was undertaken.~~

Delete without substitution:

~~SECTION BO103~~
~~DEFINITIONS~~

~~**BO103.1 General.** The terms used in this appendix, and not provided in Chapter 2, are defined as follows:~~

~~**DANGEROUS.** Any *building*, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous:~~

1. ~~The building or structure has collapsed, has partially collapsed, has moved off its foundation or lacks the necessary support of the ground.~~
2. ~~There exists a significant risk of collapse, detachment or dislodgement of any portion, member, appurtenance or ornamentation of the building or structure under permanent, routine or frequent loads; under actual loads already in effect; or under snow, wind, rain, flood, earthquake aftershock or other environmental loads when such loads are imminent.~~

Revise as follows:

BO105.5.1 Materials and methods. Newly installed electrical equipment and wiring ~~relating to work done in any work area, including in newly installed partitions and ceilings,~~ shall comply with the materials and methods requirements of Chapters 34 through 43.

BO105.5.3 Additional electrical requirements. Where the ~~work~~ area of alterations includes any of the following areas within a *dwelling unit*, the requirements of Sections BO105.5.3.1 through BO105.5.3.5 shall apply.

BO105.6 Ventilation. Reconfigured spaces intended for occupancy and spaces converted to habitable or occupiable space ~~in any work area~~ shall be provided with *ventilation* in accordance with Section R325.

BO105.8.5 Stairway illumination. *Stairways* ~~within the work area~~undergoing alterations shall be provided with illumination in accordance with Section R325.7.

Reason: This proposal cleans up Appendix BO Existing Buildings by eliminating duplicated text, incorrect terminology and an unused definition from the text. It is generally editorial in nature.

- Section BO102.2 Identification of work is stricken because documenting the scope of work on applications and permits is adequately covered in Chapter 1 of the IRC. It need not to be duplicated here.
- Section BO102.3 Structural is modified to remove language about not allowing work that causes the structure to be less compliant with code. This language is already found in 102.1 and does not need to be repeated here.
- The term "work area" is removed from sections BO105.5.3 Additional electrical requirements, BO 105.5.1 Materials and methods, BO 105.6 Ventilation, and BO105.8.5 Stairway illumination and replaced by the phrase, "area of alterations". "Work area" is specific to a particular method of compliance allowed within the IEBC and not a concept used in the IRC. It is replaced by the phrase "area of alterations" to clearly identify the area of work within the context of the IRC.
- The definition of DANGEROUS is removed from Appendix BO. The term is not used within the Appendix and is also not defined in the body of the code. It is not needed in Appendix BO and was simply mistakenly carried over from the 2021 IRC Appendix J Existing Buildings and 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:

Eliminating a definition that isn't used in the appendix in question and eliminating a term that doesn't apply in an IRC context is completely editorial in nature. There is no cost impact.

RB295-25

RB296-25

IRC: BO102.3

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

APPENDIX BO
EXISTING BUILDINGS AND STRUCTURES

Revise as follows:

BO102.3 Structural. Structural elements and systems that are altered, repaired or replaced shall comply with Section R102.6.1 and the structural provisions of this appendix. ~~The work performed shall not cause the structure to become less compliant with this code than it was before the work was undertaken.~~
Where new structural elements rely on existing structural elements for resistance to gravity or environmental loads, the supporting existing structural elements down to the foundation shall comply with or be altered to comply with this appendix. All other existing structural elements outside of the work performed shall not become less compliant with this code than before the work was undertaken.

Reason: This proposal adds language to ensure a continuous load path is maintained, where alterations and additions are made to existing structures. This section was added to Appendix BO (formerly AJ) with multi-party collaboration in the 2024 code cycle. While providing input to ICC on the 2024 edition commentary for this section, this clarification was identified as a necessary revision. Without this added language, alterations and additions that comply with this Appendix could be rendered significantly more vulnerable to environmental loads, than the structure was prior to alteration or addition. The addition of load path provisions is consistent with ASCE 7 Section 12.1.3 “Continuous Load Path and Interconnection.” This section combined with the balance of the ASCE 7 seismic provisions, are based on the published NEHRP Provisions.

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

Justification for no cost impact:

This code change proposal will not increase or decrease the cost of construction because IRC Section 301.1 already requires construction in accordance with the provisions of the IRC to provide a complete load path from the point of the load to the foundation. This code change proposal is only intended to clarify existing IRC provisions.

RB296-25

RB297-25

IRC: BO102.3.1

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

APPENDIX BO
EXISTING BUILDINGS AND STRUCTURES

Revise as follows:

BO102.3.1 Design loads. The minimum design loads for the existing structure shall be the loads applicable at the time the *building* was constructed. The minimum design loads for new structural components shall comply with this code. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsafe shall be repaired or replaced in accordance with Section R102.6.1.

Reason: This proposal recognizes that at times it may be necessary to replace structural elements rather than simply repairing them. This follows similar language that is in International Existing Building Code (IEBC) Sections 405.2.1.1, 502.3, 503.3, 706.2, 805.2 and 1103.1, where it notes when structural members may need to be “replaced or altered”.

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

Justification for no cost impact:

Proposal is entirely clarification and editorial to maintain past practice, with no substantive effect.

RB297-25

RB298-25

IRC: BO102.3.1, BO105.2, BO105.4.1, BO105.4.2, BO105.4.2.1, BO106.2

Proponents: Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com); Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com)

2024 International Residential Code

APPENDIX BO
EXISTING BUILDINGS AND STRUCTURES

Revise as follows:

BO102.3.1 Design loads. The minimum design loads for the existing structure shall be the loads applicable at the time the *building* was constructed. The minimum design loads for new structural elements ~~components~~ shall comply with this code. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsafe shall be repaired in accordance with Section R102.6.1.

BO105.2 Newly constructed elements. Newly constructed elements~~, components~~ and systems shall comply with the requirements of this code.

Exceptions:

1. Added openable windows are not required to comply with the light and *ventilation* requirements of Section R325.
2. Newly installed electrical equipment shall comply with the requirements of Section BO105.5.

BO105.4.1 Decreased structural capacity. Where an *alteration* causes a decrease in capacity in any structural element ~~component~~, that structural element ~~component~~ shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6 and 8.

BO105.4.2 Increased design loads. Where an *alteration* causes an increase in loads as described in this section, the existing structural elements ~~components~~ that support the increased load, including the foundation, shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6 and 8. Existing structural components that do not provide support for the increased loads shall not be required to comply with this section.

BO105.4.2.1 Dead load increase. *Dead load* shall be considered to be increased for purposes of this section when the weight of materials used for the *alteration* exceeds the weight of the materials replaced, or when new materials or elements are added over existing materials or elements.

Exceptions:

1. *Buildings* in which the increase in *dead load* is due entirely to the *addition* of a second layer of *roof covering* weighing 3 pounds per square foot (psf) (0.1437 kN/m^2) or less over an existing single layer of *roof covering*.
2. Installation of rooftop-mounted photovoltaic (*PV*) panel systems weighing 4 psf (0.1915 kN/m^2) or less over an existing single layer of *roof covering*.

These exceptions shall not be applied simultaneously.

BO106.2 Structure for horizontal additions. Where an *addition* involves new construction attached to an existing building, the new construction shall meet all of the structural requirements of this code for new construction. *Alterations* to the existing building shall comply with the requirements governing *alterations* within this code. In wood light-frame *additions*, connection of the structural elements ~~components~~ shall be permitted to be provided using wall top plates and *addition* studs that abut the existing building. Wall top plates shall be lapped and spliced in accordance with Section R602.3.2. Abutting studs shall be fastened in accordance with Table R602.3(1).

Exception: The *addition* structure shall be permitted to be connected to the existing building in accordance with accepted engineering practice.

Reason: This section was added through multi-party collaboration in the 2024 cycle. We have since determined that an editorial correction is needed so that consistent terminology is used. As currently written, the appendix uses structural “elements” and structural “components” interchangeably. This code change proposes to consistently use the term structural elements throughout the appendix. The terminology being proposed is consistent with a broad range of publications developed and published by FEMA including the 2020 NEHRP Provisions. There are no technical changes in this proposal.

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

Justification for no cost impact:

This code change proposal will not increase or decrease the cost of construction because the proposal is only intended to clarify the current code requirements. See reason statement.

RB298-25

RB299-25

IRC: BO102.10 (New)

Proponents: Jay Crandell, P.E., ABTG / ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz)

2024 International Residential Code

APPENDIX BO
EXISTING BUILDINGS AND STRUCTURES

Add new text as follows:

BO102.10 Energy conservation. Alterations or additions to existing buildings or structures are permitted without requiring the entire building or structure to comply with the energy requirements of the International Energy Conservation Code or Chapter 11 of this code. The alterations and additions shall conform to the energy requirements of Chapter 5 of the International Energy Conservation Code or Section N1109 of Chapter 11 of this code.

Reason: Appendix BO addresses primarily structural and safety related matters with work on existing buildings. However, its reference to energy efficiency requirements is very incomplete and inconsistent with requirements for existing building energy efficiency in the main body of the code. Section N1109 of Chapter 11 addresses many important requirements for energy efficiency related to alterations and additions to existing buildings, including replacement of windows. This proposal properly coordinates Appendix BO with requirements for existing building energy efficiency in the code.

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

Justification for no cost impact:

This proposal properly coordinates energy efficiency requirements in the code with those in Appendix BO since the two must be compatible as they are both adopted. This proposal, therefore, does not change requirements where the IRC code and Appendix BO are both adopted. Thus, in this context, there is no cost impact.

RB299-25

RB300-25

IRC: BO104.1, BO104.2.1, BO105.2, BO105.3, BO106.2

Proponents: Jenifer Gilliland, representing Seattle Department of Construction & Inspections (jenifer.gilliland@seattle.gov); Ardel Jala, representing Seattle Department of Construction & Inspections (ardel.jala@seattle.gov)

2024 International Residential Code

APPENDIX BO
EXISTING BUILDINGS AND STRUCTURES

SECTION BO104
REPAIRS

Revise as follows:

BO104.1 General. *Repairs* shall comply with the applicable provisions of this code for new construction or as permitted by this appendix. <u>Work on undamaged components necessary for the required repair of damaged components shall be considered part of the repair and shall not be subject to requirements for *alterations*.</u>

BO104.2 Materials. Materials used during *repairs* shall comply with this section.

BO104.2.1 New and replacement materials. Except as otherwise required or permitted by this code, materials permitted by this code for new construction shall be used. Like materials shall be permitted for *repairs* ~~and *alterations*,~~ provided that unsafe conditions are not created. Hazardous materials shall not be used where this code would not permit their use in *buildings* of similar occupancy, purpose and location.

SECTION BO105
ALTERATIONS

BO105.2 Newly constructed elements. Newly constructed elements~~, components~~ and systems shall comply with the requirements of this code.

Exceptions:

1. Added openable windows are not required to comply with the light and *ventilation* requirements of Section R325.
2. Newly installed electrical equipment shall comply with the requirements of Section BO105.5.

~~**BO105.3 Nonconformities.** The work shall not increase the extent of noncompliance or create nonconformity to those requirements that did not previously exist.~~

SECTION BO106
ADDITION

BO106.2 Structure for horizontal additions. Where an *addition* involves new construction attached to an existing building, the new construction shall meet all of the structural requirements of this code for new construction. *Alterations* to the existing building shall comply with the requirements governing *alterations* within this code except where <u>modified by this appendix</u>. In wood light-frame *additions*, connection of the structural ~~components~~ <u>elements</u> shall be permitted to be provided using wall top plates and *addition* studs that abut the existing building. Wall top plates shall be lapped and spliced in accordance with Section R602.3.2. Abutting studs shall be fastened in accordance with Table R602.3(1).

Exception: The *addition* structure shall be permitted to be connected to the existing building in accordance with accepted engineering practice.

Reason: This proposal corrects unanticipated errors and omissions created when Appendix BO Existing Buildings and Structures was approved for inclusion in the 2024 International Residential Code. We propose four edits to improve the appendix:

1. Add language to address work on undamaged components when damaged components are being repaired. Language from the 2024 IEBC Section 401.2 is added to clarify requirements for alterations do not apply.

2. Using "like" materials in repairs is approved but not when the work being performed is an alteration (See BO 104.2.1). According to the commentary for the 2021 IRC, appendix J, Section AJ107.1, "it is acceptable to use materials consistent with those that are already present. This allowance follows the general concept that the repair work is making the building no more unsafe or hazardous than it was prior to the work being done." The same cannot be said for alterations where use of like materials from one area of a building to other portions of a building where the material was not used would increase the nonconformity of the existing building. Alterations are considered new work throughout the code. The use of like materials should not be encouraged in alterations unless the materials comply with current codes.

3. Replace the term "structural components" with "structural elements". The term "elements" is used in various codes to describe major structural and other systems in the building, e.g. Table 601 of the IBC. A component is generally considered to be a part or portion of one of these systems. There are a few parts of the appendix that utilize the term "component" when it should be "element". These have been fixed in this proposal.

4. Relocate Section BO105.3 Nonconformities into its own section. Eliminate the second sentence of BO102.3 Structural concerning work making the building no less compliant than it was before the work was undertaken. This requirement does not need to be in three different places in the appendix. Creating section BO102.10 means the requirements about not creating a nonconformity or increasing one apply to all types of work covered by the appendix.

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

Justification for no cost impact:

This code change proposal clarifies requirements within the appendix. There is no cost or possibly a decrease in cost depending on how these items are currently being interpreted. For instance, clarifying that work on undamaged components needed for repair of damaged components doesn't need to meet alteration requirements would reduce the work needed on undamaged components. Changing "structural **components"** to "structural **elements"** would limit the review to "structural elements" rather than "structural components".

The other code changes eliminate a duplicative requirement, BO105.3 Nonconformities, because identical language will be in BO102.10, as well as clarify that alterations have to comply with the IRC, as modified by Appendix BO. Neither of these items would impact cost.

RB300-25

RB301-25

IRC: BO107.1, BO107.1.1 (New), BO107.2 (New), BO107.2.1 (New), BO107.3 (New), BO107.4 (New)

Proponents: Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com); Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com)

2024 International Residential Code

APPENDIX BO
EXISTING BUILDINGS AND STRUCTURES

Delete and substitute as follows:

~~**BO107.1 General.** Residential buildings or structures moved into or within the *jurisdiction* are not required to comply with the requirements for new construction under this code, provided they comply with all of the following conditions:~~

1. ~~The *building* shall be safe for human occupancy as determined by the International Fire Code and the International Property Maintenance Code.~~
2. ~~Any *repair*, *alteration* or change of use undertaken within the relocated structure shall comply with the requirements of this code applicable to the work being performed.~~
3. ~~Any field fabricated elements shall comply with the applicable requirements of this code.~~

BO107.1 General. These provisions apply to residential buildings or structures within the scope of the *International Residential Code* that meet all the following conditions:

1. The building is relocated from the original property to a new property or to a new location on the same property.
2. The relocated building was originally designed and constructed to remain on the original site of construction.
3. The relocated *building* remains safe for human occupancy as determined by the *International Existing Building Code*, *International Fire Code* and the *International Property Maintenance Code*

Add new text as follows:

BO107.1.1 Relocatable Buildings. Buildings and structures originally designed and constructed to be relocatable to new sites are outside the scope of this appendix.

BO107.2 Conformance. Any *repair*, *alteration* or *change of occupancy* undertaken within the relocated building shall comply with the applicable provisions of this code for new construction and this appendix. New constructed elements shall comply with the requirements of this code for new construction. Existing elements that are not *repaired*, *replaced*, or *altered* are not required to comply with the requirements of this code for new construction.

BO107.2.1 Unsafe Conditions. Elements that are uncovered during the course of the relocation and that are found to be *unsafe* shall be repaired or replaced in accordance with Section R102.6.1.

BO107.3 Design criteria. Where climatic and geographic design criteria at the proposed new site of a relocated building is higher than at the original site, the relocated building shall be shown to comply with the structural requirements of this code or shall be altered as needed to comply. Climatic and geographic design criteria for both sites shall be determined in accordance with Section R301.2.

BO107.4 Foundations. The foundation and connection of the relocated building to the foundation shall comply with this code for new construction.

Reason: This proposal provides direction on what is required for a relocated existing residential building. Although other sections may be inferred as applicable, this section clearly identifies provisions to be considered as well as allowing for future provisions to address unique conditions for relocated buildings.

Cost Impact: Increase

Estimated Immediate Cost Impact:

Relocation of a building to a location with different climatic and geographic design criteria, as per Section BO107.3, will at a minimum require determination of whether the criteria are more restrictive. This can be done with the assistance of the building official and should have negligible cost. Where the relocation results in higher loads such as snow, wind, or seismic, upgrades to the existing floors, walls and foundations may be necessary and can have widely varying scope and cost. For purposes of this proposal we estimate a lower-bound cost of $2000 and a median cost of $34,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

The $2,000 lower bound cost is estimated for evaluation of the existing framing, bracing and foundation to determine if strengthening is needed. The $34,000 median cost assumes that strengthening of the wall bracing and load path connections is needed throughout the home. This will often involve opening of wall finish materials to access sheathing and framing. It is an approximate number based on a 2023 NAHB median home cost of 425,000, and an estimated cost of strengthening of approximately 8% of the home cost based on judgment.

RB301-25

RB302-25

IRC: BO108 (New), BO108.1 (New), BO108.2 (New), BO108.3 (New)

Proponents: Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com); Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com)

2024 International Residential Code

APPENDIX BO
EXISTING BUILDINGS AND STRUCTURES

Add new text as follows:

SECTION BO108
CHANGE OF OCCUPANCY

BO108.1 General. Existing residential buildings and structures with a change of occupancy or use shall comply with the this code, except as modified by this appendix. Where a change of occupancy with the work performed is not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.

BO108.2 Change of occupancy or use. Where the live load for the proposed new occupancy or use is higher than the live load for the current occupancy or use in accordance with Table R301.5, existing framing and foundations shall be shown to comply or altered to comply with Chapters 4 through 6 of this code.

BO108.3 Live/work units. Portions of a dwelling unit converted to a *live/work* unit shall be shown to comply with or altered to comply with Section R322.2 and Section 508.5 of the *International Building Code.*

Reason: This proposal provides direction on what is required for a change of occupancy or use within an existing residential building. Although other sections may be inferred as applicable, this section clearly identifies provisions to be considered as well as allowing for future provisions to address new and creative uses of spaces to accommodate the lack of affordable housing.

Cost Impact: Increase

Estimated Immediate Cost Impact:

A change of occupancy that results in higher live loads, as per Section BO108.2, would result in increased cost to evaluate and upgrade existing foundations and framing. This should not apply for change from occupancies such as office or commercial to residential, because live loads are generally reduced rather than increased. Increased live loads do commonly occur when changing uninhabitable attics to habitable attics or areas other than sleeping and turning roofs into roof decks. In each of these instances, costs will be incurred to evaluate the existing framing and foundation, and to upgrade them as required to conform; this generally occurs as part of a renovation project that includes a range of other work and costs. The scope and cost of work can vary widely. For purposes of this proposal we estimate a lower-bound cost of $2000 and a median cost of $20,000.

Estimated Immediate Cost Impact Justification (methodology and variables):

The $2,000 lower bound cost is estimated for evaluation of the existing framing and foundation to determine if strengthening is needed. The $20,000 median cost assumes that strengthening of the floor and supporting wall framing is needed in one portion of the home. It is an approximate cost based on a 2023 NAHB median home cost of 425,000, and an estimated cost of strengthening of approximately 5% of the home cost based on judgment. This cost addresses structural strengthening only, not additional work that might be associated with the change in occupancy.

RB303-25

IRC: BO109 (New), BO109.1 (New)

Proponents: Julie Furr, Smith Seckman Reid, Inc, representing Julie Furr, PE (jcfurr@ssr-inc.com); Kelly Cobeen, Wiss Janney Elstner Associates, representing Self (kcobeen@wje.com)

2024 International Residential Code

APPENDIX BO
EXISTING BUILDINGS AND STRUCTURES

Add new text as follows:

SECTION BO109
HISTORIC BUILDINGS

BO109.1 General. Work performed to *historic buildings* that are within the scope of the *International Residential Code* shall comply with the this code, except as modified by this appendix. Where a *historic building* with the work performed is not within the scope of this code, the provisions of the *International Existing Building Code* shall apply.

Reason: This proposal provides direction on what is required for historic existing residential structures. Although other sections may be inferred as applicable, this section clearly identifies provisions to be considered as well as allowing for future provisions to address new and creative uses of spaces to preserve heritage buildings.

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

Justification for no cost impact:

Historic buildings are already allowed under the IRC or IEBC. This proposal just creates a dedicated section and fits within the bigger framework of improving the residential provisions in the IRC to allow the IRC to be standalone.

RB303-25

RB304-25

IRC: APPENDIX BP (New), SECTION BP101 (New), BP101.1 (New), BP101.2 (New), SECTION BP102 (New), BP102.1 (New), BP102.1.1 (New), BP102.1.2 (New), BP102.1.3 (New), BP102.1.4 (New), BP102.1.5 (New), SECTION BP103 (New), BP103.1 (New), BP103.1.1 (New), BP103.1.2 (New), BP103.1.3 (New), SECTION BP104 (New), BP104.1 (New), BP104.1.1 (New), BP104.1.2 (New), BP104.1.3 (New), BP104.1.4 (New), SECTION BP105 (New), BP105.1 (New), TABLE BP105.1 (New)

Proponents: Eirene Knott, representing BRR Architecture (eirene.knott@brrarch.com)

2024 International Residential Code

Add new text as follows:

APPENDIX BP
PHYSICAL SECURITY

SECTION BP101
GENERAL

BP101.1 Purpose. The purpose of this appendix is to establish minimum standards that incorporate physical security to make dwelling units resistant to unlawful entry.

BP101.2 Application. The provisions of this appendix shall apply to all new structures and to additions and alterations made to existing buildings as provided for in R102.6.1.

SECTION BP102
DOORS

BP102.1 Doors. All exterior doors and doors leading from the garage area into the dwelling unit, shall comply with Sections BP102.1.1 through BP102.1.5 based on the type of door installed.

Exceptions:

1. Vehicle access doors
2. Storm or screen doors

BP102.1.1 Wood doors. Wood doors shall be of solid core construction such as high-density particleboard, solid wood, or wood block core with a minimum thickness of 1-3/4 inches (45 mm) when measured at the locking device or hinge.

BP102.1.2 Steel doors. Steel doors shall be a minimum skin thickness of 24 gauge and have reinforcement material at the location of the deadbolt.

BP102.1.3 Fiberglass doors. Fiberglass doors shall have a minimum skin thickness of one-sixteenth inch and have reinforcement material at the location of the deadbolt.

BP102.1.4 Double doors. The inactive leaf of an exterior double door shall be provided with flush bolts having an engagement of not less than 1-inch (25.4 mm) into the head and threshold of the door frame, or by other approved methods.

BP102.1.5 Sliding doors. Sliding doors shall be installed to prevent the removal of the panels from the exterior.

SECTION BP103
DOOR FRAMES

BP103.1 Door frames. The exterior door frames shall be installed prior to the rough-in inspection. Two-inch nominal wood blocking shall be placed horizontally between studs at the door lock height for at least one stud space on each side of the door opening. Door frames shall comply with ATSM F476 Grade 40 for the bolt and hinge impact. Door frames shall comply with Sections BP103.1.1 through BP103.1.3 based on the type of door installed.

BP103.1.1 Wood frames. Wood frame doors shall be set in frame openings constructed of double studding or equivalent construction. Door frames, including those with sidelites, shall be reinforced.

BP103.1.2 Steel frames. Steel door frames shall be constructed of 18 gauge or heavier steel. Doors shall be anchored to the wall in accordance with the manufacturer's instructions.

BP103.1.3 Sidelight entry. Sidelite door units shall have framing of double stud construction or equivalent construction. Double stud construction or equivalent construction shall exist between the glazing unit of the sidelite and the wall structure of the dwelling.

SECTION BP104
DOOR HARDWARE

BP104.1 Door hardware. Exterior door hardware shall comply with Sections BP104.1.1 through BP104.1.4.

BP104.1.1 Hinges. Hinges for exterior swinging doors shall comply with the following:

1. At least two screws, 3 inches (76 mm) in length, penetrating at least 1-inch (25.4 mm) into the wall structure. Solid wood fillers or shims shall be used to eliminate any space between the wall structure and the door frame behind each hinge.
2. Hinges for out-swinging doors shall be equipped with mechanical interlock to prevent removal of the door from the exterior.

Exception: Sidelite doors complying with ASTM F476 for the bolt and hinge impact test.

BP104.1.2 Escutcheon plates. All exterior doors shall have escutcheon plates protecting the door's edge at the location of the deadbolt. Exception: Doors provided with a multi-point lock.

BP104.1.3 Locks. Exterior doors shall be provided with a deadbolt with a minimum grade B as determined by ANSI/BHMA A156.40.

BP104.1.4 Entry vision and glazing. Front entry doors to dwelling units shall be arranged so that the occupant has a 180 degree view of the area immediately outside the door without opening the door.

SECTION BP105
REFERENCED STANDARDS

BP105.1 General.. See Table BP105.1 for standards that are referenced in various sections of this appendix. Standards are listed by the standard identification with the effective date, the standard title, and the section or sections of this appendix that references the standard.

TABLE BP105.1 REFERENCED STANDARDS

STANDARD ACRONYM	STANDARD NAME	SECTIONS HEREIN REFERENCED

ASTM F476-2014	Standard Test Methods for Security of Swinging Door Assemblies	BP103.1, BP104.1.1
ANSI/BMHA A156.40-2020	Standard for Residential Deadbolts	BP104.3

Reason: In the summer of 1996, Overland Park, Kansas, experienced a series of home invasions resulting in the sexual assault of several women. For the victims of a home invasion, it's more than a property crime; it scares the victim into thinking that the criminal will return only to commit a more violent or heinous crime. To have an emotional investment in their residence is priceless. As a result of these home invasions, the City's Police Department conducted hundreds of surveys of residents in an effort to develop a solution to the home invasions. The results of the surveys lead the City to develop a building code that makes home more safe and secure. You may ask, why secure the front door? What about installing an alarm? Communities across the country continue to report a growing increase in false alarms. In an effort to provide physical security to the homeowner, there needs to be a more reliable option available.

The longer a criminal spends trying to gain access to a home, the greater the risk of detection. In addition, most home invaders will not attempt to break a window, as that makes noise that neighbors could potentially hear. Rather than face these risks, the invader is more likely to try to kick in an exterior door, where they can easily gain access without being detected.

This code change will provide for minimal provisions to be made to a new home under construction that will give the homeowner safety and peace of mind, while delaying and frustrating the criminal. Since this proposal is not dependent on electrical power, these provisions will always be available to the homeowner and will require no further action after installation. There is no on-going cost to the homeowner and these provisions will not affect the overall aesthetics of the home.

Cost Impact: Increase

Estimated Immediate Cost Impact:

The cost to secure a single door ranges from $40-$60 for a single door unit and between $140 and $180 for a double sidelite unit.

Estimated Immediate Cost Impact Justification (methodology and variables):

The cost to secure a single door ranges from $40-$60 for a single door unit and between $140 and $180 for a double sidelite unit.

Staff Analysis: A review of the following standards proposed for inclusion in the code regarding some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before April 1, 2025.
ASTM F476-2014 Standard Test Methods for Security of Swinging Door Assemblies
ANSI/BMHA A156.40-2020 Standard for Residential Deadbolts

RB304-25