

# IRC - Building



## 2022 GROUP B PUBLIC COMMENT AGENDA

SEPTEMBER 14 - 21, 2022

KENTUCKY INTERNATIONAL CONVENTION CENTER  
LOUISVILLE, KY

## 2022 Public Comment Agenda

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## **Proposed Change as Submitted**

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

### **2021 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 uses shall be permitted ~~to be constructed in accordance with this code~~ where located within a dwelling unit that is 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 receiving care ~~that are within a single-family dwelling.~~

**Reason:** The intent of this proposal is to clarify the permitted uses of the scope within dwelling units and constructed in accordance with the IRC, by removing repeated and redundant language in each of the exceptions ("within a dwelling unit") and placing that in the main body of the exception. The revisions are editorial and for clarification with no technical changes included.

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 2020 and 2021 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 code change proposal will not increase or decrease the cost of construction. The proposed changes are only editorial. This clarification of scope for IRC has no technical changes.

**Staff Analysis:** The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

RB4-22

## **Public Hearing Results**

This proposal includes unpublished errata

**Section R101.2 Scope, Item 5 should also include 'that are' as struck out.**

5. A day care facility for five or fewer persons receiving care ~~that are within a single-family dwelling.~~

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because the committee felt that moving 'dwelling unit' to the start of the exceptions was not clear where working with lodging houses and live/work units since those are not exactly dwelling units. The phrase "constructed in accordance with this code" should not be struck because it could be interpreted that this would allow these 5 items to not have to comply with the limits for construction (e.g. number of stories, separation). (Vote: 6-5)

RB4-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R101.2

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential 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-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 uses shall be permitted to be constructed in accordance with this code where located within a dwelling unit that is provided with an automatic sprinkler system complying with Section P2904:

1. Live/work units 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.
4. A care facility with five or fewer persons receiving medical care .
5. A day care facility for five or fewer persons receiving care .

**Commenter's Reason:** The BCAC would first like to address the concerns of the committee and the opposition.

The modification restores the phrase 'to be constructed in accordance with this code' due to the IRC committee's concern that someone could misread the exceptions to be for all limitations in the IRC (e.g. three stories, separate means of egress), rather than just the use.

The opposition argued that a lodging house is not a dwelling unit. This is incorrect. Below is the definition.

[RB] LODGING HOUSE. A one-family dwelling where one or more occupants are primarily permanent in nature, and rent is paid for guestrooms.

The primary focus of this change continues to be removal of other limits in the current definitions:

- that a Live/work unit should be permitted in one- and two-family homes, not just townhouses; and
- that day care facilities should be permitted in townhouses, not just single-family homes.

The intent of this proposal is:

- Item 1 - To allow for live/work units to be all types of dwelling units, not just townhouses.
- Item 5 - To allow for day care facilities in all types of dwelling units, not just single family dwellings
- Remove redundant language in Item 3 and 4.

It should be noted that Section AY101.1.1 of RB314-22 AS also contains this list. BCAC would support coordination between those two sections as code correlation.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

This would allow for additional design options for live/work units and very small day care in in home. This clarification of scope for IRC has no technical changes.

Public Comment# 3025



## **Proposed Change as Submitted**

**Proponents:** Stephen Thomas, representing Colorado Chapter ICC (stthomas@coloradocode.net)

### **2021 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- children receiving care that are within a single-family dwelling unit.

**Reason:** This proposal is designed to provide consistent language between the IBC and the IRC regarding small day care facilities. IBC Section 305.2.3 permits a day care facility within a dwelling unit to comply with the IRC where there are five or fewer children receiving day care. However, there is no scoping in the IRC for this type of use. The cross references were added in the 2018 IBC but we missed the day care provision and just made a general comment for persons receiving care. We no longer need that language since we are addressing each type of care that the IBC permits to comply with the IRC in the different uses in the exception.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. This change is a clarification and does not change any technical provisions.

**Staff Analysis:** The scope and intent of the I-codes is subject to the approval of the ICC Board of Directors.

RB5-22

## **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

R101.2Scope.

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 children receiving care within a dwelling unit.
6. A care facility for five or fewer persons receiving care within a dwelling unit.

**Committee Reason:** The modification was approved because it restored the current exception 5 with the additional modification of allowing for adult day care to be located within a townhouse or a single family home. The original proposal was approved because it specifically addressed child day care and allowed for child day care to be located within a townhouse or single family home. (Vote: 10-0)

RB5-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R101.2**

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential 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-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 ~~children~~ persons of any age receiving care within a dwelling unit.
6. ~~A care facility for five or fewer persons receiving care within a dwelling unit.~~

**Commenter's Reason:** The original proposal was too limiting as it said day care was only for children. The IBC Sections 308.5, 308.5.4 and 310.4.1 allow for day care for any age. While the BCAC agrees this should be indicated as 'day' care, adult day care should also be permitted. The proponent put in a floor modification to add the current exception 5 back into the list of exceptions as a new exception 6. That would be redundant. The clarification can be in one exception.

2021 IBC

308.5 Institutional Group I-4, day care facilities. Institutional Group I-4 occupancy shall include buildings and structures occupied by more than five persons of any age who receive custodial care for fewer than 24 hours per day by persons other than parents or guardians; relatives by blood, marriage or adoption; and in a place other than the home of the person cared for. This group shall include, but not be limited to, the following:

Adult day care

Child day care308.5.4 Five or fewer persons receiving care in a dwelling unit. A facility such as the above within a dwelling unit and having five or fewer persons receiving custodial care shall be classified as a Group R-3 occupancy or shall comply with the International Residential Code.

310.4.1 Care facilities within a dwelling. Care facilities for five or fewer persons receiving care that are within a single-family dwelling are permitted to comply with the International Residential Code provided an automatic sprinkler system is installed in accordance with Section 903.3.1.3 or Section P2904 of the International Residential Code.

It should be noted that Section AY101.1.1 of RB314-22 AS also contains this list. BCAC would support coordination between those two sections as code correlation.

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 2020, 2021 and 2022 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 net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This change is a clarification and does not change any technical provisions.

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Public Comment# 3026

### **Proposed Change as Submitted**

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

#### **2021 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 safety, health and general welfare through affordability, structural strength, means of egress, stability, sanitation, light and ventilation, energy conservation ~~and safety to life~~ providing a reasonable level of life safety and property protection from fire and other hazards and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

**Reason:** The purpose of this proposal is for consistency in language for the sections related to the purpose of the codes throughout the ICC family of codes. This would be consistent with IFC, IBC, IEBC, ISPS, and IZC – which were passed with ADM10-19. The change in the title reflects the language in the first sentence. The IRC code development committee objected to the proposal last cycle because it included “explosions”; which has been removed. The revision is for consistency with “providing a reasonable level of life safety and property 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 2020 and 2021 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 code change proposal will not increase or decrease the cost of construction. This change is for coordination across codes for the purpose statements and does not change any technical requirements.

RB6-22

### **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposal because they felt the issue of safety was already addressed in the code. (Vote: 9-1)

RB6-22

### **Individual Consideration Agenda**

#### **Public Comment 1:**

**IRC:** R101.3

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

**Modify as follows:**

#### **2021 International Residential Code**

**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 ~~providing a reasonable level of life safety~~ and property protection from fire and other hazards and to provide a reasonable level of safety to fire fighters and emergency responders during emergency operations.

**Commenter's Reason:** The BCAC feels that this proposal should be reconsidered. This is an editorial change that makes the codes consistent.

The IRC committee rejected this change because the issue of safety is already addressed in the code.' Safety" is already in the revised sentence; this is just a reformat. We are proposing only to add "life" to the existing text to be "The purpose of this code is to establish minimum requirements to provide a reasonable level of life safety" and remove the redundant language while maintaining the new text of "and property protection".

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This is an editorial change with no changes to technical requirements.

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Public Comment# 3030

## **Proposed Change as Submitted**

**Proponents:** Sue Coffman, representing Washington Association of Building Officials Technical Code Development Committee (sue.coffman@cityoftacoma.org); Hoyt Jeter, representing WABO TCD (hjeter@cityoftacoma.org); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

### **2021 International Residential Code**

**Revise as follows:**

**R102.7.1 Additions, alterations or repairs or relocations.** ~~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~~ or relocation. An existing building together with its ~~additions~~ shall comply with the height limits of this code. ~~Where the alteration causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the International Existing Building Code shall apply.~~

**Add new text as follows:**

**R102.7.2 Repairs, renovations, alterations, or reconstructions.** Repairs, renovations, alterations, or reconstructions shall conform to the requirements of the provisions of Chapter 44. Where the renovation, alteration, or reconstruction causes the use or occupancy to be changed to one not within the scope of this code, the provisions of the International Existing Building Code shall apply.

**Revise as follows:**

**[RB] ALTERATION.** Any construction, reconfiguration, retrofit or renovation to an existing 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~~ a reconfiguration or extension, addition, installation, or change to the equipment or arrangement, type or purpose of the original installation that requires a *permit*. For the definition applicable in Chapter 11, see Section N1101.6.

**Add new definition as follows:**

**CATEGORIES OF WORK.** The nature and extent of construction work undertaken in an existing building, which include repair, renovation, alteration, and reconstruction.

**DANGEROUS.** Where the stresses in any member; the condition of the building, or any of its components or elements or attachments; or other condition that results in an overload exceeding 150 percent of the stress allowed for the member or material in this code.

**MATERIALS AND METHODS REQUIREMENTS.** Those requirements in this code that specify material standards; details of installation and connection; joints, penetrations; and continuity of any element, component or system in the building. The required quantity, fire resistance, flame spread, acoustic or thermal performance, or other performance attribute is specifically excluded from materials and methods requirements.

**RECONSTRUCTION.** The reconfiguration of a space that affects an exit, a renovation or alteration where the work area is not permitted to be occupied because existing means-of-egress and fire protection systems, or their equivalent, are not in place or continuously maintained; or there are extensive alterations.

**REHABILITATION.** Any repair, renovation, alteration or reconstruction work undertaken in an existing building.

**RENOVATION.** The change, strengthening or addition of load-bearing elements; or the refinishing, replacement, bracing, strengthening, upgrading or extensive repair of existing materials, elements, components, equipment or fixtures. Renovation does not involve reconfiguration of spaces. Interior and exterior painting are considered refinishing for the purposes of this definition, and are not renovation.

**Revise as follows:**

**[RB] REPAIR.** ~~The reconstruction, replacement, patching, restoration, minor replacement, or renewal of any part materials, elements, components, equipment, or fixtures of an existing building for the purpose of its maintenance.~~ maintaining those materials, elements, components, equipment, or fixtures in good or sound condition, or to correct damage.

For the definition applicable in Chapter 11, see Section N1101.6.

**Add new definition as follows:**

**WORK AREA.** That portion of a building affected by any renovation, alteration or reconstruction work as initially intended by the owner and indicated as such in the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended

work must be performed, and portions of the building where work not initially intended by the owner is specifically required by the provisions for the renovation, alteration or reconstruction.

**Add new text as follows:**

## **CHAPTER 44** **EXISTING BUILDINGS AND STRUCTURES**

### **SECTION R4401** **SCOPE**

**R4401.1 General.** The specific provisions in this chapter shall apply to the repair, renovation, alteration, and reconstruction of existing buildings and structures. These standards shall apply where construction does not fully comply with construction standards in this code for new construction.

### **SECTION R4402** **CATEGORIES OF WORK**

**R4402.1 General.** Work in existing buildings and structures shall be categorized as repair, renovation, alteration, and reconstruction, and comply with the requirements in this chapter.

Work of more than one category shall be part of a single work project and related work permitted within a 12-month period shall be considered a single work project. Where a project includes one category of work in one building area and another category of work in a separate and unrelated area of the building, each project area shall comply with the requirements of the respective category of work. Where a project with more than one category of work is performed in the same area or in related areas of the building, the project shall comply with the requirements of the more stringent category of work.

### **SECTION R4403** **COMPLIANCE**

**R4403.1 General.** Regardless of the category of work being performed, the work shall not cause the 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 to any previously approved alternative arrangements than it was before the work was undertaken.

**R4403.2 Requirements by category of work.** Repairs shall conform with the requirements in Section R4405. Renovations shall conform to the requirements of Section R4406. Alterations shall conform to the requirements of Section 4407 and the requirements for renovations. Reconstructions shall conform to the requirements of Section R4408 and the requirements of alterations and renovations.

**R4403.3 Smoke alarms.** Regardless of the category of work, smoke alarms shall be provided where required by Section R314.2.2.

**R4403.4 Replacement windows.** Regardless of the category of work, 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 R4403.4.1 through R4403.4.3, as applicable.

**R4403.4.1 Energy efficiency.** Replacement windows shall comply with the requirements of Chapter 11.

**R4403.4.2 Safety glazing.** Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Section R308.

**R4403.4.3 Replacement windows for emergency escape and rescue openings.** Replacement windows for emergency escape and rescue openings shall comply with Section R310.5.

**4403.4.4 Window control devices.** Window opening control devices and fall prevention devices shall be installed compliant with the requirements in R312.2 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 the frame.
  - 2.2. The window replacement includes the sash only when the existing frame remains.
3. 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 where the window is in its largest opened position.
5. The vertical distance from the top of the sill 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).

**R4403.5 Flood hazard areas.** Work performed in existing buildings located in a flood hazard area as established by Table R301.2(1) shall be subject to the provisions of Section R105.3.1.1.

**R4403.6 Features exceeding code requirements.** Elements, components and systems of existing buildings with features that exceed the requirements of this code for new construction, and are not otherwise required as part of approved alternative arrangements or deemed by the building official to be required to balance other building elements not complying with this code for new construction, shall not be prevented by these provisions from being modified as long as they remain in compliance with the applicable requirements for new construction.

## **SECTION R4404**

### **EVALUATION OF AN EXISTING BUILDING**

**R4404.1 General.** The building official shall have authority to require an existing building to be investigated and evaluated by a registered design professional in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:

1. Available documentation of the existing building.
  - 1.1. Field surveys.
  - 1.2. Tests (nondestructive and destructive).
  - 1.3. Laboratory analysis.

**Exception:** Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing and extensive reconstruction shall not be required to be evaluated.

## **SECTION R4405**

### **REPAIRS**

**R4405.1 Materials and methods.** Except as otherwise required herein, repairs shall be done using like materials or methods permitted by this code for new construction.

**R4405.1.1 Hazardous materials.** Hazardous materials no longer permitted, such as asbestos and lead-based paint, shall not be used.

**R4405.1.2 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.

**R4405.2 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 Electrical.** Repair or replacement of existing electrical wiring and equipment undergoing repair with like material shall be permitted.

**Exceptions:**

1. Replacement of electrical receptacles shall comply with the requirements of Chapters 34 through 43.
2. Plug fuses of the Edison-base type shall be used for replacements only where there is not evidence of overfusing or tampering in accordance with the applicable requirements of Chapters 34 through 43.
3. For replacement of nongrounding-type receptacles with grounding-type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuitry, the grounding conductor of a grounding-type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system, or to any accessible point on the grounding electrode conductor, as allowed and described in Chapters 34 through 43.

**R4405.4 Structural.** The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the alteration and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.

## **SECTION R4406**

### **RENOVATIONS**



**R4406.1 Materials and methods.** Except as otherwise required herein, renovations shall comply with the materials and methods requirements of this code for new construction.

**R4406.2 Door and window dimensions.** Minor reductions in the clear opening dimensions of replacement doors and windows that result from the use of different materials shall be allowed, whether or not they are permitted by this code.

**R4406.3 Interior finish.** Wood paneling and textile wall coverings used as an interior finish shall comply with the flame spread requirements of Section R302.9.

**R4406.4 Structural.** Unreinforced masonry buildings located in Seismic Design Category D2 or E shall have parapet bracing and wall anchors installed at the roofline whenever a reroofing permit is issued. Such parapet bracing and wall anchors shall be of an approved design.

## **SECTION R4407**

### **ALTERATIONS**

**R4407.1 Newly constructed elements.** Newly constructed elements, components and systems shall comply with the requirements of this code for new construction.

**Exceptions:**

1. Added openable windows are not required to comply with the light and ventilation requirements of Section R303.
2. Newly installed electrical equipment shall comply with the requirements of Section 4508.5

**R4407.2 Nonconformities.** Alterations shall not increase the extent of noncompliance with the requirements of Section 4408 or create nonconformity to those requirements that did not previously exist.

**R4407.3 Extensive alterations.** Where the total area of all of the work areas included in an *alteration* exceeds 50 percent of the area of the dwelling unit, the work shall be considered to be a reconstruction and shall comply with the requirements of Section 4408.

**Exception:** Work areas in which the alteration work is exclusively plumbing, mechanical or electrical shall not be included in the computation of the total area of all work areas.

**R4407.4 Structural.** The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the alteration and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code for new construction.

**R4407.5 Electrical equipment and wiring.** Electrical equipment and wiring in alterations shall comply with Sections R4407.5.1 through R4407.5.5.

**R4407.5.1 Materials and methods.** Newly installed electrical equipment and wiring relating to work done in any work area shall comply with the materials and methods requirements of Chapters 34 through 43.

**Exception:** Electrical equipment and wiring in newly installed partitions and ceilings shall comply with the applicable requirements of Chapters 34 through 43.

**R4407.5.2 Electrical service.** Service to the dwelling unit shall not be 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.

**R4407.5.3 Additional electrical requirements.** Where the work area includes any of the following areas within a dwelling unit, the requirements of Sections R4407.5.3.1 through R4407.5.3.5 shall apply.

**R4407.5.3.1 Enclosed areas.** Enclosed areas other than closets, kitchens, basements, garages, hallways, laundry areas and bathrooms shall have not less than two duplex receptacle outlets, or one duplex receptacle outlet and one ceiling- or wall-type lighting outlet.

**R4407.5.3.2 Kitchen and laundry areas.** Kitchen areas shall have not less than two duplex receptacle outlets. Laundry areas shall have not less than one duplex receptacle outlet located near the laundry equipment and installed on an independent circuit.

**R4407.5.3.3 Ground-fault circuit interruption.** Ground-fault circuit interruption shall be provided on newly installed receptacle outlets where required by Chapters 34 through 43.

**R4407.5.3.4 Lighting outlets.** Not less than one lighting outlet 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.

**R4407.5.3.5 Clearance.** Clearance for electrical service equipment shall be provided in accordance with Chapters 34 through 43.

**R4407.6 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 R303.

**R4407.7 Ceiling height.** Habitable spaces created in existing basements shall have ceiling heights of not less than 6 foot 8 inches (2032mm), except that the ceiling height at obstructions shall be not less than 6 foot 4 inches (1930 mm) from the basement or attic floor. Existing finished ceiling heights in nonhabitable basements shall not be reduced.

**R4407.8 Stairs.** Except as noted otherwise herein, stairs shall comply with the requirements of Section R311.

**R4407.8.1 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.

**R4407.8.2 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.

**R4407.8.3 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.

## **SECTION R4408** **RECONSTRUCTION**

**R4408.1 Materials and methods.** Except as otherwise required herein, reconstruction shall be done using materials or methods permitted by this code for new construction.

**R4408.2 Stairways.** Stairways within the work area shall be provided with illumination in accordance with Section R303.6.

**R4408.3 Handrails.** Every required exit stairway that has four or more risers, is part of the means of egress for any work area, and does not have handrails, or in which the existing handrails are judged to be in danger of collapsing, shall be provided with handrails designed and installed in accordance with Section R311 for the full length of the run of steps on not less than one side.

**R4408.4 Guards.** Every open portion of a stair, landing or balcony that is more than 30 inches (762 mm) above the floor or grade below, is part of the egress path for any work area, and does not have guards, or in which the existing guards are judged to be in danger of collapsing, shall be provided with guards designed and installed in accordance with Section R312.

**R4408.5 Wall and ceiling finish.** The interior finish of walls and ceilings in any work area shall comply with the requirements of Section R302.9. Existing interior finish materials that do not comply with those requirements shall be removed or shall be treated with an approved fire-retardant coating in accordance with the manufacturer's instructions to secure compliance with the requirements of this section.

**R4408.6 Separation walls.** Where the work area is in an attached dwelling unit, walls separating dwelling units that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. Performance of work shall be required only on the side of the wall of the dwelling unit that is part of the work area.

**Revise as follows:**

## **APPENDIX AJ** **EXISTING BUILDINGS AND STRUCTURES** **(Delete all of Appendix J)**

**Reason:** This proposed code change deletes Appendix Chapter J of the 2021 IRC and moves most of its provisions into the body of the IRC code as a new chapter 44. Definitions from the appendix chapter are also moved into the body of the code as new definitions, or modified if the definitions already existed in the body of the code.

While there are provisions for existing buildings in the IRC, they are scattered throughout different sections of the code and it is sometimes not clear when certain sections apply. There is also a need for clarity surrounding code standards for existing IRC buildings to provide an understanding of when the International Existing Building Code applies vs individual sections within the body of the code.

This proposal consolidates standards for alterations, renovations, reconstructions and repairs into a single chapter, which is referenced in a new section in Chapter R102.7.1. By moving code requirements for existing buildings into a separate chapter within the body of the code, there are distinct requirements that can be specifically applied to the variations options for modifying an existing IRC building, including repairs, renovations, alterations, and reconstructions. This is also contrasted with additions, to which only new code standards apply and the proposed code specifically

addresses additions along with renovations in this section.

In addition to a need for consolidation and clarity of code requirements in the IRC, more reasonable standards are also needed for residential buildings that were built decades ago that potentially have windows, ceiling heights and stairs that don't comply with new code standards.

With many of these spaces potentially already being used for decades as habitable spaces by the homeowner who may not be familiar with building code requirements, the risk of allowing these spaces to be converted to legal habitable space is small. The ability to apply reasonable code standards with a reasonable level of safety gives the homeowner effective use these existing buildings without requiring major reconstruction such as raising the house above the foundation, or other expensive construction techniques that may not add any substantial level of safety to the use of the building.

These proposed provisions also increase the sustainability of our IRC building code because they allows reasonable re-use of buildings. The ability to add additional bedrooms or other habitable spaces to existing buildings enables the homeowner to maximize the use of their home within the same building footprint. This provides additional value to the home without the high cost of new construction.

Although the existing building standards in Appendix J are available as an option for any jurisdiction to adopt, it is a burden to many jurisdictions who have to petition their state building code councils or governing bodies to individually adopt it for their individual jurisdiction. Appendix chapters are therefore infrequently used and most jurisdictions, especially those without a lot capacity for code development, stick to the standard provisions of the state codes and do not adopt optional provisions such as Appendix J. There is a need for the model codes to take the leap and incorporate these requirements into the body of the code, which will therefore be adopted by the states and available to all jurisdictions.

**Cost Impact:** The code change proposal will decrease the cost of construction

More reasonable standards to allow for existing spaces to be compliant with code requirements will not require extensive costly alterations.

RB7-22

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## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposal because they believed the option of using IEBC should remain. In addition, the definitions currently in Appendix J were inconsistent and conflicting with the IEBC (e.g. renovation, rehabilitation). The provisions for existing building currently into the code should be relocated to be grouped in one location. Appendix J should be updated, and then moved into the new existing building chapter. (Vote: 10-0)

RB7-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: APPENDIX AJ, SECTION AJ106, AJ106.1, AJ110.1.1, AJ110.1.2, AJ110.1.3, AJ110.3, AJ110.2, SECTION AJ107, AJ107.1, AJ107.1.1, AJ107.1.2 (New)**

**Proponents:** Julie Furr, representing FEMA ATC Seismic Code Support Committee (jfurr@rimkus.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com) requests As Modified by Public Comment

**Replace as follows:**

## **2021 International Residential Code**

### **APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES SECTION AJ106 DEFINITIONS**

**AJ106.1 General.** ~~For purposes of this appendix, the~~ The terms used in this appendix, and not provided in Chapter 2 of the *International Residential Code*, are defined as follows:

**ALTERATION.** ~~The reconfiguration of any space; the addition or elimination of any door or window; the reconfiguration or extension of any system; or the installation of any additional equipment.~~

**DANGEROUS.** Any building, structure or portion thereof that meets any of the conditions described below shall be deemed dangerous: Where the stresses in any member; the condition of the building, or any of its components or elements or attachments; or other condition that results in an overload exceeding 150 percent of the stress allowed for the member or material in this code:

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.

**REHABILITATION.** ~~Any work, as described by the categories of work defined herein, undertaken in an existing building. Any repair, renovation, alteration or reconstruction work undertaken in an existing building.~~

**REPAIR.** ~~The patching, restoration or minor replacement of materials, elements, components, equipment or fixtures for the purposes of maintaining those materials, elements, components, equipment or fixtures in good or sound condition.~~

**WORK AREA.** That portion or portions of a building consisting of all reconfigured spaces as indicated on the construction documents. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed and portions of the building where work not initially intended by the owner is specifically required by this code.~~That portion of a building affected by any renovation, alteration or reconstruction work as initially intended by the owner and indicated as such in the permit. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed, and portions of the building where work not initially intended by the owner is specifically required by these provisions for a renovation, alteration or reconstruction.~~

## SECTION AJ107 REPAIRS

**AJ107.1 Materials.** Materials used during repairs shall comply with this section. ~~Except as otherwise required herein, work shall be done using like materials or materials permitted by this code for new construction.~~

**AJ107.1.1 Hazardous materials- 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 no longer permitted, such as asbestos and lead-based paint, shall not be used where this code would not permit their use in buildings of similar occupancy, purpose, and location.

**AJ107.1.2 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.

**Commenter's Reason:** New language addressing new and existing materials has been included clarifying when new materials have to be used and when materials matching the existing materials are allowed to be used instead.

Structural definitions have been deleted where already defined in Chapter 2 of the IRC or revised to match definitions already defined in Chapter 2 of the IEBC.

In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.

[https://www.cdpassess.com/public-comment/3547/27869/files/download/3681/FEMA\\_IRC%20APP%20J%20compiled%2007-21-22.docx](https://www.cdpassess.com/public-comment/3547/27869/files/download/3681/FEMA_IRC%20APP%20J%20compiled%2007-21-22.docx)

- This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB7, RB162, RB163, RB206, and RB297

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Because the main body of the code is the default resource used given the present limitations of Appendix AJ, this proposal with floor modifications and public comments will not increase the cost of construction within the IRC. This is a long overdue cleanup that begins to align the Appendix provisions with the requirements of the main body of the code as they are frequently interpreted and used in the field.

**Staff Analysis:** Public comments to RB7, RB162, RB163, RB206 and RB297 addresses requirements for Appendix J in a different or contradicting manner. Approved proposal to Appendix J but without a public comment are RB99, RB296, RB298 and RB299. The membership is urged to make their intention clear with their actions on these public comments.

## Public Comment 2:

IRC: APPENDIX AJ, SECTION AJ101, AJ101.1, AJ101.2, AJ101.3, SECTION AJ102, AJ102.1, AJ102.2, AJ102.3, AJ102.3 (New), AJ102.4, AJ102.4.1, AJ102.4.2, AJ102.4.3, AJ102.4.3.1, AJ102.4.4, AJ102.5, AJ102.6, AJ102.7, AJ102.8, AJ102.9, SECTION AJ103, AJ103.1, SECTION AJ104, AJ104.1, SECTION AJ106, AJ106.1, SECTION 202, SECTION AJ107, AJ104.1 (New), AJ107.1, AJ107.1.1, AJ107.1.2, AJ107.2, AJ107.3, SECTION AJ108, AJ108.1, AJ108.2, AJ108.3, SECTION AJ109, AJ105.1 (New), AJ109.1, AJ109.2, AJ109.3, AJ109.4, AJ108.4, AJ109.5, AJ109.5.1, AJ109.5.2, AJ109.5.3, AJ109.5.3.1, AJ109.5.3.2, AJ109.5.3.3, AJ109.5.3.4, AJ109.5.3.5, AJ109.6, AJ109.7, AJ109.8, AJ109.8.1, AJ109.8.2, AJ109.8.3, AJ105.8.4 (New), AJ105.8.5 (New), AJ105.8.6 (New), SECTION AJ106 (New), AJ106.1 (New), SECTION AJ107 (New), AJ107.1 (New), SECTION AJ110, AJ110.1, AJ110.1.1, AJ110.1.2, AJ110.1.3, AJ110.2, AJ110.3, AJ110.4, SECTION AJ111, AJ111.1, TABLE AJ111.1

**Proponents:** Ardel Jala, representing Washington Association of Building Officials Technical Code Dev Committee (ardel.jala@seattle.gov); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Public Comment

Replace as follows:

## 2021 International Residential Code

### APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES SECTION AJ101 PURPOSE AND INTENT

**AJ101.1 General.** The purpose of these provisions is to encourage the continued use or reuse of legally existing buildings and structures. ~~These provisions are intended to permit work in existing buildings that is consistent with the purpose of this code. Compliance with these provisions shall be deemed to meet the requirements of this code.~~ 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.

**AJ101.2 Classification of work.** ~~For purposes of this appendix, work in existing buildings shall be classified into the categories of repair, renovation, alteration and reconstruction. Specific requirements are established for each category of work in these provisions.~~

**AJ101.3 Multiple categories of work.** ~~Work of more than one category shall be part of a single work project. Related work permitted within a 12-month period shall be considered to be a single work project. Where a project includes one category of work in one building area and another category of work in a separate and unrelated area of the building, each project area shall comply with the requirements of the respective category of work. Where a project with more than one category of work is performed in the same area or in related areas of the building, the project shall comply with the requirements of the more stringent category of work.~~

### SECTION AJ102 COMPLIANCE

**AJ102.1 General.** ~~Regardless of the category of work being performed, the~~ The work shall not cause the 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 to any previously *approved* alternative arrangements than it was before the work was undertaken.

**AJ102.2 Requirements by category of work.** ~~Repairs shall conform to the requirements of Section AJ107. Renovations shall conform to the requirements of Section AJ108. Alterations shall conform to the requirements of Section AJ109 and the requirements for renovations. Reconstructions shall conform to the requirements of Section AJ110 and the requirements for alterations and renovations.~~

~~AJ102.2~~ **AJ102.3 Smoke detectors alarms.** ~~Regardless of the category of work, smoke detectors~~ Smoke alarms shall be provided where required by Section R314.2.2.

**AJ102.3 Carbon monoxide alarms.** Carbon monoxide alarms shall be provided where required by Section R315.2.2.

~~AJ102.4 Replacement windows.~~ Where ~~Regardless of the category of work, 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 AJ102.4.1 through AJ102.4.4, as applicable.

**AJ102.4.1 Energy efficiency.** Replacement windows shall comply with the requirements of Chapter 11.

**AJ102.4.2 Safety glazing.** Replacement glazing in hazardous locations shall comply with the safety glazing requirements of Section R308.

**AJ102.4.3 Replacement windows for emergency escape and rescue openings.** Where windows are required to provide emergency escape and rescue openings, replacement windows shall be exempt from Sections R310.2 and R310.4.4 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 not part of a change of occupancy.

~~Window opening control devices and fall prevention devices complying with ASTM F2090 shall be permitted for use on windows serving as required emergency escape and rescue openings.~~

**AJ102.4.3.1 ~~Control Window opening control devices and fall protection device height.~~** ~~Emergency escape and rescue openings with window opening control devices or fall prevention devices shall be located at a height in accordance with Section R310.1.1 or at as low a height as can be installed within the existing clear opening, complying with ASTM F2090, after operation to release the control device allowing the window to fully open, shall not reduce the net clear opening area of the window unit. Emergency escape and rescue openings shall be operational from the inside of the room without the use of keys or tools.~~

**AJ102.4.4 ~~Window control devices fall protection.~~** ~~Window fall protection shall be installed in accordance with Section R312.2.~~

~~Window opening control devices or 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 the frame.~~
  - ~~2.2. The window replacement includes the sash only when the existing frame remains.~~
- ~~3. 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 where the window is in its largest opened position.~~
- ~~5. The vertical distance from the top of the sill 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).~~

**AJ102.5 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 R105.3.1.1.

**AJ102.6 Equivalent alternatives.** Work performed in accordance with the *International Existing Building Code* shall be deemed to comply with the provisions of this 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 and its use authorized by the *building official*.

**AJ102.7 Other alternatives.** ~~Where compliance with these provisions or with this code as required by these provisions is technically infeasible or would impose disproportionate costs because of construction or dimensional difficulties, the building official shall have the authority to accept alternatives. These alternatives include materials, design features and operational features.~~

**~~AJ102.7~~AJ102.8 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.

**~~AJ102.9 Features exceeding code requirements.~~** ~~Elements, components and systems of existing buildings with features that exceed the requirements of this code for new construction, and are not otherwise required as part of approved alternative arrangements or deemed by the building official to be required to balance other building elements not complying with this code for new construction, shall not be prevented by these provisions from being modified as long as they remain in compliance with the applicable requirements for new construction.~~

## SECTION AJ103 PRELIMINARY MEETING

**AJ103.1 General.** If a building permit is required at the request of the prospective permit applicant, the *building official* or his or her designee shall meet with the prospective applicant to discuss plans for any proposed work under these provisions prior to the application for the permit. The purpose of this preliminary meeting is for the *building official* to gain an understanding of the prospective applicant's intentions for the proposed work.

and to determine, together with the prospective applicant, the specific applicability of these provisions.

## SECTION AJ104 EVALUATION OF AN EXISTING BUILDING

**AJ104.1 General.** ~~The building official shall have the authority to require an existing building to be investigated and evaluated by a registered design professional in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:~~

- ~~1. Available documentation of the existing building.~~
  - ~~1.1. Field surveys.~~
  - ~~1.2. Tests (nondestructive and destructive).~~
  - ~~1.3. Laboratory analysis.~~

**Exception:** Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing an extensive reconstruction shall not be required to be evaluated.

## SECTION AJ103AJ106 DEFINITIONS

~~**AJ103.1AJ106.1 General.** For purposes of this appendix, the terms used are defined as follows:~~ The terms used in this appendix, and not provided in Chapter 2 of the International Residential Code, are defined as follows:

**ALTERATION.** ~~The reconfiguration of any space; the addition or elimination of any door or window; the reconfiguration or extension of any system; or the installation of any additional equipment~~

**CATEGORIES OF WORK.** ~~The nature and extent of construction work undertaken in an existing building. The categories of work covered in this appendix, listed in increasing order of stringency of requirements, are *repair*, *renovation*, *alteration* and *reconstruction*.~~

### **DANGEROUS.**

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

1. The building of 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.

Where the stresses in any member; the condition of the building, or any of its components or elements or attachments; or other condition that results in an overload exceeding 150 percent of the stress allowed for the member or material in this code.

**EQUIPMENT OR FIXTURE.** ~~Any plumbing, heating, electrical, ventilating, air conditioning, refrigerating and fire protection equipment; and elevators, dumb waiters, boilers, pressure vessels, and other mechanical facilities or installations that are related to building services.~~

**MATERIALS AND METHODS REQUIREMENTS.** ~~Those requirements in this code that specify material standards; details of installation and connection; joints; penetrations; and continuity of any element, component or system in the building. The required quantity, fire resistance, flame spread, acoustic or thermal performance, or other performance attribute is specifically excluded from materials and methods requirements.~~

**RECONSTRUCTION.** ~~The reconfiguration of a space that affects an exit, a renovation or *alteration* where the work area is not permitted to be occupied because existing means of egress and fire protection systems, or their equivalent, are not in place or continuously maintained; or there are extensive *alterations* as defined in Section AJ109.3.~~

**REHABILITATION.** ~~Any *repair*, *renovation*, *alteration* or *reconstruction* work undertaken in an existing building.~~

**RENOVATION.** ~~The change, strengthening or addition of load-bearing elements; or the refinishing, replacement, bracing, strengthening, upgrading or extensive repair of existing materials, elements, components, equipment or fixtures. Renovation does not involve reconfiguration of spaces. Interior and exterior painting are not considered refinishing for purposes of this definition, and are not renovation.~~

**REPAIR.** ~~The patching, restoration or minor replacement of materials, elements, components, equipment or fixtures for the purposes of maintaining those materials, elements, components, equipment or fixtures in good or sound condition.~~

**WORK AREA.** ~~That portion of a building affected by any renovation, *alteration* or *reconstruction* work as initially intended by the owner and indicated as such in the permit. Work area excludes other portions of the building where incidental work entailed by the intended work must be performed, and portions of the building where work not initially intended by the owner is specifically required by these provisions for a renovation,~~

## SECTION ~~AJ104~~**AJ107** REPAIRS

**~~AJ104.1~~ General.** Repairs shall comply with the applicable provisions of the *International Residential Code* for new construction or as permitted by this appendix.

**~~AJ104.2~~**AJ107-1** Materials.** Except as otherwise required herein, repairs work shall be done using like materials or materials permitted by this code for new construction.

**~~AJ104.2.1~~**AJ107-1.1** Hazardous materials.** Hazardous materials no longer permitted, such as asbestos and lead-based paint, shall not be used.

**~~AJ104.1.2~~**AJ107-1.2** 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.

**~~AJ104.3~~**AJ107-2** 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.

**~~AJ104.4~~**AJ107-3** Electrical.** Repair or replacement of existing electrical wiring and equipment undergoing repair with like material shall be permitted. shall comply with Chapters 34 through 43.

### **Exceptions:**

- ~~1. Replacement of electrical receptacles shall comply with the requirements of Chapters 34 through 43.~~
- ~~2. Plug fuses of the Edison base type shall be used for replacements only where there is not evidence of overfusing or tampering in accordance with the applicable requirements of Chapters 34 through 43.~~
- ~~3. For replacement of nongrounding type receptacles with grounding type receptacles and for branch circuits that do not have an equipment grounding conductor in the branch circuitry, the grounding conductor of a grounding type receptacle outlet shall be permitted to be grounded to any accessible point on the grounding electrode system, or to any accessible point on the grounding electrode conductor, as allowed and described in Chapters 34 through 43.~~

## SECTION **AJ108** RENOVATIONS

**~~AJ108.1~~ Materials and methods.** The work shall comply with the materials and methods requirements of this code.

**~~AJ108.2~~ Door and window dimensions.** Minor reductions in the clear opening dimensions of replacement doors and windows that result from the use of different materials shall be allowed, whether or not they are permitted by this code.

**~~AJ108.3~~ Interior finish.** Wood paneling and textile wall coverings used as an interior finish shall comply with the flame spread requirements of Section R302.9.

## SECTION ~~AJ105~~**AJ109** ALTERATIONS

**~~AJ105.1~~ General.** Alterations to existing buildings shall comply with the provisions of this code for new construction, except as permitted by Sections AJ105.2 through AJ105.8. 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.

**~~AJ105.2~~**AJ109-1** Newly constructed elements.** Newly constructed elements, components and systems shall comply with the requirements of this code.

### **Exceptions:**

1. Added operable windows are not required to comply with the light and *ventilation* requirements of Section R303.



2. Newly installed electrical equipment shall comply with the requirements of Section ~~AJ109.5~~ AJ105.5.

~~AJ105.3~~ **AJ109.2 Nonconformities.** The work shall not increase the extent of noncompliance with the requirements of Section ~~AJ110~~, or create nonconformity to those requirements that did not previously exist.

**AJ109.3 Extensive alterations.** Where the total area of all of the work areas included in an *alteration* exceeds 50 percent of the area of the *dwelling unit*, the work shall be considered to be a reconstruction and shall comply with the requirements of these provisions for reconstruction work.

**Exception:** Work areas in which the *alteration* work is exclusively plumbing, mechanical or electrical shall not be included in the computation of the total area of all work areas.

~~AJ105.4~~ **AJ109.4 Structural.** Altered structural elements and systems shall comply with Section R102.7.1 and the structural provisions of this appendix. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.

**AJ105.4.1** ~~AJ109.4~~ **Structural-Unreinforced masonry walls.** Unreinforced masonry buildings located in Seismic Design Category D<sub>2</sub> or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.

~~AJ105.5~~ **AJ109.5 Electrical equipment and wiring.** Electrical equipment and wiring shall comply with this section.

**AJ105.5.1** ~~AJ109.5.1~~ **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.

**Exception:** Electrical equipment and wiring in newly installed partitions and ceilings shall comply with the applicable requirements of Chapters 34 through 43.

**AJ105.5.2** ~~AJ109.5.2~~ **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.

**AJ105.5.3** ~~AJ109.5.3~~ **Additional electrical requirements.** Where the work area includes any of the following areas within a *dwelling unit*, the requirements of Sections ~~AJ109.5.3.1~~ AJ105.5.3.1 through ~~AJ109.5.3.5~~ AJ105.5.3.5 shall apply.

**AJ105.5.3.1** ~~AJ109.5.3.1~~ **Enclosed areas.** Enclosed areas other than closets, kitchens, *basements*, garages, hallways, laundry areas and bathrooms shall have not less than two duplex receptacle outlets, or one duplex receptacle outlet and one ceiling- or wall-type lighting outlet.

**AJ105.5.3.2** ~~AJ109.5.3.2~~ **Kitchen and laundry areas.** Kitchen areas shall have not less than two duplex receptacle outlets. Laundry areas shall have not less than one duplex receptacle outlet located near the laundry equipment and installed on an independent branch circuit.

**AJ105.5.3.3** ~~AJ109.5.3.3~~ **Ground-fault circuit interruption.** Ground-fault circuit interruption shall be provided on newly installed receptacle outlets if required by Chapters 34 through 43.

**AJ105.5.3.4** ~~AJ109.5.3.4~~ **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.

**AJ105.5.3.5** ~~AJ109.5.3.5~~ **Clearance.** Clearance for electrical service equipment shall be provided in accordance with Chapters 34 through 43.

**AJ105.6** ~~AJ109.6~~ **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 R303.

**AJ105.7** ~~AJ109.7~~ **Ceiling height.** ~~Habitable spaces created in existing basements shall have~~ Where a habitable attic or habitable space is created in an existing building, ceiling heights shall not be of not less than 6 feet, 8 inches (2032 mm). , except that the ceiling height at obstructions shall be not less than 6 feet 4 inches (1930 mm) from the basement floor. Existing finished ceiling heights in nonhabitable spaces in basements shall not be reduced. 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 (1931 mm) from the finished floor.

**AJ105.8.1**~~AJ109.8~~ **Stairs, handrails, and guards.** Stairs, handrails, and guards shall comply with this section.

**AJ105.8.1**~~AJ109.8.1~~ **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*.

**AJ105.8.2**~~AJ109.8.2~~ **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.

**AJ105.8.3**~~AJ109.8.3~~ **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.

**AJ105.8.4** **Stair treads and riser.** An existing stairway shall not be required to comply with Section R311.7.5 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.

**AJ105.8.5** **Stairway Illumination.** Stairways within the work area shall be provided with illumination in accordance with Section R303.6.

**AJ105.8.6** **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 Section R311 and R312.

## **SECTION AJ106**

### **ADDITIONS**

**AJ106.1 General.** Where the existing building with an addition is within the scope of the International Residential Code, the addition shall comply with the applicable provisions of the International Residential Code for new construction or as permitted by this appendix.

## **SECTION AJ107**

### **RELOCATED BUILDINGS**

**AJ107.1 General.** Residential buildings or structures moved into or within the jurisdiction are not required to comply with the requirements for new construction under the International Residential 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.

## **SECTION AJ110**

### **RECONSTRUCTION**

#### **AJ110.1**

#### **Stairways, handrails and guards**

**AJ110.1.1 Stairways.** Stairways within the work area shall be provided with illumination in accordance with Section R303.7.

**AJ110.1.2 Handrails.** Every required exit *stairway* that has four or more risers, is part of the means of egress for any work area, and is not provided with not fewer than one *handrail*, or in which the existing *handrails* are judged to be in danger of collapsing, shall be provided with *handrails* designed and installed in accordance with Section R311 for the full length of the run of steps on not less than one side.

**AJ110.1.3 Guards.** Every open portion of a *stair*, landing or balcony that is more than 30 inches (762 mm) above the floor or *grade* below, is part of the egress path for any work area, and does not have *guards*, or in which the existing *guards* are judged to be in danger of collapsing, shall be provided with *guards* designed and installed in accordance with Section R312.

**AJ110.2 Wall and ceiling finish.** The interior finish of walls and ceilings in any work area shall comply with the requirements of Section R302.9. Existing interior finish materials that do not comply with those requirements shall be removed or shall be treated with an *approved* fire-retardant coating in accordance with the manufacturer's instructions to secure compliance with the requirements of this section.

**AJ110.3 Separation walls.** Where the work area is in an attached *dwelling unit*, walls separating *dwelling units* that are not continuous from the foundation to the underside of the roof sheathing shall be constructed to provide a continuous fire separation using construction materials consistent with the existing wall or complying with the requirements for new structures. Performance of work shall be required only on the side of the wall of the

~~dwelling unit that is part of the work area.~~

~~**AJ110.4 Ceiling height.** *Habitable spaces* created in existing *basements* shall have ceiling heights of not less than 6 feet, 8 inches (2032 mm), except that the ceiling height at obstructions shall be not less than 6 feet 4 inches (1930 mm) from the *basement* floor. Existing finished ceiling heights in nonhabitable spaces in *basements* shall not be reduced.~~

## **SECTION ~~AJ111~~ AJ108**

### **REFERENCED STANDARDS**

~~**AJ111.1**~~ **AJ108.1 General.** See Table ~~AJ111.1~~ AJ108.1 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 AJ111.1-AJ108.1 REFERENCED STANDARDS**

| STANDARD ACRONYM | STANDARD NAME   | SECTION HEREIN REFERENCED |
|------------------|---|---------------------------|
| ASTM F2090—17    | <del>Specification for Window Fall Prevention Devices with Emergency Escape (Egress) Release Mechanisms</del> | AJ102.4.3, AJ102.4.4      |
| IEBC—21-24       | International Existing Building Code  | AJ102.6                   |
| IFC - 24         | International Fire Code   | AJ107.1                   |
| IPMC-24          | International Property Maintenance Code   | AJ107.1                   |

**Commenter's Reason:** This public comment is being submitted in response to the direction given by the IRC-Building Committee to improve Appendix AJ before trying to move its provisions into the body of the code. To that end, we have taken many of the provisions from our originally-proposed Chapter 44 and incorporated them into Appendix AJ. Along the way, we have cleaned up the appendix by deleting unfamiliar terms in the appendix in favor of more familiar terms, clarifying the scope, and updating provisions that have not been updated since the appendix was created. This comprehensive public comment results in an appendix that is a clearer, updated, reasonable, and more usable and enforceable—and therefore, more adoptable. A clean version of the final result of RB7-22 incorporating this public comment, without strike-throughs and underlines, can be viewed via this link:

[https://www.cdpaccess.com/public-comment/3211/27823/files/download/3670/RB7\\_WABO\\_clean%20%28final%29%20V2.pdf](https://www.cdpaccess.com/public-comment/3211/27823/files/download/3670/RB7_WABO_clean%20%28final%29%20V2.pdf)

In developing this public comment, we have collaborated with the FEMA/ATC Seismic Code Support Committee, and this public comment will work in conjunction with their code change proposals and public comments. Attached is a document showing how Appendix AJ is intended to look, if this public comment and all the SCSC proposals and public comments are approved

[https://www.cdpaccess.com/public-comment/3211/27823/files/download/3671/WABO\\_FEMA%20Combined%20Proposals\\_V2.pdf](https://www.cdpaccess.com/public-comment/3211/27823/files/download/3671/WABO_FEMA%20Combined%20Proposals_V2.pdf)

## OVERVIEW

### Relation of Appendix to Code:

The underlying philosophy for this public comment is that the appendix, when adopted, is to be added to the code. It is not a standalone existing buildings code. This is true of the existing appendix, despite its “deemed to comply” provision in the existing AJ101.1. Given that philosophy, the “deemed to comply” language has been deleted, since it could imply that none of the rest of the code applies—which is clearly erroneous, as we would expect items not in the appendix to be regulated by the rest of the IRC. In its place, the appendix now clearly says to comply with the IRC for new construction, except where Appendix AJ modifies those provisions. Carrying this philosophy through results in the deletion of many redundant provisions and definitions (further explanations below).

### Reorganization:

This public comment deletes several unnecessary and outdated sections, as follows. Deletion of these sections results in the editorial renumbering of the subsequent sections, as shown in this public comment.

- Section AJ103 (Preliminary Meeting). This section required the building official to meet with a permit applicant, at the applicant's request. The stated purpose of the meeting is for the building official to understand the applicant's intention for the work, and for the building official and the applicant to collaborate on what's required. This requirement is unnecessary, as this is a service that a reasonable building department will provide on request. In addition, many the issues can be handled in other ways other than a meeting.
- AJ104 (Evaluation of an Existing Building). This provision that allows the building official to require an evaluation of the existing building by a registered design professional is tied to “reconstruction.” Aside from the fact that provisions relating to “reconstruction” are being deleted (see below), Section R106.1 already gives the building official this authority.
- Sections AJ108 (Renovations) and AJ110 (Reconstruction). See “Terminology and Definitions” below.

New Sections AJ106 (Additions) and AJ107 (Relocations) have been added to regulate those classifications of work.

## SPECIFIC CHANGES

### Purpose and Intent (AJ101):

- The scope now refers to repairs, alterations, additions and relocations, consistent with the changes described in “Terminology and Definitions” below.
- The scope also clearly states that the rest of the code applies, where it's not modified by Appendix AJ.

- Sections AJ101.2 (classification of work) and AJ101.3 (multiple categories of work) have been deleted since they are unnecessary. The text in AJ101.2 doesn't do anything. Most of AJ101.3 is clear with the new classifications of work and their definitions. Regarding the 12-month period in AJ101.3, this is something that should be covered by building department procedures and policies for each jurisdiction, and reflect how flexible they want to be. Having a set period of time unnecessarily ties the building official's hands, and encourages gaming of the system

#### **Compliance (AJ102):**

- Carbon monoxide alarms are required to be installed, consistent with Section R315.2.2 (AJ102.3).
- The sections relating to replacement EERO windows has been reorganized and modified for clarity and flexibility (AJ102.4.3). The current provisions provide a break on full compliance for replacement windows for emergency escape and rescue openings. This public comment provides flexibility for the vertical height of the window opening control devices and fall protection devices in existing openings. It also clarifies that window opening control devices and fall protection are not required when window replacement is of the glazing only. These changes are consistent with the concept approved by the Committee in RB99-22.
- Sections AJ102.7 (Other Alternatives) and AJ102.9 (Features exceeding code requirements) are deleted because they are unnecessary. AJ102.7 is covered in Chapter 1, and there are never restrictions on exceeding code requirements (AJ102.9).
- This public comment also makes editorial changes to this section, deleting unnecessary verbiage ("regardless of the category of work being performed") and updating the terminology (smoke alarms vs detectors)

#### **Terminology and Definitions (AJ103):**

The end result of the changes to the definitions is that only the additional definitions that are needed to apply the provisions of the appendix remain in Section AJ103.

- This public comment deletes the unfamiliar terms "reconstruction," "rehabilitation," and "renovation" from the definitions, along with the sections regulating them. Instead, the appendix now exclusively uses "repair," "alteration," "addition," and "relocation" to refer to the work being done on an existing building. These terms are familiar to users of the I-codes, and more closely correspond with the terms used in Section 107.2.1 of the IRC.
- Unnecessary definitions for "equipment or fixture" and "materials and methods requirements," and "rehabilitation" have been deleted. "Equipment" and "fixtures" are well understood to users of the code. Alternate materials and methods are covered in Chapter 1. "Rehabilitation" was defined, but the term is not used in either the existing appendix or the appendix as modified by this public comment.
- The definition for "dangerous" is being added since it is not defined in Chapter 2. The language is taken from the IEBC.

#### **Repairs (AJ104):**

The modifications this public comment makes to the section on repairs are editorial. The change in Section AJ104.1 from "work" to "repair" clarifies the scope of the section is about repair work, not work in general. The modification Section AJ104.3 consolidates the exceptions which required compliance with IRC Chapters 34 through 43 anyway.

#### **Alterations (AJ105):**

- New Section AJ105.1 scopes the alterations section, as well as clearly states newly-installed elements need to comply with the code for new construction. The "do no harm" provision is included as well, consistent with Section R102.7.1.
- The existing section on extensive alterations is being deleted because it referred to the deleted section on reconstruction. For further discussion of the technical changes, see the discussion on Reconstruction below.
- AJ105.4 provides a pointer to the sections regulating structural alterations. Note that other code change proposals and public comments would add further structural provisions to the appendix.
- Section AJ105.4.1 on unreinforced masonry walls has been relocated from the deleted section on renovations.
- Substantive changes to Section AJ105.5 on electrical equipment and wiring add a requirement that lighting outlets must be controlled by a wall-mounted switch, located near an entrance to the room, consistent with IRC Section E3903.2 (AJ105.5.3.4). The other changes are editorial, including the clarification that the circuit is a "branch" circuit, consistent with the definitions in IRC Section E3501.1 (AJ105.5.3.2). The exception to AJ105.5.1 isn't really an exception and still refers to the same chapters, so it has been integrated into the main charging language.
- The existing appendix permits a ceiling height of not less than 6 feet 8 inches. This public comment further extends the relief on ceiling height in existing buildings to include existing attics (AJ105.7). Bathrooms, toilet rooms and laundry rooms are allowed to have a ceiling height not less than 6 feet 4 inches, similar to a break these occupiable spaces receive in new construction (R305.1, Exception 3). The first exception maintains the sloped ceiling height provisions per R305.1 for new construction but lowers the minimum ceiling height requirement for 50% of the room from 7 feet to 6 feet 8 inches, consistent with the general requirement. The second exception maintains the allowance for beams, girders, and other obstructions that is permitted in new construction. This concept was supported by the Committee in their approval of RB82-22.
- Section AJ105.8 is expanded to include requirements for stairway illumination (AJ105.8.5) and handrails and guards at stairs (AJ105.8.6). The provision for stairway illumination is relocated from the deleted section on reconstruction. In a substantive change to the current appendix provisions, if the stair is altered, compliant handrails and guards must be installed (AJ105.8.6). This remedies an unsafe condition.

The new section on stair treads and risers (AJ105.8.4) gives a break for stair treads and risers that is consistent with a more general break for existing stairs in IEBC Section 506.3. The concept of the break was supported by the Committee in their approval of RB114-22.

#### **Additions (AJ106):**

This is a new section in this appendix. The requirement for additions to comply with new construction is consistent with the principles in Section R102.7.1 and the IEBC.

#### **Relocations (AJ107):**

This is a new section in this appendix. The provisions are consistent with how the IEBC treats moved buildings (see IEBC Section 1401.2).

#### **Referenced Standards (AJ108):**

- ASTM F2090 is stricken from Table AJ108.1. Section AJ102.4.3 is revised to refer to Section R312.2 which contains the reference to this standard within the body of the code.
- Reference to the International Existing Building Code is updated to the 2024 edition.
- Reference to the International Fire Code and to the International Property and Maintenance Code is added as reference to these codes is added in Section AJ107 Relocated Buildings.

### **PROVISIONS IN DELETED SECTIONS ON RENOVATIONS AND RECONSTRUCTION**

#### **Renovations:**

All of the sections in the section on renovations have been deleted without relocating them. The sections on materials and methods and on interior finish are unnecessary because this appendix is only about modifications to the code. The section on door and window dimensions is deleted because “minor reductions” is ambiguous, and unnecessary.

#### **Reconstruction:**

Sections on stairway illumination, handrails, and guards have either been moved to new Section AJ105.8, or are already covered by that section. The ceiling height allowance is now located in the Alterations section (AJ105.7).

The sections on wall and ceiling finish and separation walls have been deleted without substitution because they were incomplete, and it is unreasonable to trigger these retroactive requirements for the following reasons:

- The current provisions are incomplete because they only deal with common wall separations as you would find in townhouse-style units (vertical), and not with duplexes with horizontal separations.
- As far as it being unreasonable, the section on wall and ceiling finishes would require additional costs to comply, both to provide the materials, and to comply with permit requirements. It requires an accounting of every wall and ceiling finish in the work area in terms of the actual materials, and then whether they comply with the flame spread and smoke development requirements. In older construction, this could be difficult to determine, and from a plan review standpoint, would likely result in at least two rounds of corrections—the first to request the information, the second to tell them to fix it.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Since the public comment moves these provisions into an optional appendix, there will be no effect on the cost of construction.

**Staff Analysis:** Public comments to RB7, RB162, RB163, RB206 and RB297 addresses requirements for Appendix J in a different or contradicting manner. Approved proposal to Appendix J but without a public comment are RB99, RB296, RB298 and RB299. The membership is urged to make their intention clear with their actions on these public comments.

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Public Comment# 3211

## RB11-22

### **Proposed Change as Submitted**

**Proponents:** Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

#### **2021 International Residential Code**

**Add new text as follows:**

**R104.2.1 Listed compliance.** Listings required by this code shall be based on a test standard or approved listing evaluation that is germane to the provision requiring the listing. Anything required by this code, or a reference standard, to be listed shall be installed in accordance with the listing and the manufacturer's instructions. Copies of the listing standard and manufacturer's instructions shall be made available to the building official upon request.

**Reason:** When the code requires something to be listed, the test standard used or the listing evaluation must be germane to the code provision that is requiring the listing. Additionally, the installation must be in accordance with the manufacturer's instructions and copies of the listing standard and manufacturer's instructions must be made available to the building official.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

This only clarifies that when something is required to be listed, the test standard used or the listing evaluation must be germane to the code provision that is requiring the listing. As with any listing, the installation must be in accordance with the manufacturer's instructions and the building official must have access to the listing standard and manufacturer's instructions.

RB11-22

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### **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal was disapproved based on the proponents request and the committee action on ADM 13-22. (Vote: 10-0)

RB11-22

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### **Individual Consideration Agenda**

#### **Public Comment 1:**

**IRC: R104.2.1 (New)**

**Proponents:** Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com); Kristen Owen, representing Myself (kowen4568@gmail.com) requests As Modified by Public Comment

**Replace as follows:**

#### **2021 International Residential Code**

**R104.2.1 Listed compliance.** Where this code or a referenced standard requires equipment, materials, products or services to be listed and a listing standard is specified, the listing shall be based on the specified standard. Where a listing standard is not specified, the listing shall be based on an approved listing criteria. Listings shall be germane to the provision requiring the listing. Installation shall be in accordance with the listing and the manufacturer's instructions, and where required to verify compliance, the listing standard and manufacturer's instructions shall be made available to the building official.

**Commenter's Reason:** In response to the committee reason for disapproval, the proposed modification now uses the same language as ADM13 and now applies across the codes. If ADM13 is not approved, this proposed modification will allow this single code change to be considered on its own for approval.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The proposal does not require additional listings other than what is already required by the code.





## **Proposed Change as Submitted**

**Proponents:** Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

### **2021 International Residential Code**

**Revise as follows:**

**R104.11 Alternative materials, design and methods of construction and equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. The *building official* shall have the authority to approve an alternative material, design or method of construction upon application of the *owner* or the owner's authorized agent. The *building official* shall first find that the proposed alternative meets all of the following:

1. The alternative material, design or method of construction is satisfactory and complies with the intent of the provisions of this code, ~~and that~~
2. The material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in as it pertains to the following:
  - 2.1. Quality. ~~quality~~;
  - 2.2. Strength. ~~strength~~;
  - 2.3. Effectiveness. ~~effectiveness~~;
  - 2.4. Fire ~~fire~~ resistance.;
  - 2.5. Durability. ~~durability~~, and
  - 2.6. Safety. ~~safety~~

Compliance with the specific performance-based provisions of the International Codes shall be an alternative to the specific requirements of this code. Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons why the alternative was not *approved*.

**Reason:** This section can be written more clearly as to the various criteria that must be met in order to be approved as an alternate material, design or method of construction. This will make it easier for the building official to make the necessary evaluation and decision. Should the alternate not be approved, it will also make it easier for the building official to cite the reasons for disapproval. There are no changes to the various requirements that the building official or fire code official must consider. During the last code cycle, this change was approved in the IBC and was well received by the committee and membership who agreed that it made it easier to read.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
There are no changes to the requirements in this section.

RB12-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal was disapproved based on the proponents request and the committee action on ADM 13-22. (Vote: 10-0)

RB12-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com); Kristen Owen, representing Myself (kowen4568@gmail.com) requests As Submitted

**Commenter's Reason:** This proposal is the same as ADM25-22 for the IFC, ADM26-22 for the IEBC, and ADM27 for the IWUIC which were all

approved by the committee. This is how the 2021 IBC 104.11 now reads.

The reason I asked that RB12-22 be disapproved is because ADM13-22 had just been approved as noted in the committee reason statement and I was willing to have that version prevail.

If ADM13 is not approved, this proposed modification will allow this single code change to be considered on its own for approval.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The proposal does not add any new requirements.

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Public Comment# 3448

## **Proposed Change as Submitted**

**Proponents:** Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com)

### **2021 International Residential Code**

**Add new text as follows:**

**R104.11.2 Research reports.** Supporting data, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall consist of valid research reports from an approved agency accredited to evaluate or certify products. The alternative material, design or method of construction and product evaluated shall be within the scope of accreditation and the criteria used for the evaluation shall be referenced within the report.

**Reason:** It is sometimes difficult to determine the legitimacy of a research report. Agency accreditation is an excellent way to determine the legitimacy and reliability of research reports issued by such agencies. This is similar to R109.2 which authorizes the building official to accept reports from approved agencies, provided such agencies satisfy the requirement as to qualifications and reliability. The IBC, IEBC, IFC, IFGC, IMC, IPC, IPMC, IPSDC have provisions for the use of valid research reports as an aid to alternate approval. This will be valuable when the building official reviews a research report.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

This new section does not require that a research report be submitted when requesting an alternate, only that when one is submitted to support a request for an alternate, the issuing agency be accredited to evaluate or certify products and that the alternative material, design or method of construction and product evaluated be within the scope of accreditation and the criteria used for the evaluation be referenced within the report.

RB13-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal was disapproved based on the proponents request and the committee action on ADM 13-22. (Vote: 10-0)

RB13-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R104.11.2 (New), R104.11.2.1 (New), R104.11.2.2 (New)**

**Proponents:** Manny Muniz, representing Representing self (mannymuniz.mm@gmail.com); Kristen Owen, representing Myself (kowen4568@gmail.com) requests As Modified by Public Comment

**Replace as follows:**

### **2021 International Residential Code**

**R104.11.2 Reports.** Supporting documentation, where necessary to assist in the approval of materials or assemblies not specifically provided for in this code, shall comply with Sections 104.11.1.1 and 104.11.1.2.

**R104.11.2.1 Evaluation reports.** Evaluation reports shall be issued by an approved agency accredited to evaluate or certify products and use of the evaluation report shall require approval by the building official for the installation. The alternate material, design or method of construction and product evaluated shall be within the scope of the building official's recognition accreditation of the approved agency . Criteria used for the evaluation shall be identified within the report and where required, provided to the building official., developed using a process that includes input from the public and made available for review by the public.

**R104.11.2.2 Other reports.** Reports not complying with Section 104.11.1.1 shall describe criteria, including but not limited to any referenced testing or analysis, used to determine compliance with code intent and justify code equivalence, including but not limited to any referenced testing or

analysis. The report shall be prepared by a qualified engineer, specialist, laboratory or specialty organization acceptable to the building official. The building official is authorized to require design submittals to be prepared by, and bear the stamp of, a registered design professional.

**Commenter's Reason:** ADM30-22 for the IBC, ADM31-22 for the IEBC, ADM32-22 for the IFC, ADM33-22 for the IWUIC saw discussions regarding the difficulties of determining the legitimacy of research reports. This was also discussed in ADM13-22. At the end of the ADMIN hearings and after considerable discussions with various stake holders, ADM13 was approved with specific requirements for reports and supporting documentation.

The proposed modification now uses the same language as ADM13. If ADM13 is not approved, this proposed modification will allow this single code change to be considered on its own for approval.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal only clarifies what is required for reports.

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Public Comment# 3450

## **Proposed Change as Submitted**

**Proponents:** Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

### **2021 International Residential Code**

**[RB] ATTIC.** The unfinished space between the ceiling assembly and the *roof assembly*.

**Revise as follows:**

**[RB] ATTIC, HABITABLE.** A finished or unfinished *habitable space* ~~within an attic between the ceiling assembly and the roof assembly.~~

**Reason:** "Attic" is defined to be ONLY an unfinished space. So a "habitable attic" cannot rely on the definition of attic to specify part of its parameters since a "habitable attic" can be finished. It technically doesn't qualify as an attic under the current base definition.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
Editorial clarification of current intent with no intended technical change.

RB19-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because the proposed language could be read to be the top story of the unit, and not an attic space. This would have significant implications in the code. (Vote: 7-3)

RB19-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: SECTION 202**

**Proponents:** Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**[RB] ATTIC.** The unfinished space between the ceiling assembly of the highest story and the *roof assembly*.

**[RB] ATTIC, HABITABLE.** A finished or unfinished *habitable space* between the ceiling assembly of the highest story and the roof assembly.

**Commenter's Reason:** When this item came to the floor, I was busily attempting to process a multitude of floor modifications to ADM13 and was unable to testify in support of the change. The single testifier in opposition and the committee neglected to notice that the proposed definition of "habitable attic" was simply a modified version of the longstanding definition of "attic," which as it is currently written, inherently excludes the concept of a habitable attic. The existing definitions are as follows:

*[RB]ATTIC. The unfinished space between the ceiling assembly and the roof assembly.*

*[RB]ATTIC, HABITABLE. A finished or unfinished habitable space within an attic.*

Because the "attic" definition states that it only includes unfinished space, a "habitable attic" cannot be an attic. The original proposal simply extracted the needed text from the existing "attic" definition and placed it into the "habitable attic" definition to make it clear that "habitable attic" is a separate definition that does not rely on the definition of "attic." Although I personally believe that APPROVAL AS SUBMITTED is a viable option for this proposal, since it simply uses existing text, this public comment offers an alternative path that responds to comments that were made when the proposal was discussed. If the membership prefers the modification, that's fine. Otherwise, I will ask for AS SUBMITTED.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The proposed change simply fixes a problem with code text.

Public Comment# 3393

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## ***Public Comment 2:***

**IRC:** SECTION 202

**Proponents:** Kota Wharton, City of Grove City, representing City of Grove City (kwharton@grovecityohio.gov) requests As Modified by Public Comment

**Modify as follows:**

## **2021 International Residential Code**

**[RB] ATTIC.** The unfinished non-habitable space between the ceiling assembly of the top story of a unit and the *roof assembly*.

**[RB] ATTIC, HABITABLE.** A finished or unfinished *habitable space*, other than a sleeping loft or a mezzanine, between the floor-ceiling assembly of the top story of a unit and the *roof assembly*.

**Commenter's Reason:** This modification does the following:

- **ATTIC.** Addition of the descriptor *non-habitable space* to the definition of attic to clarify the space to be non-habitable. Addition of *of the top story of a unit* for clarity. This clarifies that the top story, simply because it is above a story below, shall not be considered an attic.
- **ATTIC, HABITABLE.** Addition of an inline exception to definition *other than a sleeping loft or mezzanine* to exempt sleeping lofts and mezzanines from being classified as habitable attics. Sleeping lofts are regulated in Chapter 3 per RB153-22. Addition of *floor-* prior to ceiling to specify that a habitable attic shall have a floor. Addition of *of the top story of a unit* for clarity. This clarifies that the top story, simply because it is above a story below, shall not be considered an attic.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Same as original proposal. This is editorial.

Public Comment# 3214

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### **Proposed Change as Submitted**

**Proponents:** Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

#### **2021 International Residential Code**

**Add new definition as follows:**

**LANDING (for stairs and ramps).** The minimum required area for a walking surface at the top and bottom of a stair flight or ramp run.

**LANDINGS (for doors).** The minimum required area of approach on each side of a door.

**Reason:** The term landing is prolific throughout the model IRC, family of ICC model codes, accessibility codes and standards. Those of us that navigate the codes and standards everyday have different views of what a landing actually is and often use the explanation, I know it when I see it. This code proposal for the definition of a landing is directed at the heart of the term and to provide a simple precise meaning. The reality is a landing is the minimum level area of a walking surface, floor area, that is required at the tops and bottoms of stair flights and ramp runs. They are also the minimum area on both sides of a door/doorway. The walking surface or floor area can be larger than the minimum area required for a landing and when you have connecting stair flights or ramp runs, the minimum areas can overlap, and they can also overlap with a door. However, the landing is required for each door, stair flight and ramp run, and the minimum required is the landing. To be more precise and to encompass the 2 different areas within the code that center around landings being required, we listed landings with 2 term qualifiers (Stairs & Ramps) and (Doors), we see the same split definition currently within the code for the definition of a Riser, (stair) & (plumbing).

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

This is a definition and is not adding or subtracting any technical requirements within the code which the author believes will increase or decrease cost.

RB24-22

### **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because two different definitions for landings would be confusing. The requirements for landings for stairways and ramps are already addressed in Sections R311.7.6 and R311.8.2. (Vote: 10-0)

RB24-22

### **Individual Consideration Agenda**

#### **Public Comment 1:**

**IRC:** SECTION 202

**Proponents:** Thomas Zuzik Jr, representing NOMMA (coderep@railingcodes.com) requests As Modified by Public Comment

**Further modify as follows:**

#### **2021 International Residential Code**

**~~LANDING (for stairs and ramps).~~** The required area of approach for a walking surface at an elevator or at the top and bottom of a stair flight or ramp run.

**~~LANDINGS (for doors).~~** The minimum required area of approach on each side of a door.

**Commenter's Reason:** When the original proposal was presented at the committee action hearings, the committee felt that splitting the definition into doors, and then stairs and ramps, was confusing. The reasoning was that a door is not required to have a landing specifically, but a floor or landing, of which you would only have a landing if a stair, ramp or elevator shared their required landing area with the floor area on either side of a

door. Additionally, elevators do have landings and were included into this public comment revising the proposal into one definition covering all 3 locations.

Those opposed to adding a definition for a landing into the model building code at the committee action hearings, felt no need, as it was noted as easily understood by those that testified, and inspect and enforce the model codes as currently written.

However, their statements, that those that enforce it, understand and see no need, leaves out the majority of designers, contractors and sub-contractors to start with that have to work with the wording of the model code once adopted, and to many of them, not having a clear definition for such a common term is a common conversation of disagreement as to what this area of the floor's function is.

The simple fact that as noted already, most that see no need for this definition are also those that instruct and teach about the model codes, ergo the most highly educated on the entire model code, compared to those that don't have this level of knowledge working through understanding the model codes and implementing them truly not seeing what the top 5% see and read into, thus leaving out the bottom 95%.

By approving the modification by public comment for code change RB24-22 will insert a definition that is widely searched for by a major majority and is currently not available, into the model code.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

This is a definition and is not adding or subtracting any technical requirements within the code which the author believes will increase or decrease cost

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Public Comment# 3142



### **Proposed Change as Submitted**

**Proponents:** David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

#### **2021 International Residential Code**

**Add new definition as follows:**

**LANDING.** The required area of approach used to directly access an adjacent door, stair, or ramp.

**Reason:** Landings are required throughout the code at doors, stairs and ramps but are not clearly understood in many cases as a walking surface. Egress from doors, stairs, and ramps may often be into a yard, a lawn, driveway or landscaped path. This definition purposefully allows the size, shape, and surface requirements of the landing to regulated by the code as suits the location.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
The definition will not affect the cost of construction but may result in changes to the interpretation of existing requirements that will.

RB25-22

### **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because requirements for landings for stairways and ramps are already addressed in Sections R311.7.6 and R311.8.2. This is a common term that is understood sufficiently. (Vote: 10-0)

RB25-22

### **Individual Consideration Agenda**

#### **Public Comment 1:**

**IRC: R202**

**Proponents:** David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org) requests As Modified by Public Comment

**Replace as follows:**

#### **2021 International Residential Code**

**R202 LANDING.** ~~The required area of approach used to directly access an adjacent door, stair, or ramp.~~ The required walking surface used to directly access, or that is directly accessed from, an adjacent stair, ramp, exterior door or elevator.

**Commenter's Reason:** A definition of landing will provide a much better understanding and allow for consistent interpretation of the code. A landing is but a portion of a floor or may not be a floor at all if it is not at a floor level but rather only an intermediate platform between levels or at an exterior door. Stairways include landings by their definition within the 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. ***<emphasis added>***

This modification addresses the committee action and testimony to the original definition proposed:

1. "Everyone knows what a landing is" ???
2. You move to and from landings not just approach
3. Includes elevators that also have landings
4. The landing is only the required area of walking surface

Hearing testimony clearly disputes one committee member's opinion that "everyone knows what a landing is". Maybe so but the point is everyone

does not agree. What is the difference between a landing and a floor? There is clearly a lack of agreement, a difference that is not understood. An entire floor is not a landing, but the code uses the term "floor-or-landing" interchangeably due to the lack of a definition for either floor or landing. Where the code requires a "floor-or-landing" as in "**R311.7.6 Landings for stairways**. There shall be a floor or landing at the top and bottom of each stairway....", does this give the jurisdiction the option to require a floor instead of a landing? Again what's the difference? Whatever it is... it is widely interpreted.

Landings are typically required at various changes in elevation that are covered by inclusion of stairs or ramps in the definition. Elevators have been added because the area outside an elevator door is also referred to as a landing. Landing is a common term used in the elevator industry and ASME A17.1/CSA B44 Safety Code for Elevators and Escalators includes a definition for landings for elevators.

"landing, elevator or material lift: that portion of a floor, balcony, or platform used to receive and discharge passengers or freight"

Landings may be located between flights of stairs but are not a part of a flight of stairs however they are required at the top and bottom. (Or is that a floor or platform that is required?) When a landing coincides with a floor level there is no way to distinguish what portion of the floor is a landing. Because landings at floors are a part of a stairway by definition, the limit of the landing is what defines where the stairway ends and where the floor, or yard or deck begins. It is important to define landing because the width, depth, and headroom of landings that are part of stairways are regulated within Section 311.7. A landing may be a portion of a mezzanine or of a loft and the end of the landing should define the end of a stairway that connects the mezzanine or loft to another level often with another stairway or ramp.

It is quite simple, without a definition of a landing in the IRC you cannot determine where a floor begins and a stairway ends or if there is a floor level required at all. Headroom, width, ceiling height, etc. are regulated differently in stairways than hallways or lofts. A definition is needed.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This change only defines the difference between a floor and a landing that will aid in consistent enforcement without change to materials or their use in construction.

Public Comment# 3296

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## Proposed Change as Submitted

**Proponents:** T. Eric Stafford, representing Insurance Institute for Business and Home Safety

### 2021 International Residential Code

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 structural design of buildings for wind loads shall be in accordance with one or more of the following methods:

1. AWC *Wood Frame Construction Manual* (WFCM).
2. ICC *Standard for Residential Construction in High-Wind Regions* (ICC 600).
3. ASCE *Minimum Design Loads 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.

#### **Exceptions:**

1. For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R608.2.
2. For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R610.2.
3. 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.
4. The seismic provisions of this code apply in accordance with the scope of Section R301.2.2.
5. Exterior wall coverings, roof coverings, and fenestrations shall comply with the provisions of this code.
6. The design of exterior decks for dead, live, and snow loads shall be in accordance with Section R507.

~~The elements of design not addressed by the methods in Items 1 through 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 one of two proposals 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 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.

A new exception is 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.

A new exception is proposed for decks that clarifies that the design of exterior decks for dead, live, and snow loads is to be in accordance with Section R507.

A similar proposal was submitted last cycle 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 addresses those concerns from the last cycle.

This proposal is not intended to change any technical requirements in the IRC related to wind design. It is intended to simply clarify the wind limitations in the IRC.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This code change proposal will not impact the cost of construction as it is simply a clarification.

RB36-22

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## **Public Hearing Results**

### **Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because the proposed Exceptions 4, 5 and 6 are not exceptions to the high wind requirement, but rather pointers to other requirements in the IRC. In addition, this could be read to not require a building to comply with the high wind criteria.  
(Vote: 10-0)

RB36-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

#### **IRC: R301.2.1.1**

**Proponents:** T. Eric Stafford, representing Insurance Institute for Business and Home Safety (testafford@charter.net); Philip Line, representing American Wood Council (pline@awc.org) requests As Modified by Public Comment

#### **Modify as follows:**

### **2021 International Residential Code**

#### **R301.2.1.1 Wind limitations and wind design required.**

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 structural design of buildings for wind loads shall be in accordance with one or more of the following methods:

1. AWC Wood Frame Construction Manual (WFCM).
2. ICC Standard for Residential Construction in High-Wind Regions (ICC 600).

3. ASCE *Minimum Design Loads 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.

**Exceptions:**

- 1- ~~6.~~ For concrete construction, the wind provisions of this code shall apply in accordance with the limitations of Sections R404 and R608.2.
- 2- ~~7.~~ For structural insulated panels, the wind provisions of this code shall apply in accordance with the limitations of Section R610.2.
- 3- ~~8.~~ 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.
- 4- ~~The seismic provisions of this code apply in accordance with the scope of Section R301.2.2.~~
- 5- ~~9.~~ 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 ~~comply with the provisions of this code.~~
- 6- ~~The design of exterior decks for dead, live, and snow loads shall be in accordance with Section R507.~~

The elements of design not addressed by the methods in Items 1 through 9 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.

**Commenter's Reason:** This public comment addresses concerns raised at the Committee Action Hearings. This public comment further modifies the original proposal to simplify identification of applicable wind design requirements for in regions where wind design is required in accordance with Figure R301.2.1.1 or where the ultimate design wind speed, Vult, in Figure R301.2(2) equals or exceeds 140 miles per hour (225 kph) in a special wind region. Items 1-9 identify acceptable methods already addressed in the IRC in regions where wind design is required without introducing a technical change.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This code change public comment is simply a clarification.

Public Comment# 3362

## **Proposed Change as Submitted**

**Proponents:** Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

### **2021 International Residential Code**

**Add new definition as follows:**

**SYSTEM COMPONENTS.** Mechanical, electrical, plumbing, fuel-gas, fire-protection, photovoltaic, thermal energy, and other components. Such components shall include but are not limited to: utilities and appliances such as water heaters, thermal storage units, HVAC cabinets, and components of a similar height and weight.

**Delete without substitution:**

**R301.2.2.10 Anchorage of water heaters.** ~~In Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> and in townhouses in Seismic Design Category C, water heaters and thermal storage units shall be anchored against movement and overturning in accordance with Section M1307.2 or P2801.8.~~

**Add new text as follows:**

**R301.2.2.10 Seismic restraint of system components required.** In Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> and in townhouses in SDC C, system components 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.

**Exception:** Seismic support, bracing, and anchorage are not required for the following:

1. Suspended mechanical ducts, electrical conduit, and plumbing systems that are not part of a fire-suppression or other life-safety system.
2. Where the component or housing 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 component or housing is suspended from the structure less than 7-inches (152.4 mm) below the supporting structural element and the net operating weight is less than 50 pounds per support.
4. Where the operating weight of the component and its housing is less than 400 pounds and is less than 4 feet above floor level.

**R301.2.2.10.1 Seismic restraint resistance.** Supports, bracing, and anchorage of system components in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> and in townhouses in Seismic Design Category C, shall resist a horizontal force equal to one-third times the operating weight of the component, acting in any direction. Bracing shall comply with the following:

1. Components supported at the base shall be braced with strapping at points within the upper one-third of the component's vertical dimensions, or the component anchorage shall be designed to resist overturning.
2. Components suspended from the structure shall be braced to the structure, using either flexible or rigid bracing. Flexible bracing such as wires or straps shall be provided in each of the four orthogonal directions. Rigid bracing such as struts or bars may be provided in two orthogonal directions.

**Revise as follows:**

**M1307.2 Anchorage of appliances.** *Appliances* designed to be fixed in position shall be fastened or anchored in an *approved* manner. In Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>, and in townhouses in Seismic Design Category C, water heaters and thermal storage units shall be anchored or strapped to resist horizontal displacement caused by earthquake motion in accordance with Section R301.2.2.10, one of the following:

- ~~1. Anchorage and strapping shall be designed to resist a horizontal force equal to one-third of the operating weight of the water heater storage tank, acting in any horizontal direction. Strapping shall be at points within the upper one-third and lower one-third of the appliance's vertical dimensions. At the lower point, the strapping shall maintain a minimum distance of 4 inches (102 mm) above the controls.~~
- ~~2. The anchorage strapping shall be in accordance with the appliance manufacturer's recommendations.~~

**M2301.2.13 Thermal storage unit seismic bracing.** In *Seismic Design Categories* D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> and in townhouses in Seismic Design Category C, thermal storage units shall be anchored in accordance with Section R301.2.2.10, M1307.2:

**G2404.8 Seismic resistance.** Where earthquake loads are applicable in accordance with this code, the supports shall be designed and installed for the seismic forces in accordance with Section R301.2.2.10 this code.

**P2801.8 Water heater seismic bracing.** In Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> and townhouses in Seismic Design Category C, water heaters shall be anchored in accordance with Section R301.2.2.10, ~~or strapped in the upper one-third and in the lower one-third of the appliance to resist a horizontal force equal to one-third of the operating weight of the water heater, acting in any horizontal direction, or in accordance with the appliance manufacturer's recommendations.~~

**Reason:** This proposal clarifies currently undefined IRC seismic restraint requirements for non-structural systems that pose a hazard if displaced during an earthquake. This proposal provides prescriptive direction that does NOT require a registered design professional, but still allows compliance with the intent of the IRC.

The new Section R301.2.2.10 makes use of current IRC language, while adjusting the provisions to better suit a variety of sizes and shapes. Exceptions have been added to limit the scope so that only larger and heavier components are subject to the required restraint. The limits on these exceptions have been correlated with ASCE 7 Chapter 13, which in some instances reduced the scope of the requirements (i.e. 300 lb limit has been increased to a 400 lb limit). These exclusions prevent components like common ductwork, electrical conduit, etc. from being subject to additional and unnecessary restraints.

By consolidating the seismic restraint requirements into Chapter 3, users no longer have to jump between chapters and the requirements can be uniformly defined without contradictions. This also follows the established precedent to define applicable scope criteria for seismic provisions within Chapter 3.

#### Issue this Addresses

While sections such as G2404.8 reference "seismic forces in accordance with this code", the IRC does not provide direction on how to determine the "seismic forces" or how to select anchorage and bracing that will support that force. As a result, the user is left with a choice between the responsibility of properly selecting the anchorage and bracing themselves or turning to an engineered solution to truly comply with the IRC.

Utility and non-structural systems other than water heaters (M1307.2) and thermal storage units (M2301.2.13) are just as vulnerable to displacement during an earthquake but are not explicitly covered by the current language. Displacements of these systems pose as much or more of a hazard than water heaters, from falling debris, containment failure of systems, or gas leaks within the residence. The current IRC provisions provide insufficient direction on how to adequately brace non-structural systems other than water heaters.

**Cost Impact:** The code change proposal will increase the cost of construction

The cost increase will be small since the anchorage and bracing can be achieved with typical construction materials readily available from local hardware stores. Non-structural items subject to this proposal can be braced with coil strapping, wire bracing, or rigid struts with approximate costs as follows:

- \$9 - \$15 => basic water heater strap kit
- \$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

RB39-22

## **Public Hearing Results**

### **Committee Action:**

**As Modified**

### **Committee Modification:**

#### **Delete without substitution:**

**SYSTEM COMPONENTS.** Mechanical, electrical, plumbing, fuel gas, fire protection, photovoltaic, thermal energy, and other components. Such components shall include but are not limited to: utilities and appliances such as water heaters, thermal storage units, HVAC cabinets, and components of a similar height and weight.

#### **Revise as follows:**

**R301.2.2.10 Seismic restraint of ~~system components~~ appliances and equipment required.**

In Seismic Design Categories D<sub>0</sub>, D<sub>1</sub>, and D<sub>2</sub> and in townhouses in SDC C, ~~system components~~ 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.

**Exception:** Seismic support, bracing, and anchorage are not required for the following:

1. Suspended mechanical ducts, electrical conduit, automatic sprinkler systems, and plumbing systems. ~~that are not part of a fire-suppression or other life safety system.~~
2. Where the ~~component or housing~~ 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 component or housing is suspended from the structure less than 7 inches (152.4 mm) below the supporting structural element and the net operating weight is less than 50 pounds per support. Where the installed weight of a suspended appliance or equipment is 50 pounds or less.~~
4. ~~Where the operating weight of the component or housing is less than 400 pounds and is less than 4 feet above floor level. Where the installed weight is 400 pounds or less and the bottom of the appliance or equipment is 4 feet or less above the adjacent floor level.~~

**Committee Reason:** The modification to delete the definition of 'system components' was appropriate because this is already addressed in the defined terms for 'appliances' and 'equipment'. With the definition deleted, the change to Section R301.2.2.10.1 main paragraph and Exception 2 are correlation with that deletion. The modification to Section R301.2.2.10.1 Exception 1, is because 'lift safety system' is too broad; this should be limited to automatic sprinkler systems. The modification to Section R301.2.2.10 Exceptions 3 and 4 were a simplification/clarification of what items are expected to be braces.

The proposal was approved as modified because this proposal provides seismic constraint for heavy equipment and appliances in residential construction which is important for resiliency and for addressing seismic force hazards. (Vote: 10-0)

RB39-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R301.2.2.10.1**

**Proponents:** Julie Furr, representing FEMA ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

**R301.2.2.10.1 Seismic restraint resistance.** Supports, bracing, and anchorage of appliances and equipment ~~system components~~ in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>, and in townhouses in Seismic Design Category C, shall resist a horizontal force equal to one-third times the operating weight of the component, acting in any direction. Bracing shall comply with the following:

1. Components supported at the base shall be braced with strapping at points within the upper one-third of the component's vertical dimensions, or the component anchorage shall be designed to resist overturning.
2. Components suspended from the structure shall be braced to the structure, using either flexible or rigid bracing. Flexible bracing such as wires or straps shall be provided in each of the four orthogonal directions. Rigid bracing such as struts or bars may be provided in two orthogonal directions.

**Commenter's Reason:** The original proposal introduced the phrase "system components", which was replaced by "appliances and equipment" with a floor modification approved by the committee. This public comment is an editorial change to clean up a stray reference that was overlooked.

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction. The cost increase will be as stated in the original proposal. This public comment is an editorial change.

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Public Comment# 3127



## **Proposed Change as Submitted**

**Proponents:** Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); J Daniel Dolan, representing Seismic Code Support Committee (jddolan@wsu.edu); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

### **2021 International Residential Code**

**Add new text as follows:**

**R301.2.2.11 Voluntary lateral force-resisting system alterations.** Structural alterations that are intended exclusively to strengthen the lateral force-resisting system and are not required by other provisions of this code shall be permitted in accordance with one of the following:

1. ICC 1300, for buildings that meet its eligibility requirements.
2. Appendix A Chapter A3 of the International Existing Building Code.
3. Appendix A Chapter A4 of the International Existing Building Code.
4. Section 503.13 or 805.4 of the International Existing Building Code.

Such alterations shall not trigger compliance with other requirements of this code.

**Add new standard(s) as follows:**

## **ICC**

International Code Council, Inc.  
500 New Jersey Avenue NW 6th Floor  
Washington, DC 20001

1300-2022

Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings

**Reason:** The recently published document *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings Volume 1 - Prestandard* (FEMA P-1100, 2018) is in the process of being converted to Standard ICC-1300 by the ICC Residential Assessment and Seismic Retrofit Standard Committee. The FEMA prestandard and the ICC standard have used state of the art analysis tools and performance-based methods to develop seismic retrofit provisions for cripple wall, living-space-over-garage, and hillside dwellings as well as residential brick masonry chimneys.

This proposal recognizes voluntary seismic retrofit and allows such retrofit to be provided without triggering other code provisions. This is intended to facilitate use of the ICC-1300 retrofit standard on a voluntary basis by interested persons. Two existing IEBC appendix chapters that contain prescriptive voluntary retrofit provisions are also listed as acceptable voluntary improvement methods, as are the IEBC prescriptive compliance provisions (IEBC Section 503.13) or Level 2 alterations provisions (IEBC Section 806.4).

**Bibliography:** ICC-1300, Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings, Under development (ICC, 2022)

Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings (FEMA P-1100), Federal Emergency Management Agency, Washington, D.C., 2018.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. Because this proposal only provides a new alternative method for voluntary retrofit, it will not impact the cost of construction.

**Staff Analysis:** A review of the standard proposed for inclusion in the code, ICC 1300-2022 Vulnerability-Based Seismic Assessment and Retrofit of One and Two Family Dwellings, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

RB40-22

## **Public Hearing Results**

This proposal includes unpublished errata

R301.2.2.11.....

4. Section 503.13 of ~~806.4~~ 805.4 of the International Existing Building Code.

**Committee Reason:** This proposal was disapproved because the code should not make appendix required by reference when the appendix are not adopted. This is a voluntary standard, so it should not be in the codes as a mandatory minimum requirement. There was a preference for RB41-22. (Vote: 9-1)

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R301.2.2.11, ICC Chapter 44**

**Proponents:** David Bonowitz, representing Self (dbonowitz@att.net) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R301.2.2.11 Voluntary lateral force-resisting system alterations..** Structural alterations that are intended exclusively to strengthen the lateral force-resisting system and are not required by other provisions of this code shall be permitted in accordance with one of the following:

1. ICC 1300, for buildings that meet its eligibility requirements.
2. Appendix A Chapter A3 of the *International Existing Building Code*.
3. Appendix A Chapter A4 of the *International Existing Building Code*.
4. Section 503.13 or 805.4 of the *International Existing Building Code*.

Such alterations shall not trigger compliance with other structural requirements of this code.

## **ICC**

International Code Council, Inc.  
500 New Jersey Avenue NW 6th Floor  
Washington, DC 20001

1300-2022

Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings

**Commenter's Reason:** The modification to the final sentence -- addition of the word "structural" -- is the same as was proposed at the hearings with no opposition. It limits the scope of the proposal to ensure no conflict with other provisions of the IRC that might apply to voluntary work. With the tentative approval of RB41, the committee has already shown a willingness to let the IRC cite external standards for voluntary work. So arguments about citing criteria already in the IEBC should be nonpersuasive.

But more significantly, this public comment responds to the obvious error -- or misunderstanding -- in the committee's reason for disapproval (see above). That reason twice suggests, wrongly, that RB40 would somehow make the cited IEBC Appendices A3 and A4 "required" or "mandatory." Nothing could be further from the truth. The point of RB40 is merely to say how one might qualify for the benefit offered in the proposal's final sentence -- a waiver on additional structural checks and improvements. The work is still voluntary! All RB40 says is that if you follow one of the listed criteria -- all of which are appropriate to IRC-eligible buildings -- then you get the waiver. And by including the different options (the IRC committee loves options in other contexts), RB40 is able to endorse the new standard ICC-1300 without implicitly abandoning well-tested and ICC-endorsed criteria in IEBC Appendices A3 and A4.

Further, the committee's reason statement suggests that anything not within the covers of the IRC is not "adopted" and is therefore inappropriate for citation from the IRC. This is also wrong, both by precedent and by common sense. By precedent, because the IRC routinely refers to other I-codes, including the IBC. And by common sense, because IEBC Appendices A3 and A4 (as well as C1 and C2) are intentionally written for IRC-eligible buildings; the IRC should be \*encouraging\* their voluntary use, not dismissing or ignoring them because they happen to currently live in a different I-code.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. As in the original proposal, the modified proposal covers only voluntary work and largely references criteria that already exist in the IEBC.

**Staff Analysis:** In accordance with Section 3.6.3.1.1 of ICC Council Policy 28, the new referenced standard ACI Code 440-22, must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.



## **Proposed Change as Submitted**

**Proponents:** Kelly Cobeen, representing ICC Residential Seismic Assessment and Retrofit Standard Consensus Committee (IS-RSARC) (kcobeen@wje.com)

### **2021 International Residential Code**

**Add new text as follows:**

**R301.2.2.11 Voluntary seismic alterations.** Structural alterations that are intended exclusively for strengthening of the seismic force-resisting system or masonry chimneys and are not required by other provisions of this code shall be permitted in accordance with ICC-1300.

**Add new standard(s) as follows:**

## **ICC**

International Code Council, Inc.  
500 New Jersey Avenue NW 6th Floor  
Washington, DC 20001

1300-2022

Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings

**Reason:** This proposal adds to IRC Section R303.2.2 "Seismic provisions" a new Section R301.2.2.11 to reference new standard ICC 1300-2022, *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings*. Section R301.2.2.11 recognizes the standard and authorizes its use for owners, contractors, registered design professionals, and building officials where seismic retrofits may be desired. The new standard is also added to Chapter 44, Reference Standards. It is the general intent that voluntary seismic retrofit per ICC 1300 be permitted without triggering other requirements of the IEBC or the IRC, but discretion is left to the building official. A companion proposal provides a similar adoption of ICC 1300 into the IEBC.

ICC 1300-2022 is an optional design and construction standard that allows, under certain circumstances, one- and two-family dwelling units and townhouses to be assessed and retrofitted to provide a higher level of seismic resistance than structures built to legacy codes or prior to building codes being in effect. Damage assessments from earthquakes and application of modern seismic design standards and modeling techniques have shown hillside homes, crawl space homes, homes with living areas over garages, and brick masonry chimneys to be vulnerable to significant earthquake damage. Prestandard FEMA P-1100, *Vulnerability-Based Seismic Assessment and Retrofit of One- and Two-Family Dwellings*, developed by the Applied Technology Council, was used as the basis of the new ICC 1300 standard. Also included is the evaluation and retrofit of masonry chimneys.

As an ANSI accredited standards developing organization, the Code Council is developing New ICC 1300-2022. The Residential Seismic Assessment and Retrofit Standard Consensus Committee (IS-RSARC) has the primary responsibility for the development of minimum requirements to safeguard the public health, safety, general welfare by providing a methodology for the identification, evaluation and retrofit of specific known vulnerabilities for one- and two-family wood light-frame dwellings up to 2 stories in height located in Seismic Design Categories B through E. This includes the use of the best available seismic numerical modeling tools and engineering practices to assist in development of assessment methods and to identify retrofit criteria to best achieve targeted performance objectives. Use of the provisions is anticipated to improve earthquake performance but is not necessarily intended to prevent earthquake damage. IS-RSARC was appointed by the ICC Board of Directors in June 2020 and has primary responsibility for the development as an American National Standard. All standards development is subject to ICC's ANSI Approved Consensus Procedures. The development of the standard is currently ongoing. The first public ballot version is included with this proposal; the final version is anticipated to be available in late 2022, as required by ICC.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

The code proposal does not increase nor decrease cost of construction, as the standard and the charging language is voluntary.

**Staff Analysis:** A review of the standard proposed for inclusion in the code, ICC 1300-2022 Vulnerability-Based Seismic Assessment and Retrofit of One and Two Family Dwellings, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

RB41-22

## **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

**R301.2.2.11 Voluntary seismic alterations.** Structural alterations that are intended exclusively for strengthening of the seismic force-resisting system or masonry chimneys and are not required by other provisions of this code shall be permitted in accordance with ICC-1300. Such alterations shall not trigger compliance with other structural provisions of this code.

**Committee Reason:** The modification to add the last sentence was to clarify that other structural provisions were not required since seismic retrofitting is voluntary. The proposal was approved as modified because this standard would provide prescriptive methods for four common problems in seismic areas. This will improve safety. While retrofitting is voluntary, this standard should be followed when this happens. Using this standard would allow for home owners to not have to move to an engineered solution. (Vote: 6-4)

RB41-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** David Bonowitz, representing Self (dbonowitz@att.net) requests Disapprove

**Commenter's Reason:** RB41, especially as modified, gives preferential treatment to one standard that has never been used. It was not even available at the time of the hearings, which is why the Structural Committee disapproved a similar proposal to the IEBC. By giving this inappropriate and unnecessary preferential endorsement, RB41 throws under the bus two existing ICC-endorsed alternatives -- IEBC Chapters A3 and A4 -- that have actually been used on thousands of beneficial retrofits! Should retrofit by Appendix A3 not get the same advantages that RB41 now confers on ICC-1300? Unfortunately, RB41 strongly suggests it should not, and that is a bad outcome that helps nobody. (To be clear, I endorse ICC-1300's technical content. I chaired the peer review committee that developed FEMA P-1100, the pre-standard that became ICC-1300. So my opposition to RB41 is not about the standard itself, but about the code giving it undeserved and premature preferential treatment, especially at the expense of other existing documents.)

Further, RB41 now brings into the IRC a problem the IEBC has had to deal with for years: the notion that if the code explicitly endorses one approach, it implicitly rejects others. That's wrong, but we know from years of experience that lots of code officials and users read the code this way. I have no doubt that RB41 will have the same effect.

But the main purpose of this public comment is to correct a misleading statement in the committee's reason statement, which reads in part, "While retrofitting is voluntary, this standard should be followed when this happens." This is exactly the problem I predicted at the hearings -- an implication that ICC-1300 is now the preferred standard. Taken together with the committee's unfortunate disapproval of RB40, this over-simple reason statement now wrongly devalues IEBC A3 and A4, whether the committee or the proponents intended that or not.

This is wrong. What the committee \*probably\* meant is that if you're going to follow the ICC-1300 standard, you need to follow it completely to qualify for the benefit offered by RB41's final sentence (added by floor mod). But that's not what the plain language of the reason statement says, so I am here correcting and clarifying it.

Finally, if RB41 is disapproved, there is no actual loss. ICC-1300 will still exist (which is good! I like it!). And as a bona fide standard, it can be adopted without hesitation by jurisdictions and agencies (such as the CEA, mentioned at the hearings) even if it does not get a special shout-out in the IRC.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.

Public Comment# 3352

### **Public Comment 2:**

**Proponents:** CP28 administration

**Commenter's Reason:** The administration of ICC Council Policy 28 (CP28) is not taking a position on this code change. This public comment is being submitted to bring a procedural requirement to the attention of the ICC voting membership. In accordance with Section 3.6.3.1.1 of ICC Council Policy 28 (partially reproduced below), the new referenced standard ICC 1300-2022 must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

**(CP28) 3.6.3.1.1 Proposed New Standards.** In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change

proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
N/A

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Public Comment# 3534

## RB44-22

### **Proposed Change as Submitted**

**Proponents:** David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

#### **2021 International Residential Code**

**R301.7 Deflection.** The allowable deflection of any structural member under the *live load* listed in Sections R301.5 and R301.6 or wind loads determined by Section R301.2.1 shall not exceed the values in Table R301.7.

**Revise as follows:**

**TABLE R301.7 ALLOWABLE DEFLECTION OF STRUCTURAL MEMBERS<sup>b, c</sup>**

Portions of table not shown remain unchanged.

| STRUCTURAL MEMBER   | ALLOWABLE DEFLECTION |
|---|----------------------|
| All other structural members <u>excluding guards and handrails.</u> | $L/240$              |

**Note:**  $L$  = span length,  $H$  = span height.

- 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).
- For cantilever members,  $L$  shall be taken as twice the length of the cantilever.
- 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  $L/120$ .
- Deflection for exterior walls with interior gypsum board finish shall be limited to an allowable deflection of  $H/180$ .
- Refer to Section R703.8.2. The dead load of supported materials shall be included when calculating the deflection of these members.

**Reason:** This proposal eliminates guards and handrails from the IRC allowed deflection table and removes the requirement that conflicts with the long accepted standards related to Guards and Handrails.

Guards and handrails are structural members listed in Table R301.5. However without a specific listing for allowable deflection in Table R301.7 they are caught in the catch all of "All other structural members" by default. It is our belief that guards and handrails fall in this category as an unintentional oversight. The allowances in this table are intended for elements of the building's envelope and core structure, e.g., floor, ceilings, roof, and walls to limit vibration and prevent cracking of applied finishes. As stated in R301.7 the deflection allowances in the table are to be considered under the required live load, which for these elements are uniformly distributed live loads. However, the loads on guards and handrails are concentrated loads to correlate with their function that is uniquely different from floors, walls, etc.

The default "All other..." allowed deflection of only  $L/240$  is simply not enforceable nor is it being enforced.  $L/240$  is over restrictive for the length of any guard system, as guards are not susceptible to the same kind of loading as floors, nor does regulating deflection of length address deflection of height which is a critical parameter when applying the required load to the top of the guard. Any horizontal deflection of the guard system as the user experiences it is dependent upon the vertical support when the required live load is applied to the top of a guard system. Height may not be a factor in deflection of a handrail system depending upon how it is mounted as with a rail mounted to a wall with brackets. However, in any case it is plain to see  $L/240$  does not factor in height of the guard.

Guards are commonly made of many different materials, wood, steel, aluminum, miscellaneous metals, glass, composites, plastics, etc. each having unique properties affecting deflection. Guards and handrails of each of these materials have been manufactured based upon the requirements of long accepted standards:

ASTM E985, *Standard Specification for Permanent Metal Railing Systems and Rails for Buildings*,

ASTM D7032, *Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)*,

ICC-ES AC273, *Acceptance Criteria for Handrails and Guards*.

These standards represent current practice for testing the deflection of manufactured guard systems and their approval by ICC-ES acceptance criteria as well as other product evaluators that use the same ASTM Tests. Such approved products are common throughout the built environment. If enforced  $L/240$  would eliminate these products without any evidence contrary to their serviceability. Furthermore in the supporting statement of RB61-13, Cole Graveen PE, SE, the proponent stated:

*"It should be noted that if the current deflection limit of  $L/240$  for All other structural members is applied to wood guards on common residential decks, as it should be per the current text of the IRC, it is highly likely that many of the typical wood guard constructions would not comply with  $L/240$ . The deflection of a typical mid-grade wood 4x4 post connected to a 2x10 band joist will exceed  $L/240$  when both the bending deflection of the post and the rotation of the support is considered."*

RB61-13 suggested that  $L/240$  be replaced with the requirements set forth in the standards cited above that are used to approve product by the ICC. RB61-13 was disapproved. This proposal however simply eliminates guards and handrails from the IRC allowed deflection Table R301.7 and removes any conflict with the long accepted standards.



We will also propose an amended version of RB16-13 with a substitution for L/240 in an attempt to harmonize the IRC with the long existing standards cited above and as the proponent it is our intention to ask that it be heard first.

- Bibliography:** 1. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2009  
2. ICC-ES AC273, Acceptance Criteria for Handrails and Guards, Corrected January 2017 (updated 2021)  
3. ASTM E985-00(2006), Standard Specification for Permanent Metal Railing Systems and Rails for Buildings  
4. ASTM E985-00 E1, Standard Specification for Permanent Metal Railing Systems and Rails for Buildings  
5. ASTM D7032-08, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails)  
6. Loferski, J., Albright, D., and Woeste, F. (July 2007) Tested Guardrail Post Connections for Residential Decks, Structure Magazine  
7. Review of Fall Safety of Children Between the Ages of 18 Months and 4 Years in Relation to Guards and Climbing in the Built Environment, Prepared for National Ornamental & Miscellaneous Metals Association (NOMMA), Prepared by NAHB Research Center, Inc., December 2007  
8. Horizontal Static Forces Exerted by Men Standing in Common Working Positions on Surfaces of Various Traction - Including Coefficients of Friction Between Various Floor and Shoe Materials, K. H. E. Kroemer, et al, Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, January 1971  
9. RB61-13, 2013 Code Development Cycle of the 2015 International Residential Code

**Cost Impact:** The code change proposal will decrease the cost of construction

Based upon the premise that the code will be enforced as written this will at the very least prevent a landslide of re-evaluation and testing subsequent to obsolescence of many guard and handrail products, all at an undetermined increase in cost.

RB44-22

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## **Public Hearing Results**

**Committee Action:**

**As Submitted**

**Committee Reason:** This proposal was approved because the L/240 deflection limit is not needed for guards. Safety is addressed by the current loading requirements. (Vote: 10-0)

RB44-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com) requests Disapprove

**Commenter's Reason:** By adding a specific exemption for guards and handrails, this change removes all requirements for deflection of guards and handrails without suggesting any alternative. That results in an unsafe condition where structural members providing safety from falling may move more than expected by the occupant causing loss of balance and a possible fall.

We recognize that the current interpretation where guards and handrails may end up being considered "all other structural members" could cause overly restrictive designs. However, currently there are published alternate deflection requirements for guards and handrails in the standards and Acceptance Criteria mentioned by the proponent (ASTM E985, ASTM D7032, ICC-ES AC 273). Guards and handrails meeting these requirements should be able to be accepted by the Building Official using an Alternate Materials and Methods approach.

However, by giving a complete exemption to guards and handrails, they will not have to meet ANY standards, and the Building Official will have no authority to enforce any deflection limits. We do not think that is appropriate.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.

Public Comment# 3510

## **Proposed Change as Submitted**

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

### **2021 International Residential Code**

**Add new text as follows:**

**R301.9 Framing Member Splices.** Splices in floor, ceiling, or roof framing members shall occur over vertical supports or shall be designed by a registered design professional in accordance with Section R301.1.3. Purlins, purlin braces, and collar ties shall not be considered a vertical support for determining splice locations.

**Revise as follows:**

**R502.3 Allowable joist spans.** Spans for floor joists shall be in accordance with Tables R502.3.1(1) and R502.3.1(2). For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall comply with Section R301.9.

**R802.4.1 Rafter size.** Rafters shall be sized based on the rafter spans in Tables R802.4.1(1) through R802.4.1(8). Rafter spans shall be measured along the horizontal projection of the rafter. For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall comply with Section R301.9.

**R802.5 Ceiling joists.** Ceiling joists shall be continuous across the structure or securely joined where they meet over interior 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). Rafter splices shall comply with Section R301.9.

**Reason:** This proposal adds language to address members spliced between bearing walls. The clear spans and loads provided in all IRC tables assume a continuous condition between supports. Although a continuous member can be achieved by splicing two members together, the splice must be properly designed to transfer forces across the spliced connection and avoid a hinge condition. Where splices have not been properly designed, members (especially rafters) have displayed visible out-of-plane deformation. In these situations, the members have required repair or replacement to stop and reverse the deformation process.

This proposal clarifies that framing member splices between bearing walls need to be engineered and references section 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 is permitted for buildings and structures, and parts thereof, included in the scope of this code."

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 2020 and 2021 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 code change proposal will not increase or decrease the cost of construction

This proposal is a clarification change only; the intent is to clarify Rafter splices need to be engineered which is what required currently but it is not addressed in the code text.

RB45-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because this is already addressed adequately in the wood sections. Splices have to be engineered or should be prohibited; so they should not be promoted by including this in Chapter 3. This does not address all splices, some are not

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R301.9, R502.3, R802.4.1, R802.5**

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**~~R301.9 Framing Member Splices.~~** ~~Splices in floor, ceiling, or roof framing members shall occur over vertical supports or shall be designed by a registered design professional in accordance with Section R301.1.3. Purlins, purlin braces, and collar ties shall not be considered a vertical support for determining splice locations.~~

**R502.3 Allowable joist spans.** Spans for floor joists shall be in accordance with Tables R502.3.1(1) and R502.3.1(2). For other grades and species and for other loading conditions, refer to the AWC STJR. Joist splices shall ~~comply with Section R301.9.~~ occur over vertical supports or shall be designed in accordance with R301.1.3.

**R802.4.1 Rafter size.** Rafters shall be sized based on the rafter spans in Tables R802.4.1(1) through R802.4.1(8). Rafter spans shall be measured along the horizontal projection of the rafter. For other grades and species and for other loading conditions, refer to the AWC STJR. ~~Joist Rafter~~ splices shall ~~comply with Section R301.9.~~ occur over vertical supports or shall be designed in accordance with R301.1.3. Purlins, purlin braces, and collar ties shall not be considered a vertical support for determining splice locations.

**R802.5 Ceiling joists.** Ceiling joists shall be continuous across the structure or securely joined where they meet over interior 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). ~~Rafter Ceiling joist~~ splices shall ~~comply with Section R301.9.~~ occur over vertical supports or shall be designed in accordance with R301.1.3.

**Commenter's Reason:** The Committee raised the concern that adding a generic splice section in Chapter 3 could lead to unintentionally requiring or promoting splices beyond the specific problematic framing conditions. In response, this public comment eliminates the generic splice section and relocates the proposed language into the three specific sections that address floor joists, rafters, and ceiling joists. This relocation of text will limit these specific splice requirements only to the three areas intended to be addressed by this proposal.

The allowable framing table spans in the IRC assume members are continuous between their supports. Without that continuity, the table spans and framing sizes are inadequate to support the required loads and result in localized and visible deflections. These deflections cause both cosmetic damage such as cracked gypsum board, and more functional damage such as racked doors that do not close or broken plumbing where it has been run through deflected floor joists. A continuous member can be achieved by using a single solid member or by using a splice that transfers the full member section capacity between pieces. This proposal addresses the spliced condition and typical field splice practices that are frequently inadequate to support the required loads.

The opposing testimony raised a concern that the proposed language could be interpreted to allow bearing walls only to be considered a vertical support. Where a splice occurs over a vertical support, the support provides the necessary restraint against deflection and meets the intent of the prescriptive framing table spans. Vertical supports include any IRC allowable bearing surface or support element, including but not limited to: girders, trusses, bearing walls, etc.

The final concern raised was that splices have not been an issue and this is unnecessary language. Field splices are frequently used to extend framing members that are too short to reach the bearing point (see photograph).

Where a splice occurs between vertical supports, the splice must transfer the full section capacity between pieces for the framing to achieve the expected performance based on the prescriptive framing tables. Specific member splice requirements will depend on the member size, material grade, and environmental exposure (interior, exterior, etc) and must be designed in accordance with accepted engineering practices. As roof pitches become increasingly steep longer rafter spans are required. As modern floor plans increase open spaces, longer ceiling and floor joist spans are required. As a result, field splices are regularly identified as deficient and the cause of framing performance issues or failures.



**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. These are existing requirements. There was a lot of confusion about the continuity of Joists, Rafters, and Ceiling joists. All the prescriptive provisions in the IRC are based on continuous Joists, Rafters, and Ceiling joists. This proposal provides clarification to the code users on the existing requirements without affecting the cost.

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Public Comment# 3080

## **Proposed Change as Submitted**

**Proponents:** David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC  
(david.renn@denvergov.org)

### **2021 International Residential Code**

**Revise as follows:**

**R302.1 Exterior walls.** Construction, projections, openings and penetrations of exterior walls of *dwelling*s, *townhouse*s and ~~accessory buildings~~ *accessory structures* shall comply with Table R302.1(1) based on fire separation distance; or *dwelling*s and *townhouse*s 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, buildings on the same lot shall be assumed to have an imaginary line between them. Where a new building is to be erected on the same lot as an existing building, the location of the assumed imaginary line with relation to the existing building shall be such that the existing building meets requirements of this section.

#### **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 structures* that face each other and are 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 or townhouse* 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 main purpose of this proposal is to add language into the body of the code that specifically dictates where imaginary lines must be assumed to determine fire separation distance. Currently, the definition of fire separation distance includes a distance to an imaginary line between two buildings on a lot, but the code doesn't tell you where an imaginary line must be assumed. Without specific language in the code that states where an imaginary line must be assumed, this part of the fire separation distance definition is somewhat moot. The proposed language addresses projects with multiple buildings on a lot, as well as when a new building is added to an existing lot. It should be noted that Exception 2 exempts walls between dwelling units and their accessory structures from fire-resistant exterior wall requirements and this proposal does not change this as the exception still applies.

There is a definite need to measure fire separation distance to an imaginary line between two buildings on lot as there are many projects with multiple dwellings or townhouses on the same lot and this requirement helps to prevent spread of fire from one building to the next (safety to property from fire is part of the intent of the code per Section 101.3). Furthermore, the alarm systems of these buildings are not tied together so it is appropriate to provide these buildings with the same protection as would be provided if the buildings were on separate lots (safety to life from fire is part of the intent of the code per Section 101.3).

This proposal also provides other improvements to this section as follows:

1. Adds the defined term "fire separation distance" into the body of this section. This defined term currently only occurs in an exception and in the tables referenced, which is not typical code language.
2. "accessory buildings" is changed to the defined term "accessory structures".
3. Townhouses are added to the scoping of the exterior wall requirements.
4. Exception 2 is revised to clarify that the exception only applies to walls of individual dwelling units and their accessory structures that face each other. As currently written, this exception could be read to apply to all walls of the dwelling units and accessory structures.
5. "Individual" in Exception 2 is revised to not be in italics as this is not a defined term.
6. Exception 4 for detached garages is revised to include garages accessory to a townhouse.

I urge your support of this proposal as it brings much needed clarity to the code regarding where imaginary lines must be assumed and provides several other improvements to the language of this section. These changes will aid in consistent interpretation and enforcement of fire-resistant

exterior wall requirements.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

Along with miscellaneous editorial changes, this proposal adds requirements to the body of the code that are already in the definition of 'fire separation distance', with no change in technical content of the code, therefore, there will be no change in cost of construction.

RB47-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal was disapproved because it is not clear what the difference in hazard is with accessory building and the main building. The phrase "face each other" is not easy to understand. "Accessory structure" is too broad of a term (e.g. carports), so how would you separate them? (Vote: 8-2)

RB47-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R302.1**

**Proponents:** David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC (david.renn@denvergov.org) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R302.1 Exterior walls.** Construction, projections, openings and penetrations of exterior walls of *dwelling*s, *townhouse*s and ~~accessory structures~~ accessory buildings shall comply with Table R302.1(1) based on *fire separation distance*; or *dwelling*s and *townhouse*s 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*, ~~buildings~~ dwellings and townhouses on the same *lot* shall be assumed to have an imaginary line between them. Where a new ~~building~~ dwelling or townhouse is to be erected on the same *lot* as an ~~existing building~~ existing dwelling or townhouse, the location of the assumed imaginary line with relation to the ~~existing building~~ existing dwelling or townhouse shall be such that the ~~existing building~~ existing dwelling or townhouse meets requirements of this section.

#### **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 ~~accessory structures that face each other and are~~ 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* ~~or townhouse~~ 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.

**Commenter's Reason:** This public comment modifies the original proposal to address concerns raised in the committee action hearings and to coordinate with another proposal that was approved in the committee action hearings. Modifications are as follows:

1. There was a concern that "accessory structures" is too broad of a term and would add non-building structures into this section that are not intended to be regulated by this section. This was not the intent of the proposal, so this public comment modifies the first sentence to change "accessory structures" back to "accessory buildings", which is the current IRC wording. Also, Exception 2 is revised to change "accessory

structures" to "accessory buildings" to be consistent with the wording in first sentence. The intent of the original proposal was to make the wording in R302.1 consistent with the wording in exception 2 and this change is consistent with the original intent and resolves a current conflict in the wording.

2. For Exception 2, there was a concern that the added phrase "that face each other" is not clear and is open to interpretation. We agree with this concern and this public comment removes the added wording in this exception, so there is no change to the current wording of Exception 2 except as noted in Item 1 above.

3. To further clarify the intent of this proposal and avoid any confusion with accessory structures/buildings, the second paragraph for imaginary line requirements is modified to change "buildings" to "dwellings and townhouses". This is done since the definition of "building" includes "accessory structure", which would then bring in non-building structures. The definitions of "dwelling" and "townhouse" are clear that these are buildings that contain dwelling units, which is the main focus of the original proposal.

4. Exception 4 is changed simply to coordinate with proposal RB14-22 that was approved in the committee action hearing by a vote of 10-0. Proposal RB14-22 clarified the use of the defined words "dwellings" and "townhouses" throughout the IRC and it should be noted that the change in this proposal that adds townhouses to the scoping in the first sentence is also included in RB14-22 which has been approved.

Opposition to this proposal raised a concern that bringing townhouses into R302.1 may conflict with townhouse requirements in R302.2. As was stated during testimony, R302.1 is specific to exterior walls of a townhouse, which is now defined as a building that contains three or more attached townhouse units - in other words, R302.1 regulates the perimeter walls of the entire townhouse building. R302.2 on the other hand regulates walls that separate individual townhouse units. There is absolutely no conflict between these sections as they deal with two very different items. Also, as noted in Item 4 above, the addition of townhouses to this section was already approved in RB14-22.

With the modifications made in this public comment we believe all of the concerns raised in the committee action hearing have been addressed. The main purpose of this proposal is to address measurement of fire separation distance for the case where there are multiple dwelling or townhouse buildings on the same lot, which is needed to prevent the spread of fire from one building to another and protect property. The concept of an imaginary line between buildings currently only occurs in the definition of "fire separation distance" and this proposal will bring clarity to the code by adding specific requirements for when the imaginary line is to be used. Please support this proposal as modified by this public comment.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal and public comment add requirements to the body of the code that are already in the definition of "fire separation distance", with no change in the technical content or intent of the code; therefore, there will be no change in the cost of construction.

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Public Comment# 3073

## **Proposed Change as Submitted**

**Proponents:** David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC  
(david.renn@denvergov.org)

### **2021 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.

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

Where *lot lines* do not exist between *townhouse units*, an imaginary line shall be assumed between the *townhouse units* for the purpose of determining *fire separation distance*.

#### **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 structures* 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* 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.

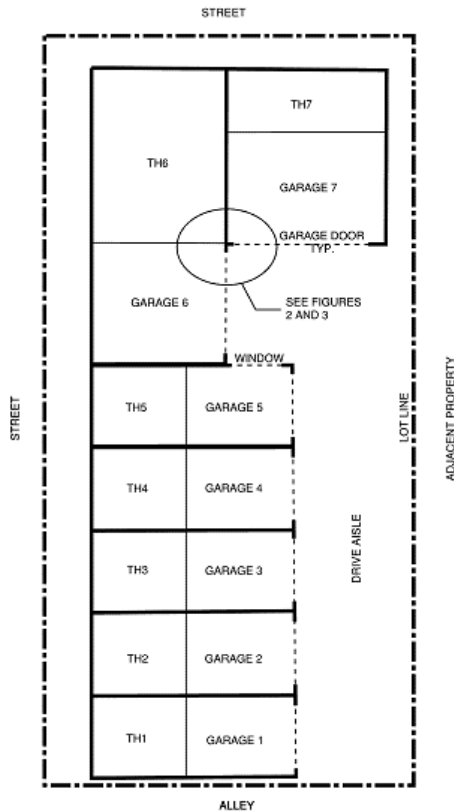
**Reason:** Per definitions in Chapter 2, a "lot" is a measured portion of a parcel of land considered as a unit having fixed boundaries, and a "lot line" is a line that bounds a plot of ground described as a lot in the title to a property. For townhouse units that are individually owned, a lot line is the property line that describes the lot in the title to the property, and this lot line would be used for the purposes of determining fire separation distance and fire-resistance rated exterior wall requirements. However, the IRC does not require townhouse units to be individually owned and does not require lot lines, or property lines, between units. In many cases, a townhouse building is owned by one entity and the townhouse units are rented instead of owned. In this case, the lot is the larger parcel of land that the townhouse building is on and there are no lot lines between the units, which results in no exterior wall requirements for exterior walls close to another townhouse unit.

It should be noted that the commentary for Section R302.2, which gives requirements for walls separating townhouses, indicates that the application of this section has its basis in the exterior wall requirements of R302.1 that deal with the building's location on a lot, and goes on to discuss "Where adjacent townhouse dwelling units meet at common or imaginary lot lines...". Based on this it is clear the intent of the code is to assume imaginary lines where common lot lines do not exist, but there is no code requirement for this. To clarify the intent of the code, this proposal adds specific language to require an imaginary line between townhouse units where a lot line does not exist. The result is that the protection from fire between individual units is always provided, regardless of whether a lot line exists or not.

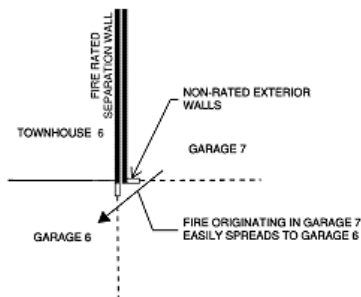
The figures below show the fire hazard this proposal is intended to address. Note that this configuration of townhouse units is from a real project - it is not hypothetical. Figure 1 shows the configuration of townhouse units on a lot where lot lines do not exist between units. Figure 2 shows exterior walls from two units that are perpendicular to each other with garage door openings adjacent to the intersection of these two walls. A fire originating in one garage could easily spread to the next since these large door openings are adjacent to each other (a similar condition occurs between Garage 6 door and Garage 5 window). Note that this condition is completely compliant with exterior wall requirements of the IRC since fire separation distance of these walls is measured to the lot lines of the lot the building is on. Figure 3 shows this same condition with an assumed imaginary line for fire separation distance, which results in a fire-resistance rated wall with no openings at this wall intersection, helping to prevent the spread of fire between units.

Please support this proposal to bring clarity to the intent of the code regarding exterior walls of adjacent townhouse units.

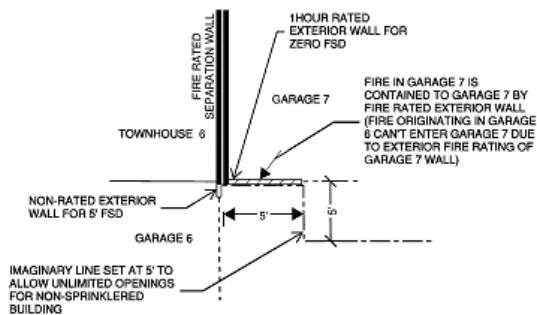




**FIGURE 1 - TOWNHOUSE LAYOUT**



**FIGURE 2 - NO IMAGINARY LINE FOR FSD**



**FIGURE 3 - IMAGINARY LINE FOR FSD**

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

The intent of the code is to provide townhouse units with protection from fire in other units and this is typically provided by measuring fire separation distances to lot lines between townhouse units. This proposal applies this intent to townhouse units without lot lines to provide consistent requirements for all townhouse units, which matches common enforcement practices. Since there is not change to the intent of the codes, there should be no change in the cost of construction.

## **Public Hearing Results**

### **Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because the code does not require fire resistance for 90 degree walls - so the concerns raised during the testimony and in the reason statement are not addressed in the proposed text. Not all townhouses have lot lines, so this would add confusion. A common wall between townhouses is not addressed in Section R302.1 - this concern is addressed in the townhouse section with requirements for common walls. There were concerns expressed that there is not a consistent interpretation in the current text on how to address common walls that that are exterior walls on one side. (Vote: 6-5)

RB48-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: SECTION 202, R302.1**

**Proponents:** David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC (david.renn@denvergov.org) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**[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.

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

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* ~~line~~ *does not exist* between adjacent *townhouse units*, an imaginary line shall be assumed between the adjacent *townhouse units* for the purpose of determining 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 structures* 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* 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.

**Commenter's Reason:** The opposition to this proposal raised concerns that walls of townhouse units are addressed in R302.2 so adding townhouse requirements in R302.1 would add confusion or conflict with R302.2. The opposition also stated that this concept may be OK if it only

addresses portions of townhouse units that are not connected. We do not agree with these concerns since R302.1 is specific to exterior walls of the townhouse building (i.e., where the units are not connected) and R302.2 is specific to walls separating townhouse units (i.e., where the units are connected). These are two very different types of walls and there is no conflict or confusion created by this proposal - this proposal only addresses portions of the townhouse units that are not connected. However, to address these concerns and avoid any confusion this public comment makes the following modifications to the original proposal:

1. Wording is changed to "fire separation distance of exterior walls" instead of just "fire separation distance". The intent with this change is to clarify that we are talking about exterior walls only, and not the townhouse separation walls required by R302.2.

2. A sentence is added that specifically states that fire separation distance and the requirements of R302.1 shall NOT apply at walls separating townhouse units that are required by R302.2. This is added to make it very clear that the separation walls are not in any way regulated by the exterior wall requirements of R302.1.

3. A sentence is added to state that where a lot line exists between adjacent units, fire separation distance of exterior walls is measured to this lot line. This is NOT a change to the code since the definition of fire separation distance already includes measurement to a lot line, and exterior wall requirements are currently enforced based on these lot lines between units. However, since the original proposal only dealt with the condition where a lot line does not exist between units, this sentence is added to clarify what is required where there is a lot line between units. Again, this is not a change to the code, just a clarification.

There was also concern raised by the committee that this proposal doesn't specifically address exterior walls that are perpendicular to each other. We disagree with this concern since this proposal addresses walls that are perpendicular to each other by requiring an imaginary line that fire separation distance for each unit is measured to. Figure 3 in the original proposal clearly shows how this would be applied at perpendicular walls and shows how one wall or the other would have to have a fire-resistance rating for some distance, which would provide protection against the spread of fire from one unit to the next. Note that the imaginary line could also be drawn at a 45-degree angle (or some other angle) which would then require a fire-resistance rating for some distance on both exterior walls.

With the modifications made in this public comment we believe the concerns raised at the committee action hearing have been addressed. This modified proposal will add an important requirement to the code to provide protection against the spread of fire from one townhouse unit to another. This protection will be provided whether there is a lot line or not between the units, which is appropriate since there should be equivalent protection for either case. Please support this proposal as modified by this public comment.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The intent of the code is to provide townhouse units with protection from fire in other units and this is typically provided by measuring fire separation distances to lot lines between townhouse units. This proposal applies this intent to the townhouse units without lot lines to provide consistent requirements for all townhouse units, which matches common enforcement practices. Since there is no change to the intent of the code, there should be no change in the cost of construction.

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Public Comment# 3074

## **Proposed Change as Submitted**

**Proponents:** Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov)

### **2021 International Residential Code**

**R302.1 Exterior walls.** Construction, projections, openings and penetrations of exterior walls of *dwelling*s and accessory buildings shall comply with Table R302.1(1); or *dwelling*s equipped throughout with an *automatic sprinkler system* installed in accordance with Section P2904 shall comply with Table R302.1(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 structures* 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* 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.

#### **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 703.3 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 <sup>a, b</sup>   | ≥ 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 in any story | 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.

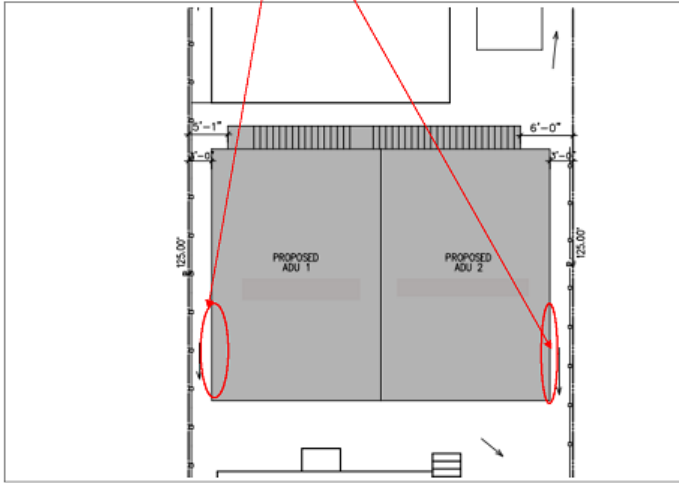
NA = Not Applicable.

- 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 gable vent openings are not installed.

**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. The IRC regulates 3 story townhouses and it is not reasonable to permit a large 10 ft by 7 ft opening located at a FSD of 3 ft in a non-sprinkler protected building to be located adjacent to a similar building on an adjacent lot. IBC Section 705.8.1 regulates the area of the exterior wall per story and it makes no sense that a 4-story dwelling regulated under the IBC differently than a 3-story dwelling or townhouse under the IRC since the fire exposure is the same and not impacted by the third dimension, building height.

The attached figure shows a dwelling with two dwelling units where the east and west sides are located at an FSD of 3 feet. If the proposed code change is adopted the wall area on the first story will be 380 sq ft and not 808 sq ft and the permitted allowable area of wall openings on the first story will be 95 sq ft and the large opening to the first patio will be reduce to 50 sq ft from 83 sq ft. The area of exterior wall openings on the second story will be unchanged.

We request the committee's support for approval as submitted this simple code change.



**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. The code change is adding a clarification and the cost of wall construction is less than door and window construction. The proposed code change should not impact building planning on the site.

RB49-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved. The IBC and IRC are specifically different in this context. The IRC has limited height so a fire in one building could be a hazard for the entire face of the adjacent building. (Vote: 10-0)

RB49-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R302.1, TABLE R302.1(1)**

**Proponents:** Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov) requests As Submitted

**Commenter's Reason:** This original code is being submitted to reintroduce RB49-22 that was not approved by the committee. Speakers in opposition swayed the committee by stating the IRC is a different code than the IBC and should have different regulations. Proponent agrees with the opposition however the two codes are significantly more similar than dissimilar. The proposed code change seeks to make them similar in another instance important to fire safety and property protection.

Both the IBC and IRC take the same approach to fire separation between buildings and accessory buildings and structures. The IBC however requires protected openings for certain exterior wall openings, or unprotected exterior wall openings when an NFPA 13 fire sprinkler is present. Both

codes seek to limit the area of exterior wall openings as a percentage of the area of the exterior wall under evaluation. Fire protected openings or openings in sprinkler protected buildings constructed under the IBC are permitted to have larger more/openings as a percentage of the exterior wall area. Both codes have a 25% limit at FSD 3 to 5 ft. The IBC however is clearer in identifying that the exterior wall area should be evaluated on a per story basis. The 2018 IBC was changed to require that the exterior wall opening evaluation be performed on a per story basis. It is possible for a larger upper story to be located at a closer FSD so the IRC also needs guidance through this code change so as to dispel the thinking that the opening below the floor projection of an upper story constitutes an exterior wall opening similar to what FS17-15 successfully argued for the IBC.

In 2008 National Institute of Standards and Technology performed full scale testing to validate the need for fire separation distance and demonstrated the soundness of the 5 ft FSD that has existed for decades and the inadequacy of the 3 ft FSD limit that existed under legacy codes for residential buildings. "NIST Technical Note 1600 - NIST Residential Structure Separation Fire Experiments" which can be found at [Microsoft Word - NIST SSE Report v581.doc](#) clearly demonstrated at fire separation distances less than 5 ft, 10 ft structure to structure, that fire will spread between buildings constructed with combustible materials.

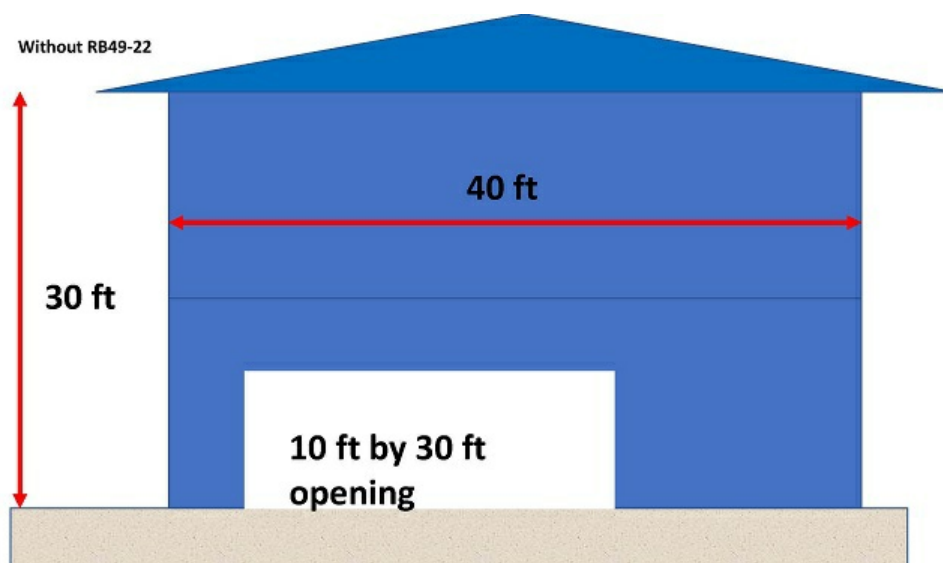
- In the abstract to the report the authors make the point that "*Flame spread between structures is a complex process primarily affected by structure construction type, structure separation distance, placement and size of windows and weather conditions.*" The IRC controls placement of the structure, the exterior wall finishes to some degree and the since of exterior wall openings.
- The IRC requires exterior wall fire resistance at a FSD of 0 to 5ft without fire sprinkler present. The test showed that fire will spread to an adjacent combustible building especially with combustible exterior wall coverings.

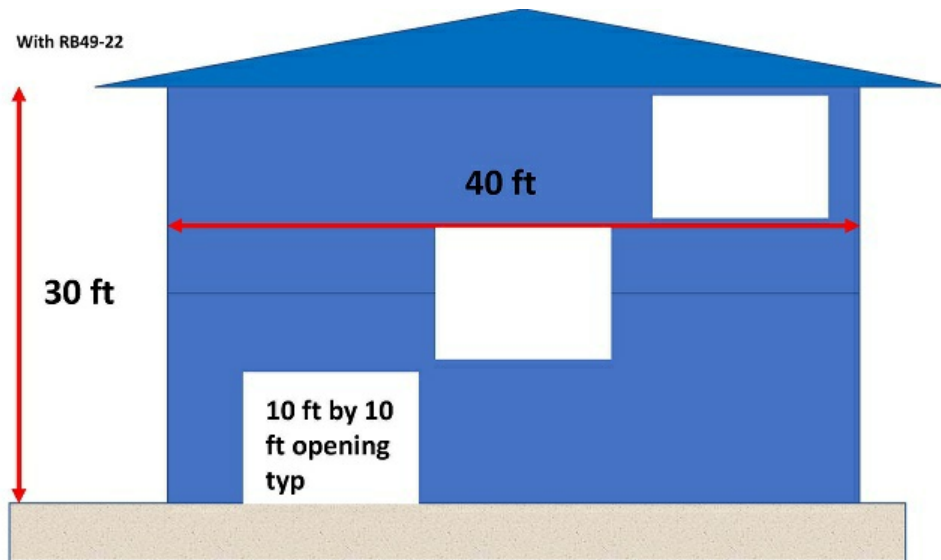
This code change is necessary to limit the risk of structure to structure fire spread from/to an unprotected residential building that under the IRC can be 3 stories in height, with no real height limit in feet, where exterior wall openings can be located at a 3 ft FSD without protection. The IRC permits between 3 ft and 5 ft FSD limited and unprotected exterior wall openings.

Without this code clarification the IRC can be read to permit a design code change the area of a 30 ft high by 40 ft long exterior wall in a 3 story unprotected building to be 30 ft long and 10 ft high on the first story. Whereas if the proposed code change is approved the same exterior wall opening can only be 10 ft high by 10 ft long. Like the IBC the IRC should seek to distribute exterior wall openings along the height of a building to minimize large exterior wall openings that can easily ignite drapery of combustible window coverings in adjacent and thus cause fire spread.

Many urban communities are seeing significant densification accessory dwelling units or the like to provide for additional rental housing stock and in quite a few jurisdictions both the older existing dwelling and the newer dwelling are not protected with fire sprinklers. In the original submittal reviewed at the CAH an actual example was shown of a lot with a single family dwelling at the street, a tall 2 story plus roof deck two unit dwelling and an exiting 3 story 5 unit apartment building located on a 50 ft by 125 ft lot; it has been more common to have a single family dwelling on this lot. This code change is also necessary to respond to this densification where firefighting access becomes more challenging and building evacuations necessary.

Voting members of the ICC please vote to overturn the committee decision for disapproval and vote for approval submitted per this public comment. We need the support of 2/3 of the voting members casting a vote to overturn the committee decision and to approve the public comment submitted for this important code change.





**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The public comment adds a clarification to the original code change and the resulting effect is to restrict the percentage of openings per story. However, the area of openings within the exterior wall will remain unchanged, the openings would be distributed as opposed to being allowed to be concentrated in one story.

Public Comment# 3012



## **Proposed Change as Submitted**

**Proponents:** Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

### **2021 International Residential Code**

**Add new text as follows:**

**R302.2 Townhouses.** Townhouses shall comply with Sections R302.2.1 through R302.2.3.

**R302.2.1 Open sides.** Each *townhouse unit* shall have not less than two open sides adjoining a *yard* or *public way*. The wall on one open side shall have a length that is not less than 20 percent of the total perimeter of the *townhouse unit*, and the wall the second open side shall have a length that is not less than 10 percent of the total perimeter of the *townhouse unit*.

**Exception:** Walls on open sides of *townhouse units* in *townhouses* that are provided with automatic sprinklers throughout in accordance with Section P2904 shall have a length of not less than 10 feet (3048 mm) on one open side and 3 feet (914 mm) on the second open side.

**Revise as follows:**

**~~R302.2~~ R302.2.2 Townhouses- Separation walls.** Walls separating *townhouse units* shall be constructed in accordance with Section ~~R302.2.1~~ or ~~R302.2.2~~ R302.2.2.1 or R302.2.2.2 and shall comply with Sections ~~R302.2.3 through R302.2.5~~ R302.2.2.3 through R302.2.2.4.1.

**R302.2.2.1 ~~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 established by an analytical method in accordance with Section 703.2.2 of the International Building Code.

**R302.2.2.2 ~~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 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 established by an analytical method in accordance with 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 established by an analytical method in accordance with 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.

**R302.2.2.3 ~~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, 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.

**R302.2.2.4 ~~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 surfaces.

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

**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 decking 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  $\frac{5}{8}$ -inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking 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 are not within 4 feet (1219 mm) of the common walls. Fire-retardant-treated wood shall meet the requirements of Sections R802.1.5 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 is more than 30 inches (762 mm) above the lower roof. The common wall construction from the lower roof 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.

**R302.2.2.4.1 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).

**R302.2.3 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 R302.2.2.2 R302-2.2, Item 1 or 2.
6. *Townhouse units* protected by a fire sprinkler system complying with Section P2904 or NFPA 13D.

**Reason:** This proposal builds on discussions of Proposal RB22-19 in the last cycle. Constructive discussion of that proposal took place at the Technical Committee Hearing, but at the Public Comment Hearing, consensus could not be reached among different interested parties. Nevertheless, there was clear support by the Technical Committee and ICC members and chapters for coming up with a fix that addresses shortcomings in the current text.

Bearing in mind that the original concept of townhouses was rectangular units in a linear configuration that was open on three sides for end units and front/rear for center units, the current code remains sufficient for its original purpose. However, over time, townhouse designers have gotten very creative in interpreting what constitutes a "side" that adjoins a yard or public way. Odd shapes and configurations that have townhouse units partially surrounded by other units, sometimes sharing walls with 3 or more neighboring units, have evolved. What constitutes a "side" in such cases has led to disagreements between code officials and designers, and lacking guidance in the code, code officials have little to fall back on beyond "I'm the code official," which that puts the code official in a difficult situation. These varied perspectives were clearly on display at last cycle's hearings, as different individuals testified with different interpretations and different perspectives on what is "reasonable."

In addition to improving the structure of the existing provisions in Section R302.2 and clarifying text referencing the IBC for fire resistance ratings (IBC Section 703.2.2 is not a test method, so the current IRC text referencing the IBC is incorrect), this proposal adds a new section 302.2.1 to support the definition of "townhouse unit" with respect to establishing minimum requirements for open sides.

The 20% requirement for the first side is derived from a typical 20x30 townhouse and follows the logic that the front side would traditionally be entirely open (20 foot front wall / 100 foot total unit perimeter = 20%); whereas, the 10% requirement for the second side generously allows the back or adjacent side to be partially blocked (10% is half of the 20-foot rear wall) by another unit or units. The exception for townhouses that are equipped with fire sprinklers, technically always required by the IRC but not enforced in some jurisdictions, is appropriate because, with sprinklers being provided, the need for large open sides for fire department access and suppression activity is drastically reduced. The allowance for a minimum of 10 feet on the primary side is considered to be a reasonable accommodation of the occasional need for narrow infill units. The allowance for the second open side to be as small as 3 feet for sprinklered townhouse units correlates with R310.1 in the 2021 IRC (from Proposal RB86-19), which clarified that emergency escape and rescue openings require a minimum of 36-inches of clear space between the opening and a public way.

Although there is no "perfect" fix to this issue given the multitude of configurations that designers might come up with, this proposal provides a fair, reasonable and flexible basis for quantifying a level of openness for townhouses that should be acceptable given the history of the townhouse provisions and interests of today's designers.

For disclosure, I am a consultant to NFSA, but this proposal is not submitted on NFSA's behalf and was not provided to NFSA prior to submittal. It is submitted as a personal proposal based on my personal interest in this topic.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

There is no way to universally quantify any cost impact of this change because of the ambiguity in existing text with respect to what constitutes an open side. Applied in jurisdictions that interpret the IRC such that two sides of a townhouse unit must be open to a yard or public way for the entire length of both sides, this change would reduce the cost of construction by adding clarity to the IRC that would relax application of the open side requirement. On the other hand, in jurisdictions that might interpret the IRC such that there is minimal length required to constitute an open side, this change would make application of the code more stringent.

RB53-22

## **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

**R302.2.1 Open sides.** Each *townhouse unit* shall have not less than two open sides adjoining a *yard or public way*. The wall on one open side shall have ~~a an open~~ length that is not less than ~~15~~ 20 percent of the total perimeter of the *townhouse unit*, and the wall the second open side shall have ~~a an open~~ length that is not less than 10 percent of the total perimeter of the *townhouse unit*.

**Exception:** Walls on open sides of *townhouse units* in *townhouses* that are provided with automatic sprinkler systems throughout in accordance with Section P2904 shall have ~~a an open~~ length of not less than ~~8~~ 40 feet (3048 mm) on one open side and 3 feet (914 mm) on the second open side.

**Committee Reason:** The modification to add "open" adds clarification on the wall open length, which was ambiguous in the original proposal. This modification should be extended to the exception. The modification to change the percentage in the main text in Section R302.2.1 and wall length in the exception scopes in a higher percentage of units that the industry is currently building and it provides a balances approach.

The proposal was approved as modified because this allows design options and resolved the ambiguity of the open length question discussed during the testimony. The proposal also addresses trade offs for jurisdictions that do not require sprinkler protection. (Vote: 6-5)

RB53-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R302.2.1

**Proponents:** Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

**R302.2.1 Open sides.** Each *townhouse unit* shall have not less than two open sides adjoining a *yard or public way*. Walls on the open sides shall comply with the following:

1. The wall on one open side shall have an open length that is not less than 15 percent of the total perimeter of the *townhouse unit* or 14 feet, whichever is less, and the
2. The wall on a the second open side shall have an open length that is not less than 10 percent of the total perimeter of the *townhouse unit* or 9 feet, whichever is less.

**Exception:** Walls on open sides of *townhouse units* in *townhouses* that are provided with automatic sprinkler systems throughout in accordance with Section P2904 shall have an open length of not less than 8 feet (3048 mm) on one open side and 3 feet (914 mm) on the second open side.

**Commenter's Reason:** The intent of this modification is to address concerns raised by the home building industry that the approved proposal is overly restrictive vs. current construction practices. The intent of the original proposal was to place a reasonable limit on townhouse construction to ensure emergency responder access vs. having no limit on what might be regarded as an open "side." This comment remains consistent with that

intent.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The intent of the public comment is to further clarify what was provided in the original proposal, potentially allowing a cost reduction for certain townhouses that might be built in a jurisdiction where sprinkler requirements in the code are not adopted.

Public Comment# 3401

## Public Comment 2:

IRC: R302.2.1

**Proponents:** Dan Buuck, representing National Association of Home Builders (dbuuck@nahb.org) requests As Modified by Public Comment

**Further modify as follows:**

## 2021 International Residential Code

**R302.2.1 Open sides.** Each *townhouse unit* shall have not less than two open sides adjoining a *yard* or *public way*. The wall on one open side shall have an open length that is not less than ~~15~~ 12 percent of the total perimeter of the *townhouse unit*, and the wall the second open side shall have an open length that is not less than 10 percent of the total perimeter of the *townhouse unit*.

**Exception:** Walls on open sides of *townhouse units* in *townhouses* that are provided with automatic sprinkler systems throughout in accordance with Section P2904 shall have an open length of not less than 8 feet (3048 mm) on one open side and 3 feet (914 mm) on the second open side.

**Commenter's Reason:** The proposal's requirement for open sides was supposedly derived from a typical townhouse. However, no study was done to show what a "typical" townhouse is. NAHB members have given feedback, which can be found in the attached substantiation. It is important to note that the proposed language as modified by this PC is more restrictive than current code. If changes to the open side requirements are to be made, they should be modest so that this type of affordable housing is not negatively affected.

### 15% Open Side Requirement

The first four examples in the following table (yellow background) are based on standard townhouse dimensions from the website [missingmiddlehousing.com](http://missingmiddlehousing.com). The depth dimension for each is the same. The widths begin with the minimum width from the website and increase in 2-foot increments. The first three examples fail the calculation that was passed by the Committee.

The Member Examples are based on input from NAHB members who design and build townhouses. Example #1 is based on an actual floor plan that includes an attached garage. Even if the upper stories do not extend over the garage, this example fails the 15% calculation because of the first floor dimensions.

Townhouse widths of 14 and 16 feet are necessary where dictated by lot sizes and other existing conditions. Member Examples #2-1 through 2-5 (blue background) show how limiting the 15% rule is for townhouses with a width of 14 feet. The overall gross floor area is required to be just over 400 sq ft maximum. The ratio of depth to width is almost 2:1, which is very limiting.

Examples #3-1 through #3-5 (reddish background) show the difficulties complying with the 15% requirement for townhouses with widths of 16 ft. Note the allowable gross floor area is less than 600 sq ft.

| Example                               | Width | Depth | Sq. Ft. per Floor (Gross) | Min Open Length Side1 (15%) | Pass/Fail Side1 (Width ≥ Col. E) | Min Open Length Side2 (10%) | Pass/Fail Side2 (Width ≥ Col. G) |
|---------------------------------------|-------|-------|---------------------------|-----------------------------|----------------------------------|-----------------------------|----------------------------------|
| Missing Middle Min Width/Max Depth†   | 18    | 55    | 990                       | 21.9                        | Fail                             | 14.6                        | Pass                             |
| Missing Middle 20-ft Width/Max Depth† | 20    | 55    | 1100                      | 22.5                        | Fail                             | 15                          | Pass                             |
| Missing Middle 22-ft Width/Max Depth† | 22    | 55    | 1210                      | 23.1                        | Fail                             | 15.4                        | Pass                             |
| Missing Middle 24-ft Width/Max Depth† | 24    | 55    | 1320                      | 23.7                        | Pass                             | 15.8                        | Pass                             |
| Member Example #1 (Attached Garage)*  | 24    | 65    | 1560                      | 26.7                        | Fail                             | 17.8                        | Pass                             |
| Member Example #2-1 (14-ft Width)     | 14    | 50    | 700                       | 19.2                        | Fail                             | 12.8                        | Pass                             |
| Member Example #2-2 (14-ft Width)     | 14    | 45    | 630                       | 17.7                        | Fail                             | 11.8                        | Pass                             |
| Member Example #2-3 (14-ft Width)     | 14    | 40    | 560                       | 16.2                        | Fail                             | 10.8                        | Pass                             |
| Member Example #2-4 (14-ft Width)     | 14    | 35    | 490                       | 14.7                        | Fail                             | 9.8                         | Pass                             |
| Member Example #2-5 (14-ft Width)     | 14    | 30    | 420                       | 13.2                        | Pass                             | 8.8                         | Pass                             |
| Member Example #3-1 (16-ft Width)     | 16    | 55    | 880                       | 21.3                        | Fail                             | 14.2                        | Pass                             |
| Member Example #3-2 (16-ft Width)     | 16    | 50    | 800                       | 19.8                        | Fail                             | 13.2                        | Pass                             |
| Member Example #3-3 (16-ft Width)     | 16    | 45    | 720                       | 18.3                        | Fail                             | 12.2                        | Pass                             |
| Member Example #3-4 (16-ft Width)     | 16    | 40    | 640                       | 16.8                        | Fail                             | 11.2                        | Pass                             |
| Member Example #3-5 (16-ft Width)     | 16    | 35    | 560                       | 15.3                        | Pass                             | 10.2                        | Pass                             |

† See <https://missingmiddlehousing.com/types/townhouse>

\* Sq. ft. calculation includes garage area

## 12% Open Side Requirement

This table shows the results of the proposed change in this public comment. Even with this change, not all combinations pass this requirement.

| Example                               | Width | Depth | Sq. Ft. per Floor (Gross) | Min Open Length Side1 (12%) | Pass/Fail Side1 (Width ≥ Col. E) | Min Open Length Side2 (10%) | Pass/Fail Side2 (Width ≥ Col. G) |
|---------------------------------------|-------|-------|---------------------------|-----------------------------|----------------------------------|-----------------------------|----------------------------------|
| Missing Middle Min Width/Max Depth†   | 18    | 55    | 990                       | 17.52                       | Pass                             | 14.6                        | Pass                             |
| Missing Middle 20-ft Width/Max Depth† | 20    | 55    | 1100                      | 18                          | Pass                             | 15                          | Pass                             |
| Missing Middle 22-ft Width/Max Depth† | 22    | 55    | 1210                      | 18.48                       | Pass                             | 15.4                        | Pass                             |
| Missing Middle 24-ft Width/Max Depth† | 24    | 55    | 1320                      | 18.96                       | Pass                             | 15.8                        | Pass                             |
| Member Example #1 (Attached Garage)*  | 24    | 65    | 1560                      | 21.36                       | Pass                             | 17.8                        | Pass                             |
| Member Example #2-1 (14-ft Width)     | 14    | 50    | 700                       | 15.36                       | Fail                             | 12.8                        | Pass                             |
| Member Example #2-2 (14-ft Width)     | 14    | 45    | 630                       | 14.16                       | Fail                             | 11.8                        | Pass                             |
| Member Example #2-3 (14-ft Width)     | 14    | 40    | 560                       | 12.96                       | Pass                             | 10.8                        | Pass                             |
| Member Example #2-4 (14-ft Width)     | 14    | 35    | 490                       | 11.76                       | Pass                             | 9.8                         | Pass                             |
| Member Example #2-5 (14-ft Width)     | 14    | 30    | 420                       | 10.56                       | Pass                             | 8.8                         | Pass                             |
| Member Example #3-1 (16-ft Width)     | 16    | 55    | 880                       | 21.3                        | Fail                             | 14.2                        | Pass                             |
| Member Example #3-2 (16-ft Width)     | 16    | 50    | 800                       | 15.84                       | Pass                             | 13.2                        | Pass                             |
| Member Example #3-3 (16-ft Width)     | 16    | 45    | 720                       | 14.64                       | Pass                             | 12.2                        | Pass                             |
| Member Example #3-4 (16-ft Width)     | 16    | 40    | 640                       | 13.44                       | Pass                             | 11.2                        | Pass                             |
| Member Example #3-5 (16-ft Width)     | 16    | 35    | 560                       | 12.24                       | Pass                             | 10.2                        | Pass                             |

† See <https://missingmiddlehousing.com/types/townhouse>  
 \* Sq. ft. calculation includes garage area

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The intent of the public comment is to further clarify what was provided in the original proposal. The language of the original proposal was too restrictive based on common townhouse dimensions. The net effect of this public comment and the code change proposal will add cost in some cases.

Public Comment# 3410

## Public Comment 3:

IRC: R302.2.1

**Proponents:** Dan Buuck, representing National Association of Home Builders (dbuuck@nahb.org) requests As Modified by Public Comment

Further modify as follows:

## 2021 International Residential Code

**R302.2.1 Open sides.** Each *townhouse unit* shall have not less than two open sides adjoining a *yard* or *public way*. The wall on one open side shall have an open length that is not less than 15 percent of the total perimeter of the *townhouse unit*, and the wall the second open side shall have an open length that is not less than 10 percent of the total perimeter of the *townhouse unit*.

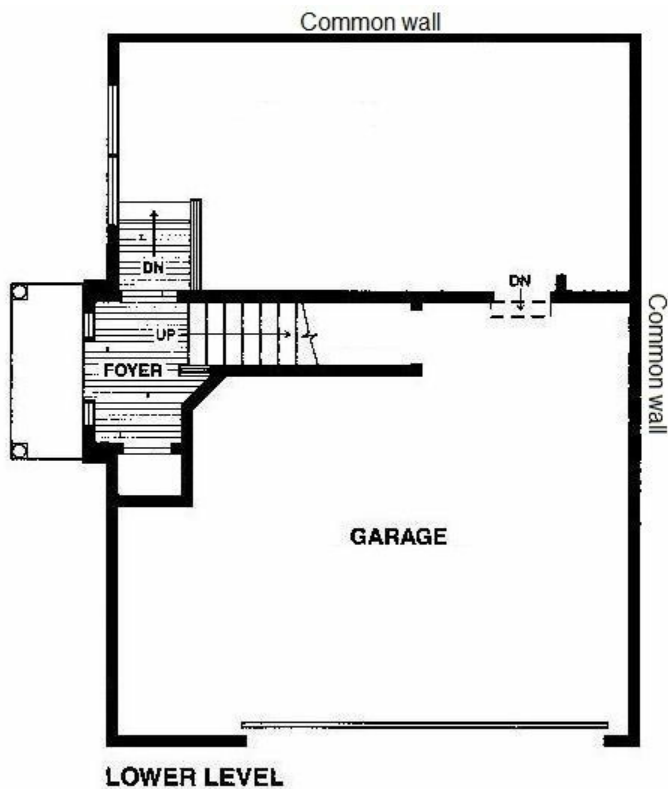
### Exception-Exceptions:

1. Walls on open sides of *townhouse units* in *townhouses* that are provided with automatic sprinkler systems throughout in accordance with Section P2904 shall have an open length of not less than 8 feet (3048 mm) on one open side and 3 feet (914 mm) on the second open side.
2. Exterior walls and openings of attached garages which adjoin a *yard* or *public way* shall count toward the open length of its respective side for *townhouse units* in *townhouses* that are provided with automatic sprinkler systems throughout in accordance with Section P2904.

**Commenter's Reason:** The new language approved by the committee has a serious flaw pertaining to certain common townhouse designs. It requires the wall on one open side to have an open length that is not less than 15 percent of the total perimeter of the townhouse unit, and the wall on the second open side to have an open length that is not less than 10 percent of the total perimeter of the townhouse unit. But at what height or story do you take that measurement? Many townhouses have an attached garage. Would the exterior walls or openings of an attached garage count toward the open length of the side? The answer is "no."

The wording of the new section applies the 15% and 10% requirements to the perimeter of the "townhouse unit." A townhouse unit is a "dwelling unit" by definition, and the definition of a dwelling unit does not include a garage. Therefore, townhouse units where the attached garage spans the entire width of one side on one floor would be prohibited by this new requirement, making it unnecessarily restrictive.

Examples of such townhouse designs are units where the garage is the entire width of the first floor and the second-story entry is at the top of a flight of exterior stairs. Another example is a quad home where each townhouse occupies a corner of the structure. Such a townhouse unit is shown below. The common walls are shown at the top and the right.



The proposed exception #2 was added to address this oversight. It only applies to sprinklered townhouses.

**Cost Impact:** The net effect of the public comment and code change proposal will decrease the cost of construction

The intent of the public comment is to further clarify what was provided in the original proposal. The language of the original proposal was too restrictive based on common townhouse designs.

Public Comment# 3464

**Proposed Change as Submitted**

**Proponents:** Shane Nilles, representing Self (snilles@cityofcheney.org)

**2021 International Residential Code**

**Revise as follows:**

**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 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.

**Exceptions:**

1. 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.
2. Plumbing and mechanical piping is permitted to pass directly through common walls provided they are protected in accordance with Section R302.4.

**Reason:** As the 2021 code now recognizes the entire structure as the townhouse building, and each townhouse as a unit within the building, piping serving plumbing and mechanical systems in townhouse buildings need to be able to pass through townhouse separation walls. The language as currently written in Section R302.2.2 to say that no such piping is permitted within the cavity of the wall at all, which would therefore prohibit piping that is simply passing directly through it. This proposal adds an exception to the section to make it consistent with the intent of townhouse units being able to share utility services as they are in a single building, with the condition that they are protected as penetrations per R302.4 which thereby maintains the required protection of the wall.

**Cost Impact:** The code change proposal will decrease the cost of construction  
The proposal creates an exception that allows for additional options and therefore decreases the cost of construction

RB55-22

**Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because the intent of the townhouses is for independent living units. Utilities should not extend through multiple units. (Vote: 8-2)

RB55-22

**Individual Consideration Agenda**

**Public Comment 1:**

**Proponents:** Shane Nilles, representing Self (snilles@cityofcheney.org) requests As Submitted

**Commenter's Reason:** The committee was under the impression that the code currently prohibits plumbing and mechanical piping from serving

multiple townhouse units by passing through the separation walls. Unfortunately this was simply a misunderstanding because it is allowed per Section R302.2.1 as there is nothing prohibiting any mechanical and plumbing systems within the cavities of double walls. It is only in Section R302.2.2 for common walls where there is such prohibition. But the intent of that restriction is not to prevent piping from passing directly through it, but rather from having entire systems within the wall cavity where the maintenance of such systems would subject the wall to a reduction in fire rating where the membrane is opened up during the work. It was never intended to prevent pass-through piping that is properly protected with listed firestop systems from serving multiple units. The proposal simply clarifies that allowance so that the code can be consistently interpreted and enforced.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The proposal and this public comment only clarifies the current intent of the code and does not directly affect the cost of construction.

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Public Comment# 3456



## **Proposed Change as Submitted**

**Proponents:** David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC  
(david.renn@denvergov.org)

### **2021 International Residential Code**

**Revise as follows:**

**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, deck or slab ~~and shall be continuous through attached enclosed accessory structures. The fire-resistance-rated wall or assembly shall extend through concealed roof overhangs to separate the attics of adjacent townhouse units. The fire-resistance rating shall extend the full length of the wall or assembly, including wall extensions through and separating attached enclosed accessory structures.~~

**Reason:** This proposal is intended to clarify the continuity requirements of townhouse separation walls in two ways:

1. As currently written, this section requires wall extensions through attached enclosed accessory structures to have a fire-resistance-rating, but doesn't actually require the extensions. It is clear the intent of the code is to provide separation walls through attached enclosed accessory structures, such as garages, and this proposal makes this a specific requirement.
2. This section requires separation walls to continue to the roof sheathing and Section R302.2.2 requires common walls to continue to the exterior sheathing of exterior walls, but there are no code requirements for continuity through concealed roof overhangs. If a common wall in an attic space stops in line with the exterior wall sheathing below the attic, there is a gap in the continuity of this wall as fire in one attic could wrap around the end of the wall through the enclosed roof overhang. This proposal remedies this by requiring the separation wall to continue through this concealed space to separate the attics of adjacent units. It is believed that this is common practice to provide the separation intended.

Please support this proposal to bring clarity to continuity requirements for townhouse walls.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

The intent of the code is to require separation walls to extend through enclosed accessory structures and this proposal rewords the current wording to require this. Also, the intent of the code is to provide a fire-rated separation wall between units to prevent the spread of fire between units. This proposal adds requirements to provide a separation through roof overhangs which is common construction practice and is commonly enforced. Since the intent of the code, common construction practice and common enforcement isn't changing, this proposal will not change the cost of construction.

RB56-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapprove because continuity is already addressed in the current text for separation in the attic space. The proposed text has an issue for when you do not have back to back accessory structures. (Vote: 9-1)

RB56-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R302.2.3

**Proponents:** David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC  
(david.renn@denvergov.org) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

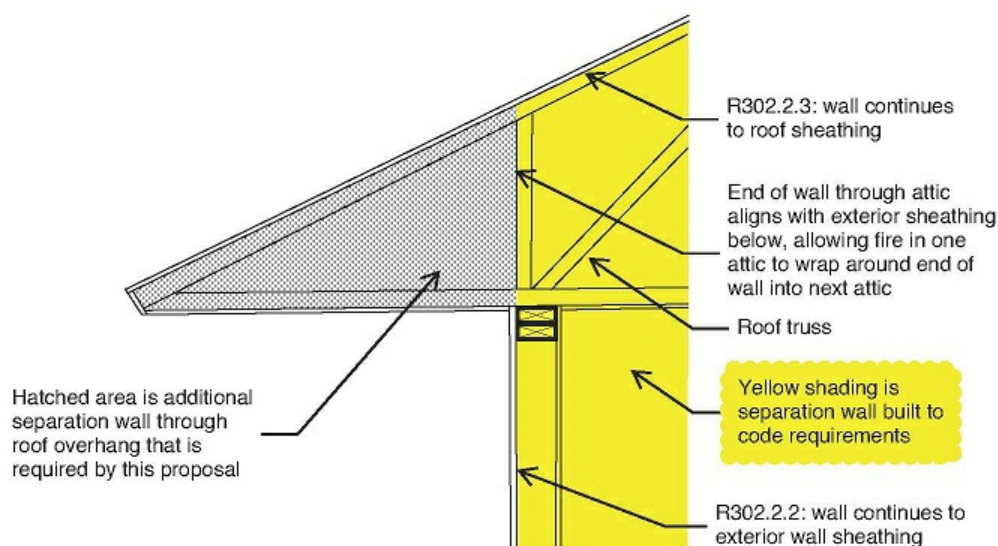
**R302.2.3 Continuity.** The fire-resistance-rated wall or assembly separating *townhouse units* shall be continuous from the foundation to the underside of the roof sheathing, deck or slab and ~~shall be continuous through attached enclosed accessory structures.~~ The fire-resistance-rated wall or assembly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

**Commenter's Reason:** This public comment makes modifications to address issues raised by the committee as follows:

1. There was concern that the wording regarding walls through enclosed accessory structures has an issue with accessory structures that are not back-to-back. We concur with this concern and have modified the proposal to bring back the current wording for wall extensions through and separating attached enclosed accessory structures. There is now no change from the current IRC for this part of this section.

2. The committee felt the current wording of the code requires the wall to continue to the roof sheathing, so the attics are already required to be separated. We agree that the code requires the wall to continue vertically to the roof sheathing, but in the horizontal direction R302.2.2 requires the wall to go to the exterior sheathing of exterior walls. If the end of the wall aligns with the exterior wall sheathing and continues vertically through the attic to roof sheathing, the current code requirements are met - this creates a gap in the separation since nothing in the code requires the wall to continue horizontally through the roof overhang. This proposal fixes this gap in the code and this public comment makes changes to tie this requirement to the requirement to extend the wall to the roof sheathing, which is simpler and more concise. The following sketch shows what this proposal is addressing.

We believe this public comment addresses the committee's concerns and clarifies the intent of this proposal. Please support to clarify the code regarding continuity requirements of separation walls through attics.



**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This public comment adds a requirement to continue separation walls through enclosed roof overhangs which is common construction practice and is commonly enforced. Since the intent of the code, common construction practice, and common enforcement isn't changed, this proposal will not change the cost of construction.

Public Comment# 3113

## **Proposed Change as Submitted**

**Proponents:** Tim Earl, representing the Gypsum Association (tearl@gbhint.com)

### **2021 International Residential Code**

**Revise as follows:**

**R302.2 Townhouses.** Walls separating *townhouse units* shall be constructed in accordance with Section R302.2.1 ~~or~~ R302.2.2, or R302.2.3 and shall comply with Sections 302.2.3 through 302.2.5.

**Add new text as follows:**

**R302.2.3 Area Separation Walls.** Area separation wall assemblies separating *townhouses* shall consist of the following:

1. A central wall consisting of two (2) 1-inch (25.4 mm) Type X gypsum shaft liner panels inserted between steel H-studs and rated for two hours per ASTM E119, UL 263 or Section 703.3 of the *International Building Code*.
2. A non-fire-resistance rated flanking wall on one or both sides attached to the steel H-studs via aluminum clips set a minimum of 3/4-inch (19 mm) off the central wall. The flanking walls shall consist of minimum 1/2-inch (12.7 mm) gypsum panels attached to minimum nominal 2 x 4 wood studs or minimum 15 mil (0.38 mm) 3-5/8" (92 mm) steel studs.

**R302.2.3.1 Penetrations.** The central wall shall not be penetrated. The non-fire-resistance rated flanking walls shall be permitted to be penetrated as needed to allow for utilities, ducts or vents in the wall cavity.

**Reason:** This proposal provides needed clarification regarding area separation walls and allowable penetrations in the flanking walls, which are not fire-rated.

Adjacent townhomes are separated in one of three ways:

1. Double walls (two 1-hour fire-resistance-rated wall assemblies)
2. A common wall (fire-resistance rated, 1 or 2 hours depending on sprinklers)
3. An "area separation wall" (ASW), consisting of one central two-hour fire-resistance-rated wall with a flanking wall attached with aluminum clips on one or both sides.

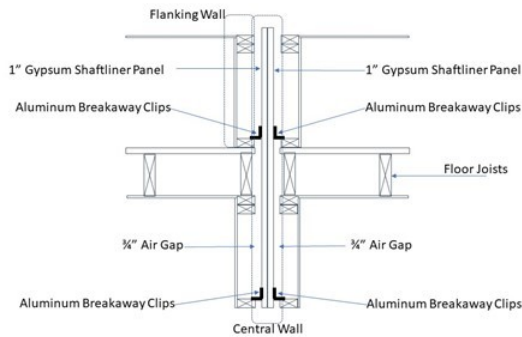
For various reasons, each of these options is more common in different regions of the US. #1 and #2 are already addressed in Section R302.2. ASWs are currently being built, but not mentioned in the code. Further clarification is required, particularly with regards to penetrations of the non-rated flanking walls, as some users have believed that the space between the central fire-rated wall and the non-rated flanking walls cannot contain plumbing or mechanical equipment. In fact, an ICC staff interpretation took this position

In an ASW system, the fire-rated central wall meets all requirements of Section R302.2 by:

- Providing a 2- hour fire resistance rating when built to the applicable design
- Not allowing penetrations
- Maintaining continuity
- Allowing for parapets
- Maintaining structural independence

This proposal provides a clear description of Area Separation Walls and where penetrations are allowed. Specifically, it makes it clear that the non-rated flanking walls may be penetrated, but the fire-rated central wall may not.

The figure below illustrates the typical installed system.



DRAWING NOT TO SCALE – FOR DEMONSTRATIVE PURPOSES ONLY

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. This proposal adds to the IRC a type of wall which is already being built today. It is simply another option.

RB57-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because the terms "area separation walls" and "flanking walls" are confusing without definitions. This proposal would add confusion to what is clear in current text that directs you to listed assemblies for use in this application. There are questions if this prescriptive method would be approved by all the proprietary systems. The transfer requirement is not comprehensively addressed. The proposal is mixing prescriptive and proprietary standards. (Vote: 10-0)

RB57-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R302.2.2**

**Proponents:** Tim Earl, representing the Gypsum Association (tearl@gbhint.com) requests As Modified by Public Comment

**Replace as follows:**

### **2021 International Residential 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 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.

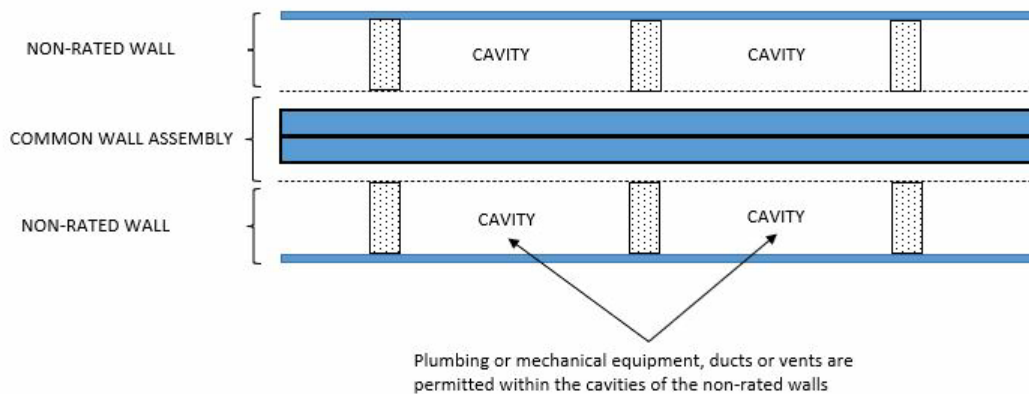
1. Where an automatic sprinkler system in accordance with Section P2904 is provided, the common wall shall be not less than a 1-hour fire-resistance-rated wall assembly tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code.
2. Where an automatic sprinkler system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

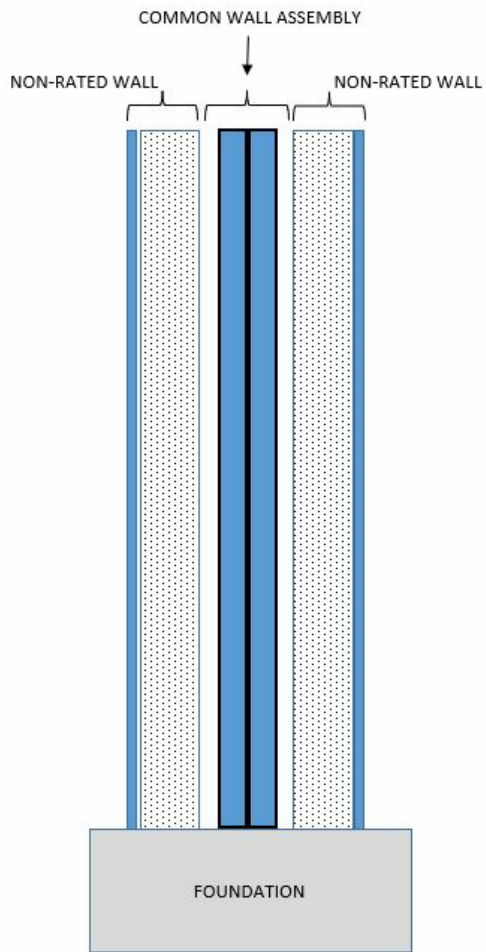
1. Common walls are permitted to extend to and be tight against the inside of the exterior walls if the cavity between the end of the common wall and the exterior sheathing is filled with a minimum of two 2-inch nominal thickness wood studs.
2. Where a common wall has attached non-rated walls, plumbing or mechanical equipment, ducts, or vents shall be permitted in the cavities of the non-rated walls.

**Commenter's Reason:** This Public Comment addresses the concerns raised by opponents and the committee during Committee Action Hearings. It replaces the overly prescriptive language of the original proposal with a simple exception to address the issue, which is the ability to run utilities inside these common wall systems. There is a type of common wall assembly in use called an area separation firewall (ASW), consisting of a central wall typically of two 1" gypsum shaftliner panels in an H-stud system with attached adjacent non-rated walls on each side (see accompanying drawings). These assemblies, including the non-rated adjacent walls, have often been seen as one common wall, meaning mechanical, plumbing, duct and vent systems/equipment have been disallowed in the cavities of the non-rated adjacent walls. However, an engineering evaluation performed in 2019 surveying systems in use today concluded that:

*Unnecessary restrictions have been placed on the H-stud ASW system by not allowing utilities in the adjacent flanking walls. Unlike typical "cavity wall" type common wall construction, utilities installed within the unrated "protected" wall framing of an ASW firewall/party-wall system would not be expected to detract from the 2-hour fire rating when tested per ASTM E119/UL263. In common walls of this type of construction, plumbing, mechanical, duct and vent systems can be placed in the cavity of the non-rated adjacent walls without compromising fire safety.*



Plan View



**Cost Impact:** The net effect of the public comment and code change proposal will decrease the cost of construction. This will decrease the cost of construction by allowing greater flexibility in the routing of mechanical systems, potentially reducing run length, etc.

Public Comment# 3276

## **Proposed Change as Submitted**

**Proponents:** Quyen Thai, representing Washington Association of Building Officials Technical Code Committee (qthai76@gmail.com); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

### **2021 International Residential Code**

**Revise as follows:**

**R302.3 Two-family dwellings.** *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies ~~having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code constructed in accordance with Section R302.3.1 through R302.3.3.~~ Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. ~~Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.~~

**Exceptions:**

- ~~1. A fire-resistance rating of  $\frac{1}{2}$  hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.~~
- ~~2. Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than  $\frac{5}{8}$ -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 wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than  $\frac{1}{2}$ -inch (12.7 mm) gypsum board or equivalent.~~

**Add new text as follows:**

**R302.3.1 Separation.** *Dwelling units* in two-family *dwellings* shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E 119, UL 263 or Section 703.3 of the *International Building Code*.

**Exception:** A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.

**R302.3.2 Continuity.** Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the *exterior wall*, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

**Exception:** Wall assemblies need not extend through attic spaces where the ceiling is protected by 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 wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.

**Revise as follows:**

**R302.3.3 ~~R302.2.4~~ Supporting construction.** Where floor assemblies are required to be fire-resistance rated by Section R302.3, the supporting construction of such assemblies shall have an equal or greater fire-resistance rating.

**Reason:** The intent of this change is to pull out the construction requirement of the common wall as a subsection to align with proper code location. There is already a construction subsection in R302.3.1 and this just creates another subsection that discusses the construction of the common wall. All three subsections are not new language to the code but rather a reorganization.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
There is no cost impact to this proposal because the language did not change. This is just a reorganization to create better readability.

RB61-22

## **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

**R302.3.1 Separation.** *Dwelling units* in two-family *dwellings* shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E 119, UL 263 or Section ~~703.3~~ 703.2.2 of the *International Building Code*.

**Exception:** A fire-resistance rating of 1/2 hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.

**Committee Reason:** The modification was a correction in the referenced section. This proposal is reorganization of the current requirements that adds clarity. There were concerns that Section R302.3.2 would disallow platform construction. (Vote: 7-3)

RB61-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R302.3.2

**Proponents:** Jason Smart, representing American Wood Council (jsmart@awc.org) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

**R302.3.2 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. ~~Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.~~

**Exception:** Wall assemblies need not extend through attic spaces where the ceiling is protected by 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 wall assembly separating the dwellings and the structural framing supporting the ceiling is protected by not less than 1/2-inch (12.7 mm) gypsum board or equivalent.

**Commenter's Reason:** These modifications further clarify that the intent is to require continuity of the required fire-resistance rating of the horizontal or vertical assembly. This is consistent with the changes made to address platform construction under FS19-21.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The cost impact statement for RB61-22 is neutral, and the modification presented in this public comment simply clarifies the intent of the section on continuity. This modification is intended to use terminology that works with platform construction, where horizontal assemblies support walls above, and are supported by walls of the story below.

**Staff Analysis:** RB61 and RB63 addresses requirements in a different or contradicting manner. The membership is urged to make their intention clear with their actions on these proposals.

Public Comment# 3115

### **Public Comment 2:**

**Proponents:** Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests Disapprove

**Commenter's Reason:** I will be asking that this proposal be heard after RB63, which also is re-writing the same section with additional requirements. If the membership supports RB63, then RB61 would not be necessary.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. No change to code.

**Staff Analysis:** RB61 and RB63 addresses requirements in a different or contradicting manner. The membership is urged to make their intention clear with their actions on these proposals.

Public Comment# 3398

### **Public Comment 3:**

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org) requests Disapprove



**Commenter's Reason:** Portions of the proposed provisions in RB61 conflict with RB63, which was approved as submitted. For example, proposed Section R302.3.2 (Continuity) conflicts with Section R302.3.3 of RB63. The proposed language in RB61 would require wall assemblies to be continuous from the foundation to the underside of the roof sheathing. This could be interpreted as precluding platform construction, in which the exterior walls are discontinuous at each story level where the floor/ceiling assembly bears on the wall below and the wall of the story above bears on the floor/ceiling assembly. The intent of the continuity provisions in both the IBC and the IRC is to ensure continuity of fire-resistance rating, rather than continuity of the wall. This is more accurately addressed in RB63.

It should also be noted that the committee did express concern at the Committee Action Hearings that proposed Section R302.3.2 "would disallow platform construction."

Furthermore, the proposed continuity language in RB61 would also conflict with 2024 IBC language that was approved in the Group A cycle under FS19-21.

For these reasons, we request disapproval of RB61 in favor of RB63.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.

**Staff Analysis:** RB61 and RB63 addresses requirements in a different or contradicting manner. The membership is urged to make their intention clear with their actions on these proposals.

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Public Comment# 3116

## **Proposed Change as Submitted**

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

### **2021 International Residential Code**

**Revise as follows:**

**R302.3 Two-family dwellings.** *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. ~~Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.~~

**Exceptions:**

1. A fire-resistance rating of  $\frac{1}{2}$  hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.
2. Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than  $\frac{5}{8}$ -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 wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than  $\frac{1}{2}$ -inch (12.7 mm) gypsum board or equivalent.

**Add new text as follows:**

**R302.3.2 Continuity.** The fire-resistance-rated floor/ceiling and wall assemblies separating dwelling units shall include extensions through and separating attached enclosed accessory structures. The fire-resistance rated assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

**Reason:** This proposal aligns the rated assembly requirements for a two-family dwelling in R302.3 with the current requirements for townhouses in R302.2.3. Rated assembly extensions through and separating attached enclosed accessory structures are not currently addressed for two-family dwellings, which allows for the creation of a discontinuity in the rated barrier.

Individual dwelling units may be separated in a two-family dwelling by a horizontal floor assembly (stacked duplex) or the more traditional vertical wall assemblies. Where attached enclosed accessory structures project above a horizontal or vertical assembly, careful consideration is required in the planning and construction to extend the assembly through/around the accessory structure in order to maintain the rated assembly continuity.

Therefore, this proposal adds a new sub-section, R302.3.2, for Continuity. The new 302.3.2 for Continuity includes the last sentence of R302.3 and the text required for townhouses to the two-family dwelling section since the need to maintain such separation is equally necessary for both building types.

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 2020 and 2021 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 code change proposal will increase the cost of construction

This is a technical change to two-family dwellings, despite the fact that the original intent has always been for the separation assemblies to continue through two-family attached accessory structures. Depending on the layout, this may require a longer wall to separate the units.

RB62-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because attached accessory structures are part of the structure. The accessory structure is defined as detached. There are concerns about the fire separation requirements in the proposal. This could be read to prohibit common garages for duplex units. (Vote: 8-2)

RB62-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R302.3, R302.3.2**

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

**R302.3 Two-family dwellings.** *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not.

#### **Exceptions Exception:**

- 1- A fire-resistance rating of  $\frac{1}{2}$  hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.
- 2- ~~Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than  $\frac{5}{8}$ -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 wall assembly separating the dwellings and the structural framing supporting the ceiling is protected by not less than  $\frac{1}{2}$ -inch (12.7 mm) gypsum board or equivalent.~~

**R302.3.2 Continuity.** The fire-resistance-rated floor/ceiling and wall assemblies separating dwelling units shall include extensions through and separating attached enclosed ~~accessory structures-rooms~~. The fire-resistance rated assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

#### **Exceptions:**

1. Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than  $\frac{5}{8}$  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 wall assembly separating the dwellings and the structural framing supporting the ceiling is protected by not less than  $\frac{1}{2}$ -inch (12.7 mm) gypsum board or equivalent.
2. The fire-resistance-rated floor/ceiling and wall assemblies are not required to extend through common rooms constructed in accordance with Section R302.3.3

**Commenter's Reason:** This proposal addresses the fire safety concern where two-family dwelling units have attached areas that fall outside of the definition for a dwelling unit that must be separated by the fire-rated assemblies to maintain continuity.

This public comment addresses the concerns from the committee by: 1. As the committee had a problem with attached accessory structures, This PC removing accessory and clarifies that the new section addresses "separating attached enclosed rooms" such as garages, mechanical closets and other storage spaces. "Room" is also used in the approved RB64-22.

2. The committee has a concern about "This could be read to prohibit common garages for duplex units." This PC incorporates the approved RB64-22, which allows for "Common" accessory rooms to simply be separated from the rest of the dwelling unit(s) rather than have all accessory rooms be split and dedicated to individual units. 3. This PC also moves the related exception #2 from the existing R302.3 to the new section R302.3.2.

The BCAC recognized that with the action on RB64-22, our proposal needed to include an exception that provides for those new provisions, while still addressing the original concern. The public comment ties everything together so that the code will work cleanly regardless as to whether there are adjacent spaces, such as garages, that are dedicated to the individual units or common to both, so that there is less confusion for the code user, consistency in application, and fully maintains the intended level of protection from one dwelling unit to the other.

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction

This is a technical change to two-family dwellings, despite the fact that the original intent has always been for the separation assemblies to continue through two-family attached rooms and spaces. The cost of construction will be impacted as below:

1) No increase in cost: In most cases where the intent has already been followed, there will not be an increase in construction cost.

2) Could cause increase in cost: where the code may have been misinterpreted to allow the separation to only be through the interior of the living space only, there will be additional cost in creating a 1 hour separation wall through the other spaces, such as garages, and ensuring that such walls meet vertical continuity and penetration requirements.

With the addition of the provisions of the approved RB64 in conjunction with the new exception provided for in this PC, flexibility of design and allowances for common rooms may decrease the cost of construction in those instances.

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Public Comment# 3094

# RB63-22

## **Proposed Change as Submitted**

**Proponents:** Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

### **2021 International Residential Code**

**Delete and substitute as follows:**

**R302.3 Two-family dwellings.** *Dwelling units* in two-family dwellings shall be separated from each other by wall and floor assemblies having not less than a 1-hour fire-resistance rating where tested in accordance with ASTM E119, UL 263 or Section 703.2.2 of the International Building Code. Such separation shall be provided regardless of whether a *lot line* exists between the two *dwelling units* or not. Fire-resistance-rated floor/ceiling and wall assemblies shall extend to and be tight against the exterior wall, and wall assemblies shall extend from the foundation to the underside of the roof sheathing.

#### **Exceptions:**

1. A fire-resistance rating of  $\frac{1}{2}$  hour shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904.
2. Wall assemblies need not extend through attic spaces where the ceiling is protected by not less than  $\frac{5}{8}$ -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 wall assembly separating the *dwellings* and the structural framing supporting the ceiling is protected by not less than  $\frac{1}{2}$ -inch (12.7 mm) gypsum board or equivalent.

**R302.3 Two-family dwellings.** *Dwelling units* in two-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 two *dwelling units*.

**Add new text as follows:**

**R302.3.1 Dwelling unit separation.** The two 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 1/2 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 a continuous and complete separation 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:

1. The foundation.
2. A horizontal assembly complying with Section 302.3.2
3. The underside of roof sheathing.
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.

**Revise as follows:**

**R302.3.4 R302.3.1 Supporting construction.** ~~Where floor assemblies are required to be fire-resistance rated by Section R302.3, the supporting construction of such assemblies have~~ Vertical and horizontal assemblies separating dwelling units shall be supported by construction having an equal or greater fire-resistance rating.

**Add new text as follows:**

**R302.3.5 Vertically stacked dwelling units.** Where one dwelling unit in a two-family dwelling is located above the other 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.

**Reason:** This proposal accomplishes two things. First, it provides a cleanup and update of Section R302.3, including moving the exceptions to the main code text. Provisions have been reorganized and divided into subsections to more clearly delineate current requirements, and the section has been broadened to recognize that separations between dwelling units might not be limited to either a floor assembly or a wall assembly. The current text restricts horizontal assemblies to only include floors, as opposed to floor-ceiling or ceiling-only assemblies, and it fails to clearly recognize and accommodate that separations may involve a combination of vertical and horizontal elements, which always occurs if an interior stairway is used as the means of egress for the upper unit. Terminology in IBC Section 707.3.10 has been used as guidance for the proposed IRC text. Second, Section 302.3.5 has been added to recognize that stacked duplexes are inherently more hazardous than side-by-side duplexes, particularly with respect to the upper unit due to the tendency of smoke and flames to spread vertically, which increases the risk of charging the upper unit with smoke and cutting off the means of egress and the means of escape if/when fire vents through exterior doors or windows. Providing a smoke separation, in addition to the current requirement for a fire-rated separation, will delay smoke transmission to the upper unit. The proposed text related to construction of the smoke separation is derived from the IBC definition of "smoke partition," which establishes the performance requirement "...is constructed to limit the transfer of smoke."

Providing a remote sounder for the opposite dwelling unit will allow more escape time for occupants who are not in the unit of origin, recognizing that smoke alarms are designed to provide sufficient warning to escape an incipient fire but not necessarily a well-developed fire spreading from another part of the building. Additional warning is particularly important where: 1) The downstairs unit occupants are not home or are home but don't or are unable to warn the upstairs occupants, and 2) The upstairs unit is two stories tall, perhaps even with a habitable attic above, which increases escape distance and the associated escape time, particularly for individuals who may have difficulty rapidly traversing stairs or using a means of escape window that would be 3 or 4 stories above grade.

For disclosure, I am a consultant to NFSA, but this proposal is not submitted on NFSA's behalf and was not provided to NFSA prior to submittal. It is submitted as a personal proposal based on my personal interest in this topic.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. Technically, the IRC requires all buildings to be sprinklered, so this doesn't have a cost impact with respect to the model code. However, in jurisdictions that choose to amend the IRC by removing the sprinkler requirement, there would be a cost. Alternately, the increased flexibility provided for using additional types of separation assemblies and a combination of vertical and horizontal assemblies may provide a reduction in the cost of construction.

RB63-22

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## **Public Hearing Results**

### **Committee Action:**

**As Submitted**

**Committee Reason:** The proposal addresses the continuity of horizontal and vertical separation for vertically stacked units. This is not addressed in the current text. This provides flexibility in design options. This would also address current housing needs that involves separating existing housing into two units. (Vote: 7-3)

RB63-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R302.3.5**

**Proponents:** Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

**Modify as follows:**

## **2021 International Residential Code**

**R302.3.5 Vertically stacked dwelling units.** Where one dwelling unit in a two-family dwelling is located above the other 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, such as solid materials, self-closing door openings, sealed penetrations, and other approved methods that inhibit air flow.
2. A notification appliance connected to smoke alarms in the other dwelling unit shall be provided in each dwelling unit.

**Commenter's Reason:** A comment made at the committee hearing requested that additional clarity be provided with respect to the proposed requirement to limit smoke transfer. Although the original proposed text mirrored text in the IBC, and was therefore considered to be sufficient for inclusion in the IRC, I have submitted this public comment to provide an opportunity for the membership to consider whether examples of compliance methods might improve the proposed text. To be clear, I fully support APPROVAL AS SUBMITTED for this proposal, but I can also support APPROVAL AS MODIFIED by this public comment if that is preferred by the membership.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The public comment simply adds clarity and options to the original text that was approved.

**Staff Analysis:** RB61 and RB63 addresses requirements in a different or contradicting manner. The membership is urged to make their intention clear with their actions on these proposals.

Public Comment# 3399

## **Public Comment 2:**

### **IRC: R302.3.5**

**Proponents:** Jenifer Gilliland, representing Seattle Department of Construction and Inspections (jenifer.gilliland@seattle.gov); Richard Pelling, representing Seattle Department of Construction and Inspections (richard.pelling@seattle.gov); Micah Chappell, representing Seattle Department of Construction & Inspections (micah.chappell@seattle.gov) requests As Modified by Public Comment

**Modify as follows:**

## **2021 International Residential Code**

~~**R302.3.5 Vertically stacked dwelling units.** Where one dwelling unit in a two-family dwelling is located above the other 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.~~

**Commenter's Reason:** This PC includes two changes to the original proposal that was approved at the committee action hearings 7-3. While the proposal makes it clear that dwelling units in two-family dwellings are required to have vertical or horizontal separation or a combination of the two, it goes too far in two instances:

1. R302.3.5 Vertically stacked dwelling units (where a P2904 automatic sprinkler system is not provided). The proponent's reason statement says:

"stacked duplexes are inherently more hazardous than side-by-side duplexes, particularly with respect to the upper unit due to the tendency of smoke and flames to spread vertically, which increases the risk of charging the upper unit with smoke and cutting off the means of egress and the means of escape if/when fire vents through exterior doors or windows."

This is a theoretical statement based on general fire science, but the proponent provides no data or even anecdotal evidence to support that it has been a problem. It seems overly punitive on these types of structures and buys very little building safety for the cost increase for the vague requirement of "limiting the transfer of smoke". At least in the IBC there is a definition for smoke partition. Now building officials will need to determine what this means in the context of the IRC. It also implies that the required fire-resistive construction has no impact on the transfer of smoke between units. If all of your assemblies (horizontal, vertical or combination) are required to extend to and be tight against each other per 302.3.3.1 and 302.3.3.2 for more traditional duplex construction (side by side units), and there is no concern about smoke transfer in these types of units, what about stacked units lends itself to more smoke transfer?

2. Providing a remote sounder for the opposite dwelling unit will result in an increase of annoying neighbor burnt popcorn alarms with very little additional safety. It is quite likely that these sounders would be disabled.

Because of these issues, this PC recommends striking Section R302.3.5 from the proposal.

**Cost Impact:** The net effect of the public comment and code change proposal will decrease the cost of construction. By adopting the public comment, the increased costs that would occur because of new requirements for stacked units would be reduced.

**Staff Analysis:** RB61 and RB63 addresses requirements in a different or contradicting manner. The membership is urged to make their intention clear with their actions on these proposals.

Public Comment# 3319

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### ***Public Comment 3:***

#### **IRC: R302.3.3**

**Proponents:** Jason Smart, representing American Wood Council (jsmart@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org) requests As Modified by Public Comment

**Modify as follows:**

## **2021 International Residential 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 ~~a continuous and complete separation~~ between the dwelling units.

**Commenter's Reason:** This modification further clarifies that the intent is to require continuity of the required fire-resistance rating of the horizontal or vertical assembly. This is consistent with the changes made to address platform construction under FS19-21.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The cost impact statement for RB63-22 is neutral, and the modification presented in this public comment simply clarifies the intent of the section on continuity. This modification is intended to use terminology that works with platform construction, where horizontal assemblies support walls above, and are supported by walls of the story below.

**Staff Analysis:** RB61 and RB63 addresses requirements in a different or contradicting manner. The membership is urged to make their intention clear with their actions on these proposals.

Public Comment# 3287

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## RB64-22

### ***Proposed Change as Submitted***

**Proponents:** Quyen Thai, representing Washington Association of Building Officials Technical Code Committee (qthai76@gmail.com); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

### **2021 International Residential Code**

**Add new text as follows:**

**R302.3.2 Common accessory rooms.** A common accessory room shall be separated as required by Table R302.3.2. Openings in a common accessory room shall comply with Section R302.3.2.1. Attachment of gypsum board shall comply with Table R702.3.5. The wall separation provisions of Table R302.3 shall not apply to common accessory room walls that are perpendicular to the adjacent dwelling unit wall.

**TABLE R302.3.2 DWELLING-COMMON ACCESSORY ROOM SEPARATION**

| <b><u>SEPARATION</u></b>  | <b><u>MATERIAL</u></b>  |
|---|---|
| <u>From the dwelling units and attics</u>   | <u>Not less than 1/2-inch gypsum board or equivalent applied to the accessory room side wall</u>                                  |
| <u>From habitable rooms above or below the common accessory room</u>  | <u>Not less than 5/8-inch Type X gypsum board or equivalent</u>   |
| <u>Structures supporting floor/ceiling and wall assemblies used for separation required by this section</u> | <u>Not less than 1/2-inch gypsum board or equivalent</u>  |
| <u>Common accessory rooms located less than 3 feet from a dwelling unit on the same lot</u>                 | <u>Not less than 1/2-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area</u> |

For SI: 1 inch=25.4 mm, 1 foot=304.8 mm

**R302.3.2.1 Opening protection.** Openings from a common accessory room or area directly into a room used for sleeping purposes shall not be permitted. Other openings between the shared common accessory room or area and dwelling units shall be equipped with solid wood doors not less than 1 3/8 inches in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches thick, or a fire door assembly with a 20-minute fire-protection rating, equipped with a self-closing or automatic-closing device.

**R302.3.2.2 Duct penetration.** Ducts penetrating the walls or ceilings separating the *dwelling* from the common accessory room 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 common accessory room.

**R302.3.2.3 Other penetrations.** Penetrations through the walls, ceiling, and floor level separation required in Section R302.3.2 shall be protected as required by Section R302.11, Item 4.

**Reason:** Designers are beginning to incorporate optional design common accessory rooms such as common laundry facilities and storage rooms that are connected to both dwelling units in their design. The IRC is currently silent on such a room but due to potential storage hazards as well as gas appliances of the washer/dryers and other appliances, there is a need to provide clear directions to protect the dwelling units from a shared common accessory space. The proposal is to treat these common rooms similar to garages and therefore, much of the proposed language draws from the dwelling-garage provision of the code.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. Since this is just a clarifying addition where the code is silent, several jurisdictions have already required the construction of the separation wall between habitable space and their accessory spaces. Therefore no increase in cost is noted.

RB64-22

## **Public Hearing Results**

**Committee Action:**

**As Submitted**

**Committee Reason:** The proposal addressed shared spaces in duplexes (e.g., bike storage, laundry facilities) where the code is currently silent. The proposal provides appropriate separation requirements. (Vote: 9-1)

RB64-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R302.3.2, TABLE R302.3.2, R302.3.2.1, R302.3.2.2, R302.3.2.3

**Proponents:** Jenifer Gilliland, representing Washington Association of Building Officials (jenifer.gilliland@seattle.gov); Richard Pellingier, representing Washington Association of Building Officials (richard.pellingier@seattle.gov); Micah Chappell, representing Seattle Department of Construction & Inspections (micah.chappell@seattle.gov) requests As Modified by Public Comment

**Modify as follows:**

## 2021 International Residential Code

**R302.3.2 Common Shared accessory rooms.** A ~~common~~ Shared accessory room-rooms shall be separated from each individual dwelling unit ~~as required by~~ in accordance with Table R302.3.2. Openings ~~in a common~~ between the shared accessory room and dwelling unit shall comply with Section R302.3.2.1. Attachment of gypsum board shall comply with Table R702.3.5. ~~The wall separation provisions of Table R302.3 shall not apply to common accessory room walls that are perpendicular to the adjacent dwelling unit wall.~~

**TABLE R302.3.2 DWELLING-~~COMMON~~ 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 <del>common</del> <u>shared</u> accessory room                          | Not less than 5/8-inch Type X gypsum board or equivalent  |
| Structures supporting floor/ceiling <del>and wall</del> assemblies used for separation required by this section | Not less than 1/2-inch gypsum board or equivalent   |
| <del>Common accessory rooms located less than 3 feet from a dwelling unit on the same lot</del>                 | <del>Not less than 1/2-inch gypsum board or equivalent applied to the interior side of exterior walls that are within this area</del> |

For SI: 1 inch=25.4 mm, 1 foot=304.8 mm

**R302.3.2.1 Opening protection.** Openings from a ~~common~~ shared accessory room or area directly into a room used for sleeping purposes shall not be permitted. Other openings between the shared ~~common~~ accessory room or area and dwelling units shall be equipped with solid wood doors not less than 1 3/8 inches in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches thick, or a fire door assembly with a 20-minute fire-protection rating, equipped with a self-closing or automatic-closing device.

**R302.3.2.2 Duct penetration.** Ducts penetrating the walls or ceilings separating the *dwelling* from the ~~common~~ shared accessory room 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 ~~common~~ shared accessory room.

**R302.3.2.3 Other penetrations.** Penetrations through the walls, ceiling, and floor level separation required in Section R302.3.2 shall be protected as required by Section R302.11, Item 4.

**Commenter's Reason:** This PC is being submitted by the proponents of the original code proposal and refines the original proposal by:

- Replacing the word "common" throughout the proposal with an easily understood, plain language substitute, "shared".
- Adding language to clarify that the shared accessory room must be separated from each individual dwelling unit that shares the room.
- Eliminating the last sentence of the proposed R302.3.2 because it isn't needed and is confusing.
- Eliminating "and wall" in the fourth row of the table as it duplicates the requirement in the second row of the table for separation from the dwelling units and attics.
- Eliminating the last row of TABLE R302.3.2 because the information, originally taken from the garage separation provisions, isn't relevant in this situation where the shared accessory room is between the two units which are themselves within the two-family dwelling.

Designers are beginning to incorporate shared accessory rooms such as laundry facilities and storage rooms that are connected to both dwelling units in their design for two-family dwellings. The IRC is currently silent on such rooms, but due to potential storage hazards and the fossil fuel supplied to washer/dryers and other appliances, clear direction is needed to protect the dwelling units from a shared accessory space. The proposal treats these shared rooms in the same way that the separation of shared garages from dwelling units is handled in the code. As a result, much of the proposed language draws from the dwelling-garage provisions of the code.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This public comment would make it clearer how to protect these shared accessory rooms between units in a two-family dwelling. Right now, the topic is unaddressed by the code which means jurisdictions may be under- or over-regulating them. So, depending on the jurisdiction this could be an increase or decrease in cost.

Public Comment# 3286

## **Public Comment 2:**

**IRC:** R302.3.2, TABLE R302.3.2, R302.3.2.1, R302.3.2.2, R302.3.2.3

**Proponents:** Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

**Modify as follows:**

## **2021 International Residential Code**

**R302.3.6 ~~R302.3.2~~ Common accessory rooms.** A common accessory room shall be separated as required by Table ~~R302.3.2~~ R302.3.6. Openings in a common accessory room shall comply with Section ~~R302.3.2.1~~ R302.3.6.1. Attachment of gypsum board shall comply with Table R702.3.5. The wall separation provisions of Table ~~R302.3.2~~ R302.3.6 shall not apply to common accessory room walls that are perpendicular to the

adjacent dwelling unit wall.

**TABLE ~~R302.3.6~~ ~~R302.3.2~~ DWELLING-COMMON 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 common accessory room  | Not less than 5/8-inch Type X gypsum board or equivalent   |
| Structures supporting floor/ceiling and wall assemblies used for separation required by this section | Not less than 1/2-inch gypsum board or equivalent  |
| Common accessory rooms 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

**R302.3.6.1 ~~R302.3.2.1~~ Opening protection.** Openings from a common accessory room or area directly into a room used for sleeping purposes shall not be permitted. Other openings between the shared common accessory room or area and dwelling units shall be equipped with solid wood doors not less than 1 3/8 inches in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches thick, 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 ~~R302.3.2.2~~ Duct penetration.** Ducts penetrating the walls or ceilings separating the *dwelling* from the common accessory room 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 common accessory room.

**R302.3.6.3 ~~R302.3.2.3~~ Other penetrations.** Penetrations through the walls, ceiling, and floor level separation required in Section ~~R302.3.2–R302.3.6~~ shall be protected as required by Section R302.11, Item 4.

**Commenter's Reason:** Editorial clarification of how this section is best integrated into the rewrite accomplished by RB63-22.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction editorial

Public Comment# 3397

## **Proposed Change as Submitted**

**Proponents:** Chad Sievers, representing Department of State (chad.sievers@doh.ny.gov); Jeanne Rice, representing NYSDOS (jeanne.rice@doh.ny.gov)

### **2021 International Residential Code**

**Add new text as follows:**

**R302.3.2 Opening Protectives.** Where there are openings in the fire-rated wall or floor assemblies required by Section R302.3 the opening shall have a fire-protection rating of 3/4 hour as determined by tests specified in Section 716 of the *International Building Code*. Doors shall be self-latching and equipped with a self-closing or automatic closing device.

**Exception:** 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 (35mm) thick, or a door with a 20-minute fire protection rating shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904. Doors shall be self-latching.

**Reason:** The code is currently silent on openings between dwelling units in a two-family dwelling. This silence neither prohibits nor allows doorways between the units, leaving the code enforcement officer unsure of their requirements when one is proposed. Often the code enforcement officer must use personal discretion to decide what is appropriate. The wall between the dwelling units is required to have a one-hour fire protection rating period to ensure the separation between the dwellings is not compromised.

There are several occasions when door openings between dwelling units of two-family dwellings are appropriate. The first instance is most common: the dwelling units share a common foyer for their entrance, either side-by-side unit entrances on a single story with a shared vestibule entrance; or a two-story building with a vestibule entrance on the first floor, an entrance to the first floor unit on the ground floor, and an entrance to the second floor unit at the top of a stairway that is within the vestibule. Another instance is the addition of a full mother-in-law apartment to a single-family dwelling unit. Less commonly, a single-family dwelling may be converted to a two-family dwelling with the option to convert the home back to a single-family dwelling depending on the occupant. Finally, other situations can arise where the occupants, typically extended families, may wish to share living space in a manner similar to the mother-in-law apartment situation but with a more traditional two-family home.

To stay consistent with the code, the language is mirrored after R302.3 including the leniency for sprinklers. The fire protection ratings were referenced from Table 716.1(2) of the IBC for "Other Fire Partitions" and language was utilized from R302.5 to maintain the prescriptive nature of the code and the allowance of "practical solutions". A requirement for a self-closing mechanism was not included because

**Cost Impact:** The code change proposal will increase the cost of construction

The cost of a two-family home may slightly increase, but only when a door between the two units is installed, as the door is now specifically required to be a fire-rated door. This code change will not have any impact on most two-family dwellings because and openings are not typically installed within the fire-rated wall assembly between dwelling units.

RB66-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal was disapproved because a door between units is a security issue in a two-family dwelling unit. If there is a door between the units for a multi-generational situation, this is a single dwelling unit. (Vote: 6-5)

RB66-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R302.3.2

**Proponents:** Chad Sievers, representing Department of State (chad.sievers@doh.ny.gov) requests As Modified by Public Comment

Modify as follows:

## 2021 International Residential Code

**R302.3.2 Opening Protectives.** Where there are openings in the fire-rated wall or floor assemblies required by Section R302.3 the opening shall have a fire-protection rating of 3/4 hour as determined by tests specified in Section 716 of the *International Building Code*. Doors shall be independently lockable from either side, self-latching, and equipped with a self-closing or automatic closing device.

**Exception:** 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 (35mm) thick, or a door with a 20-minute fire protection rating shall be permitted in buildings equipped throughout with an automatic sprinkler system installed in accordance with Section P2904. Doors shall be independently lockable from either side, self-latching, and equipped with a self-closing or automatic closing device.

**Commenter's Reason:** At the CAH the committee expressed concerns about the security with the doors this public comment addresses their concerns by requiring that both sides have independent locks; and extends the requirements for a self-closing devise to the scenario with a sprinkler.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The code is silent on openings and this provision will just give requirements when the designer chooses to install a door.

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Public Comment# 3504

### **Public Comment 2:**

**Proponents:** Jeanne Rice, representing NYSDOS (jeanne.rice@dos.ny.gov) requests As Submitted

**Commenter's Reason:** As two-family units adapt to different user needs the likely hood of a two-family home being comingled for a portion of the building's design life is high. potentially the mother-in-law apartment, children in their teens or twenties, siblings, or another extended family member or even a family. In reality, two-family homes that join are in our communities let us help make them safe.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This is an option that is not currently addressed in the code and the doorway is not mandated.

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Public Comment# 3248



## RB69-22

### **Proposed Change as Submitted**

**Proponents:** China Clarke, representing NYS DOS Division of Building Standards and Codes (china.clarke@dos.ny.gov); Gerard Hathaway, representing self (gerard.hathaway@dos.ny.gov)

## **2021 International Residential Code**

**Revise as follows:**

**R302.6 ~~Dwelling-garage~~ Garage fire separation.** ~~The garage-~~ Private garages attached to dwelling units and detached garages containing habitable space shall be separated as required by Table R302.6. 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 shall not apply to garage walls that are perpendicular to the adjacent *dwelling unit* wall.

**TABLE R302.6 DWELLING-GARAGE SEPARATION <sup>a</sup>**

| <b>SEPARATION</b>   | <b>MATERIAL</b>  |
|---|--|
| From the residence and attics <sup>b</sup>  | Not less than 1/2-inch gypsum board or equivalent applied to the garage side   |
| From habitable rooms above the garage   | Not less than 5/8-inch Type X gypsum board or equivalent   |
| Structure(s) 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.

a. Includes habitable space-detached garage separation.

b. Includes the separation from habitable rooms and associated attics attached to detached garages.

**Reason:** The residential code allows for structures accessory to buildings constructed to the residential code to also be constructed to the residential code; however, the residential code is then lacking some essential safety provisions that are necessary to make these detached accessory structures safe.

In this code change proposal, we are addressing the concern of a detached accessory garage structure that may also have habitable space. In New York, we frequently see large, detached garages that are accessory to single-family homes, but with habitable space within them, such as recreational rooms, private art studios, exercise spaces, or even sleeping rooms.

Without this code change proposal, those garage spaces are not required to have any fire separation from the habitable space or vice versa. Without first interpreting that the accessory nature of the spaces means they are all in fact part of the dwelling, therefore triggering the dwelling garage separation requirements. This change simply requires any habitable space attached to both a detached and attached garage built to the residential code have the same fire separation.

**Cost Impact:** The code change proposal will increase the cost of construction

Some jurisdictions either already interpret the habitable space of a detached accessory garage to be part of the dwelling or do not permit habitable space in a detached accessory garage. In these instances, the cost of construction would not increase, or, in the case of the second option where it is not permitted, the cost of construction would likely decrease due to the building needing to be constructed to the more stringent International Building Code.

However, if jurisdictions interpret that the code as written permits habitable spaces in detached accessory garage structures to not need fire separation, the cost of construction would increase between \$1 and \$2 per square foot of wall/ceiling to provide the separation. This would vary widely based on the size of the spaces being separated and the region in which the construction is occurring.

RB69-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because the proposal is not clear. What is a private garage in the context of the IRC. Putting a workshop in a garage does not increase the hazard in the garage. The current language does not distinguish between detached and attached garages. (Vote: 10-0)

RB69-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R302.6, TABLE R302.6**

**Proponents:** China Clarke, representing NYS DOS Division of Building Standards and Codes (china.clarke@dos.ny.gov) requests As Modified by

**Modify as follows:**

## **2021 International Residential Code**

**R302.6 Garage fire separation.** ~~Private garages~~ Garages attached to dwelling units and detached garages containing habitable space shall be separated from dwelling units as required by Table R302.6. Garages that contain habitable space, and are located more than 3 feet from a dwelling unit on the same lot, shall be separated from habitable space as required by Table R302.6. 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 shall not apply to garage walls that are perpendicular to the adjacent *dwelling unit* wall.

**TABLE R302.6 DWELLING-GARAGE SEPARATION <sup>a</sup>**

| SEPARATION  | MATERIAL   |
|---|--|
| <b><u>Dwelling-garage separation</u></b>  |  |
| From the residence and attics <sup>b</sup>  | Not less than 1/2-inch gypsum board or equivalent applied to the garage side   |
| From habitable rooms above the garage   | Not less than 5/8-inch Type X gypsum board or equivalent   |
| Structure(s) 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 |
| <b><u>Garages containing habitable space and located more than 3 feet from a dwelling unit, but on the same lot</u></b> |  |
| From <u>habitable space</u> adjacent to the garage  | <u>Not less than 1/2-inch gypsum board or equivalent applied to the garage side</u>  |
| From <u>habitable space</u> above the garage  | <u>Not less than 5/8-inch Type X gypsum board or equivalent</u>  |
| <u>Structure(s) supporting floor/ceiling assemblies used for separation required by this section</u>                    | <u>Not less than 1/2-inch gypsum board or equivalent</u>   |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

~~a. Includes habitable space detached garage separation.~~

~~b. Includes the separation from habitable rooms and associated attics attached to detached garages.~~

**Commenter's Reason:** This proposal was modified to address concerns that arose during the committee action hearing. We broadened the scope of section 302.6 by removing the word “dwelling” from the Section’s title and added specific provisions to the body of the section. Although we changed the title of the section, the opening and penetration protection provisions contained in the section will remain applicable only to dwelling-garage construction, per the title and content of that section.

We removed the footnotes that were added previously. Instead, we added rows to the table that address our proposed provisions. We separated the table into two sections, one for dwelling garage separations, and the other for habitable space within detached garages.

We refrained from using the term “detached garage” and “private garage” in the proposed code language, as they are not defined terms.

Some committee members believe that the life safety concern of having habitable space within a detached garage would likely be caught and addressed by the Code Official during the permitting process. However, without the addition of this language there is no basis for a Code Official to reject a permit or request that plans be modified and resubmitted.

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction. Some jurisdictions either already interpret the habitable space of a detached accessory garage to be part of the dwelling or do not permit habitable space in a detached accessory garage. In these instances, the cost of construction would not increase, or, in the case of the second option where it is not permitted, the cost of construction would likely decrease due to the building needing to be constructed to the more stringent International Building Code.

However, if jurisdictions interpret that the code as written permits habitable spaces in detached accessory garage structures to not need fire separation, the cost of construction would increase between \$1 and \$2 per square foot of wall/ceiling to provide the separation. This would vary widely based on the size of the spaces being separated and the region in which the construction is occurring.

Public Comment# 3425

## **Proposed Change as Submitted**

**Proponents:** Jason Smart, representing American Wood Council (jsmart@awc.org); David Tyree, representing American Wood Council (dtyree@awc.org); Raymond O'Brocki, representing American Wood Council (robrocki@awc.org)

### **2021 International Residential Code**

**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<sup>2</sup>) 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 in accordance with ASTM D8391.

**Add new standard(s) as follows:**

## **ASTM**

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

### D8391-22

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

**Reason:** To provide code and fire officials with a standardized approach to "... *approve floor assemblies as demonstrating equivalent fire performance...*" as permitted by Exception #4, a new standard, *ASTM D8391-22, Specification for Demonstrating Equivalent Fire Performance of Wood-Based Floor Framing Members to Unprotected 2x10 Dimension Lumber or Equal-Sized Structural Composite Lumber* has been developed. The ASTM standard referenced in this proposal uses the same method as currently used by the International Code Council Evaluation Service (ICC-ES). Adding the standard to Exception #4 will establish a universal baseline for how products are tested and safeguards to ensure their durability.

ASTM D8391-22 leverages the current criteria provided by ICC-ES. Specifically, it expands the scope from trusses (ICC-ES AC224) and I-joists (ICC-ES AC14) to include "any wood-based residential framing member." Additionally, the scope includes "floor framing members with or without applied treatments or materials used to increase fire resistance, including fire-resistive paints, coatings, or chemical treatments, and including mechanically attached or adhered fire protection materials." Robust quality control criteria for applied treatments are included in the standard.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
It provides additional clarity for demonstrating equivalent performance under one option of complying with the code.

**Staff Analysis:** A review of the standard proposed for inclusion in the code, ASTM D8391-22 Specification for Demonstrating Equivalent Fire Performance for Wood-Based Floor Framing Members to Unprotected 2 by 10 Dimension Lumber or Equal-Sized Composite Lumber, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

## **Public Hearing Results**

### **Committee Action:**

**As Modified**

### **Committee Modification:**

**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<sup>2</sup>) 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 a floor assembly complying with one of the following:
  - 4.1. ~~other approved~~ Approved wood-based floor assemblies demonstrating equivalent fire performance in accordance with ASTM D8391.
  - 4.2. Other approved floor assemblies demonstrating equivalent fire performance.

**Committee Reason:** The modification allows for equivalent fire protection performance as another option to ASTM D8391. This option is currently allowed in the code. The proposal was approved as modified because this would provide options for 2x10 equivalency for wood floor assemblies. (Vote: 8-2)

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R302.13

**Proponents:** Marcelo Hirschler, representing GBH International (mmh@gbhint.com) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

**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<sup>2</sup>) 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 a floor assembly complying with one of the following.~~
  - ~~4.1. Approved wood-based floor assemblies demonstrating equivalent fire performance in accordance with ASTM D8391.~~
  - ~~4.2. Other approved floor assemblies demonstrating equivalent fire performance.~~
5. Approved wood floor assemblies that demonstrate equivalent fire performance in accordance with ASTM D8391, without using field-applied fire-resistive paints, coatings, or chemical treatments.
6. Other approved floor assemblies that demonstrate equivalent fire performance without using field-applied fire-resistive paints, coatings, or chemical treatments

**Commenter's Reason:** ASTM D8391 is a new method of determining equivalent fire performance. However, it has one severe flaw in that it allows the use of "field-applied fire-resistive paints, coatings, or chemical treatments". The field application of paints is not an acceptable method for improving the fire performance of new construction because application of paints (or other treatments) should only be done at a manufacturing facility (and then brought to the building site) or by a certified applicator at the building site. There are no certified applicators of "field-applied fire-resistive paints, coatings, or chemical treatments" that can supervise such an application in the IRC. Moreover, without certified supervision there is no evidence that the painter is able to determine the number and/or thickness of the coats of paint that are required for the desired fire safety. Therefore, such a field application should not be allowed.

ASTM D8391 contains an appropriate method for developing wood-based floor assemblies with equivalent fire performance to that of the 2 x 10 structural composite lumber without the need to rely on field application of paints.

During testimony at the committee hearing it was stated that it is common practice to use field application of paints in the IRC by applying the method of using "alternative materials and methods". In that case, it is up to the code official to approve a specific application if he/she believes it is safe. The language proposed in this public comment will allow that practice to continue but such a practice will not be codified. However, if the public comment is not approved the code official will not be able to exercise the appropriate discretion to allow or disallow the use of field-applied paints in a specific use, when it might not be appropriate.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The proponents stated that the code proposal will not affect the cost of construction. Therefore, the clarification in the public comment would also not affect the cost of construction.

Public Comment# 3102

## Public Comment 2:

IRC: R302.13

**Proponents:** Stephen Skalko, representing self (svskalko@svskalko-pe.com) requests As Modified by Public Comment

**Further modify as follows:**

## 2021 International Residential Code

**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<sup>2</sup>) 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 a floor assembly complying with one of the following:
  - 4.1. *Approved* wood-based floor assemblies demonstrating equivalent fire performance in accordance with ASTM D8391. Field-applied protection shall be field inspected in accordance with Section 9.3.3 of ASTM D8391 and Section 1705.15 of the *International Building Code*.
  - 4.2. Other *approved* floor assemblies demonstrating equivalent fire performance.

**Commenter's Reason:** ASTM D8391 allows the use of field-applied materials, such as mastics and intumescent, to provide the equivalent fire protection for wood floor assemblies. Section 9.3.3 of ASTM D8391 requires field-applied protection to be field inspected to verify that the installation of the field-applied protection is consistent with specimens used for qualification testing and product evaluation. Just including language with a simple reference ASTM D8391 in this section of the IRC does not make it clear to the code official that such field inspections are a necessary part of the approval. Field inspection of mastics and intumescent is a very critical part of verification to ensure the fire resistance requirements are met.

The need for special inspections of these field-applied materials for protection is evident by the special inspection requirements for mastics and intumescent in Section 1705.15 of the IBC. This public comment includes language necessary to require these special inspections of field-applied protections for compliance.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The code presently allows alternate methods of protection for fire resistance of wood floor assemblies. Alternate methods that include the use of ASTM D8391 include requirements for field inspection of the field-applied protections. The proposal and public comment do not change this requirement.

Public Comment# 3242

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## **Proposed Change as Submitted**

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

### **2021 International Residential Code**

Revise as follows:

**R303.1 Habitable rooms.** ~~Habitable space rooms shall be provided natural light and natural ventilation in accordance with Sections R303.1.1 through R303.1.3, have an aggregate glazing area of not less than 8 percent of the floor area of such rooms. Natural ventilation shall be through windows, skylights, doors, louvers or other approved openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants. The openable area to the outdoors shall be not less than 4 percent of the floor area being ventilated.~~

#### **Exceptions:**

- ~~1. For habitable rooms other than kitchens, the glazed areas need not be openable where the opening is not required by Section R310 and a whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.~~
- ~~2. For kitchens, the glazed areas need not be openable where the opening is not required by Section R310 and a local exhaust system is installed in accordance with Section M1505.~~
- ~~3. The glazed areas need not be installed in rooms where Exception 1 is satisfied and artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.~~
- ~~4. Use of sunroom and patio covers, as defined in Section R202, shall be permitted for natural ventilation if in excess of 40 percent of the exterior sunroom walls are open, or are enclosed only by insect screening.~~

Add new text as follows:

**R303.1.1 Natural light.** Habitable rooms shall have an aggregate area of glazed openings not less than 8 percent of the floor area of such rooms. Required glazed openings shall open directly onto a street, alley or public way, or a yard or court located on the same lot as the building.

#### **Exceptions:**

1. Required glazed openings shall be permitted to face into a roofed porch, deck or patio adjacent to a street, alley, public way, yard or court, where there the longer side of the roofed area is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).
2. Required glazed openings shall be permitted to face into a sunroom adjacent to a street, alley, public way, yard or court.
3. Glazed openings are not required where artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
4. Eave projections shall not be considered as obstructing the clear open space of a yard or court.

**R303.1.2 Natural ventilation.** Habitable rooms shall have an aggregate area openable to the outdoors not less than 4 percent of the floor area of such rooms. Openings shall be through windows, skylights, doors, louvers or other approved openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants.

#### **Exceptions:**

1. Natural ventilation shall not be required in habitable rooms other than kitchens where a whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.
2. Natural ventilation shall not be required in kitchens where a local exhaust system is installed in accordance with Section M1505.
3. Required ventilation openings shall be permitted to open into a thermally isolated sunroom or roofed porch, deck, or patio where not less than 40 percent of the roofed area perimeter is open to the outdoor air.
4. Required ventilation openings shall be permitted to open into a thermally isolated sunroom provided there is an openable area between the adjoining room and the sunroom of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (2 m<sup>2</sup>). The minimum openable area of the sunroom to outdoor air shall be based on the total floor area of the adjoining room and the sunroom.

Revise as follows:

~~R303.2 R303.1.3~~ **Adjoining rooms.** For the purpose of determining light and *ventilation* requirements, rooms shall be considered to be a portion of an adjoining room where not less than one-half of the area of the common wall is open and unobstructed and provides an opening of not less than one-tenth of the floor area of the interior room and not less than 25 square feet (2.3 m<sup>2</sup>).

~~**Exception:** Openings required for light or *ventilation* shall be permitted to open into a *sunroom* with thermal isolation or a patio cover, provided that there is an openable area between the adjoining room and the *sunroom* or patio cover of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (2 m<sup>2</sup>). The minimum openable area to the outdoors shall be based on the total floor area being ventilated.~~

**Delete without substitution:**

~~**R303.9 Required glazed openings.** Required glazed openings shall open directly onto a street or public alley, or a *yard* or court located on the same *lot* as the building.~~

~~**Exceptions:**~~

- ~~1. Required glazed openings that face into a roofed porch where the porch abuts a street, *yard* or court and the longer side of the porch is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).~~
- ~~2. Eave projections shall not be considered as obstructing the clear open space of a *yard* or court.~~
- ~~3. Required glazed openings that face into the area under a deck, balcony, bay or floor cantilever where a clear vertical space not less than 36 inches (914 mm) in height is provided.~~

~~**R303.9.1 Sunroom additions.** Required glazed openings shall be permitted to open into *sunroom additions* or patio covers that abut a street, *yard* or court if in excess of 40 percent of the exterior *sunroom* walls are open, or are enclosed only by insect screening, and the ceiling height of the *sunroom* is not less than 7 feet (2134 mm).~~

**Reason:** In the 1800's natural light and ventilation were married in the only feature to provide them, windows. Today, the IRC offers other ways to provide light and ventilation that are no longer the same feature, yet they are still married together in Section R303.1. It's time for the IRC to modernize and allow light and ventilation to be separately addressed. Currently, the provisions and choices for light and ventilation are incredibly difficult to understand and scattered throughout sections that have been modified in pieces since the 2000 edition. Nothing reveals just how confusion these provisions are presented than when you are trying to teach them to new professionals.

Very little has been removed or changed in the application of these provisions, but you have to carefully look them over to realize this. The majority of the deletions have simply been moved and reworded. They have been applied to what they are meant to apply to, light, ventilation, or both.

#### **SOME MOTIVATION FOR THIS PROPOSAL.**

- 1) Glazed openings are required in Section R301.1. However, you have to skip ahead to R301.9 to get the full story of what they face into.
- 2) Ventilation can be provided through windows, skylights, doors and louvers, yet there is language like "the glazed area need not be openable". This would not need to be said if glazed openings and ventilation openings were looked at individually.
- 3) "Roofed porches" (R303.9) have different requirements for obstructed perimeters than "patio covers" (R303.1). I am unable to find anyway to interrupt these two features distinctly using the IRC. These terms are similar jargon.
- 4) Sunroom provisions are just plain confusing. There is no reason to site a definition, such as "as defined in Section R202". That is not standard form.

#### **COMMENTARY EXPLAINING THE INTENT OF EACH MODIFICATION [WRITTEN AS IF APPROVED]**

**R303.1 Habitable rooms:** Habitable space shall be provided natural light and natural ventilation in accordance with Sections R303.1.1 through R303.1.3.

This purposefully begins with the defined term "habitable space" which connects the entire section and use of the term "habitable rooms" back to the definition of habitable space. This sets the general requirement that they shall have light and ventilation.

**R303.1.1 Natural light:** Habitable rooms shall have an aggregate area of glazed openings not less than 8 percent of the floor area of such rooms. Required glazed openings shall open directly onto a street, alley or public way, or a yard or court located on the same lot as the building.

This allows the methods for natural light to be presented independently of them being an option for ventilation as well. "habitable room" is now used when referencing measurements of floor area, speaking to the presence of dividing walls that create "rooms" and affect where natural light will reach.

**R303.1.1, Exception 1:** Required glazed openings shall be permitted to face into a roofed porch, deck or patio adjacent to a street, alley, public

way, yard or court, where there the longer side of the roofed area is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).

[relocated from R303.9 Ex. 1] This clarifies when the glazed openings face into an area covered with a roof. All jargon terms for the floor have been included as to not confuse interpretation (porch, deck, patio). This exception is from R303.9 which is specific to "glazed openings" not ventilation.

**R303.1.1, Exception 2:** Required glazed openings shall be permitted to face into a sunroom adjacent to a street, alley, public way, yard or court.

By definition, sunrooms have 40% of their wall and ceiling area in glazed openings. Sunrooms are sunny inside. Section R303.9.1 Sunroom additions is a subsection to "required glazed openings". These provisions appear to be about natural light. A sunroom that needs to bring light in to the room it adjoins need not be open to the outside air (ventilation). Glazed openings can open into sunrooms.

**R303.1.1, Exception 3:** Glazed openings are not required where artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.

[relocated from R303.1, ex 3] The original exception is rewritten simply in reference to glazed openings for natural light. It no longer must address the other exception about ventilation.

**R303.1.1, Exception 4:** Eave projections shall not be considered as obstructing the clear open space of a yard or court.

[relocated from R303.9, exception 2] Text unchanged.

**R303.1.2 Natural ventilation:** Habitable rooms shall have an aggregate area openable to the outdoors not less than 4 percent of the floor area of such rooms. Openings shall be through windows, skylights, doors, louvers or other approved openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants.

This language from R303.1 related to ventilation has been relocated to it's own section. Text is unchanged.

**R303.1.2, Exception 1:** Natural ventilation shall not be required in habitable rooms other than kitchens where a whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.

[relocated from R303.1, ex. 1] The original text is relocated as an exception only to ventilation, so the reference to "glazed areas need not be openable" is deleted.

**R303.1.2, Exception 2:** Natural ventilation shall not be required in kitchens where a local exhaust system is installed in accordance with Section M1505.

[relocated from R303.1, ex. 2] The original text is relocated as an exception only to ventilation, so the reference to "glazed areas need not be openable" is deleted.

**R303.1.2, Exception 3:** Required ventilation openings shall be permitted to open into a thermally isolated sunroom or roofed porch, deck, or patio where not less than 40 percent of the roofed area perimeter is open to the outdoor air.

[intent relocated from R303.1, ex 4 and 303.9.1] This change will require more explanation. This exception is for "exterior floor areas covered in a roof and partially enclosed with walls" and addresses how enclosed the walls are and if ventilation can get through. This is why the location of the openings in the walls are not important, as they are in the "roof porch exception for light to hit the windows under the natural lighting provisions". This is why thermally isolated sunrooms and roofed porch, deck, or patio is referenced. Often these floor areas will be larger than the portion that is covered. Therefore the proposed exception refers to the "roofed area perimeter". Using the term "area" is in lieu of repeating all the jargon terms.

**R303.1.2 Exception 4:** Required ventilation openings shall be permitted to open into a thermally isolated sunroom provided there is an openable area between the adjoining room and the sunroom of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (2 m2). The minimum openable area of the sunroom to outdoor air shall be based on the total floor area of the adjoining room and the sunroom.

[relocated from R303.2] Though this exception is about an adjoining space, it is better suited in the exceptions for ventilation. A sun room has 40% glazing, so it's sunny glazed openings can open into any of them under proposed R303.1.1, ex 2. A thermally isolated sunroom according to the categories in R301.2.1.1.1 is always nonhabitable. Therefore the sunroom does not require ventilation. The goal of this exception is for fully enclosed sunrooms and how much openable area is required to pass through the sunroom and reach the adjoining habitable space. The original motivation for this exception is related to sunroom additions and not requiring relocation of windows for

ventilation. Thus the provisions for a large opening between the two that occupants can open to "connect" the air of the sunroom and adjoining room. Though the sunroom is not "required" to be ventilated, the air does not know this and the sunroom is ventilated regardless. Therefore the minimum openable area of the sunroom walls must account for 4% percent of the floor area for the sunroom and the adjoining room combined.

#### DELETIONS THAT WERE NOT REWRITTEN.

Exception 3 of R303.9 is unnecessary. 303.9 is about glazed openings which is about natural light reaching the opening. It makes no sense to expect a window under a deck of unlimited size and unlimited percent of perimeter enclosed to the ground would provide natural light to a window. For a glazed opening under a "roofed porch" to get sunlight, the ceiling must be seven feet high and open around 65% of the perimeter. This does NOT equate to burying a glazed opening under a deck. This exception appears to be included due to emergency escape and rescue opening provisions, which is unnecessary and confusing. This has been deleted.

Mentions of "insect screening" has been deleted. There is no mention of screens on windows, a common practice and requirement of the IPMC. Any reasonable interpretation of ventilation should not be affected by screens.

#### A FEW MORE NOTES:

All mentions of glazed openings toward obstructions have been worded as "facing into". The term "glazed openings" is a noun. When used in a sentence as "Required glazed openings shall be permitted to OPEN into a..." the term "open" is read more as a verb, an action and appears to be about ventilation. Therefore all glazed opening provisions are written as "facing into"

All mention of ventilation opens are phrased "open into" to further assist in interpretation.

The goal of this proposal is for the provisions to make logical sense, to be specific in language, and to most effectively "Present the Intent"

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

This proposal is editorial in nature and does not change the original intent in any manner that creates a substantial cost impact in either direction. Readers will save money on headache medicine from not reading these sections as is ever again.

RB76-22

## **Public Hearing Results**

#### **Committee Action:**

#### **As Modified**

#### **Committee Modification:**

**R303.1.1 Natural light.** Habitable rooms shall have an aggregate area of glazed openings not less than 8 percent of the floor area of such rooms. Required glazed openings shall face open directly onto a street, alley or *public way*, or a *yard or court* located on the same *lot* as the *building*.

#### **Exceptions:**

1. Required glazed openings shall be permitted to face into a roofed porch, deck or patio adjacent to a street, alley, *public way, yard or court*, where there the longer side of the roofed area is not less than 65 percent unobstructed and the ceiling height is not less than 7 feet (2134 mm).
2. Required glazed openings shall be permitted to face into a sunroom adjacent to a street, alley, public way, yard or court.
3. Glazed openings are not required where artificial light is provided that is capable of producing an average illumination of 6 footcandles (65 lux) over the area of the room at a height of 30 inches (762 mm) above the floor level.
4. Eave projections shall not be considered as obstructing the clear open space of a yard or court.

**Committee Reason:** The modification to Section R301.1.1 was for consistent terminology for glazed openings throughout this proposal. The proposal was approved as modified as it separates the requirements for natural light and ventilation. There were concerns the Section R303.1.1

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R303.1.2

**Proponents:** Thom Zaremba, representing National Glass Association (tzaremba@ralaw.com); Nicholas Resetar, representing Glazing Industry Code Committee (GICC) (nresetar@ralaw.com) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

**R303.1.2 Natural ventilation.** Habitable rooms shall have an aggregate area openable to the outdoors not less than 4 percent of the floor area of such rooms. Openings shall be through windows, skylights, doors, louvers or other approved openings to the outdoor air. Such openings shall be provided with ready access or shall otherwise be readily controllable by the building occupants.

#### **Exceptions:**

- ~~1. Natural ventilation shall not be required in habitable rooms other than kitchens where a whole-house mechanical ventilation system or a mechanical ventilation system capable of producing 0.35 air changes per hour in the habitable rooms is installed in accordance with Section M1505.~~
- ~~2. Natural ventilation shall not be required in kitchens where a local exhaust system is installed in accordance with Section M1505.~~
- ~~3.1.~~ Required ventilation openings shall be permitted to open into a thermally isolated sunroom or roofed porch, deck, or patio where not less than 40 percent of the roofed area perimeter is open to the outdoor air.
- ~~4.2.~~ Required ventilation openings shall be permitted to open into a thermally isolated sunroom provided there is an openable area between the adjoining room and the sunroom of not less than one-tenth of the floor area of the interior room and not less than 20 square feet (2 m<sup>2</sup>). The minimum openable area of the sunroom to outdoor air shall be based on the total floor area of the adjoining room and the sunroom.

**Commenter's Reason:** On March 11, 2020, the World Health Organization declared COVID-19 a global pandemic ("Pandemic"). As of this writing, 85.6 MILLION cases have been diagnosed in the United States, resulting in 1.01 MILLION deaths.

This proposal, recommended for adoption "As Modified" by the Technical Committee, should be further modified as set out in this Public Comment.

Since the beginning of the pandemic, "scientists stress that **VENTILATION** should be viewed as one strategy in a three-pronged assault on COVID, along with vaccination ... and high-quality, well-fitted masks .... Improved airflow provides an additional layer of protection - and can be a vital tool for people who have not been fully vaccinated, people with weakened immune systems and children too young to be immunized." (Emphasis added.) The U.S. Environmental Protection Agency has endorsed increased ventilation as an "important approach to lowering the concentrations of ... any viruses indoors." Likewise, the Center for Disease Control and Prevention recommends improving ventilation in homes by "opening windows" in order to "[b]ring as much fresh air into your home as possible" to help "keep virus particles from accumulating inside."

As pointed out by the Committee in its Reason Statement, this proposal does an excellent job of separating the requirements for natural light and ventilation. However, by retaining the first two exceptions to Section R303.1.2, it would allow the minimum natural ventilation requirements of R303.1.2 to be eliminated entirely if a home includes a certain level of mechanical ventilation and a kitchen exhaust system. Whether a home does or does not have mechanical ventilation or an exhaust system, should not determine whether it should also have the minimum levels of natural ventilation specified in R303.1.2. Every home should include a minimum level of natural ventilation, otherwise, homeowners will be left with no fresh air ventilation strategy to combat the accumulation and transmission of viruses within their homes.

In this age of endless Covid variants that will likely continue the current pandemic far into the foreseeable future, the National Glass Association (NGA) and the Glazing Industry Code Committee (GICC) ask voting Members to vote against the standing motion to Approve as Modified in order to consider further modifying this proposal to restore minimum natural ventilation requirements without exception for homes built in our Country.

**Bibliography:** *Better Ventilation Makes a Better Workplace - if Companies Invest*, Liz Szabo, NPR. April 19, 2022.

<https://www.npr.org/sections/health-shots/2022/04/19/1093342120/better-workplace-ventilation>

*Ventilation in Homes*, U.S. Environmental Protection Agency

<https://www.epa.gov/coronavirus/ventilation-and-coronavirus-covid-19>

**Improving Ventilation in Your Home**, Centers for Disease Control and Prevention. Nov. 24, 2021.

<https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/improving-ventilation-home.html>

"New Omicron strains capable of evading immune protections ... now account for more than 21% of total COVID cases in the U.S., according to updated CDC figures." **New Omicron Variants Gaining Ground**, Axios - Health, June 15, 2022.

<https://www.axios.com/2022/06/15/omicron-variants-gaining-ground>

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction

As currently recommended for approval "as modified" by the Committee, the inclusion of certain mechanical ventilation and exhaust systems in a home can eliminate the need for any minimum areas openable to the outdoors. If the additional modifications proposed in this Public Comment are adopted, homes with or without mechanical ventilation and exhaust systems would also require the minimum ventilation openings specified in R303.1.2. Adding minimum ventilation openings to mechanical and exhaust systems in a home could have the net effect of increasing the cost of construction.

Public Comment# 3193

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## **Proposed Change as Submitted**

**Proponents:** Glenn Mathewson, representing Self (glenn@glenmathewson.com)

### **2021 International Residential Code**

**Revise as follows:**

**R303.8 Exterior stairway illumination.** Exterior *stairways* shall be provided with an artificial light source located at the top landing of the *stairway*. Exterior *stairways* providing access to a *basement* from the outdoor *grade* level shall be provided with an artificial light source located at the bottom landing of the *stairway*.

**Exception:** A light source shall not be required at the top of exterior stairways less than 30 inches (762 mm) in total rise.

**Reason:** This section was considerably revised in the 2015 edition to only require illumination at the top of exterior stairways. Using an exterior stairway in the dark is a conscience choice of the occupant and with an assumption of risk they must make themselves aware of. It is not the job of the local government to mandate protection from this hazard. However, the top of a stairway is often an opening in a required guard. There is always a fall hazard at this opening, but in the dark it is greater. Therefore the minimum required lighting for exterior stairways is only a light source at the top landing. This change has remained with no challenge in the 2018 and 2021 edition.

This proposed exception addresses decks that are low to the ground and do not require guards. A small stairway from these decks do not create more of a fall hazard from the deck when there are no required guards. A multilevel deck, with a few steps between is not a greater fall hazard of the upper deck than if no stair existed between the two. Therefore, if it is reasonable to not require guards for fall protection it is also reasonable to not provide a light for fall protection.

For a risk assessment comparison, Section R303.7 for interior stairway lighting only requires a switch at the top and bottom of interior stairways with 6 or more risers. At a conventional riser height of 7 ¾ inches, a five riser stairway could be 38 ¾ inches high. If it is reasonable for an occupant to ascend or descend an interior stairway at this height without access to a switch and therefore without light, then it is reasonable for a 30 inch high exterior stairway much less frequently used in the evening to also have no light.

**Cost Impact:** The code change proposal will decrease the cost of construction

Exterior floor surfaces such as decks and porches with stairways less than 30 inches in height will be less expensive to construction without a required light. There is no requirement for the operation or type of lighting, so the most conservative choice would be using low voltage lighting. This lighting does not typically require a licensed electrician to install. In the least, this proposal will reduce the cost of construction for certain deck and porch designs by perhaps a couple hundred dollars. However, it is difficult to assume what type of lighting requirements are being interpreted by building authorities with the current provision. If non-permanent solar lighting is being accepted, such as plastic "post cap lights" the cost reduction could be under \$50.

RB79-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because stairways are the most unsafe areas in a dwelling, so lighting is needed. Safety needs to consider guests as well as family members. (Vote: 9-0)

RB79-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R303.8

**Proponents:** Glenn Mathewson, representing Self (glenn@glenmathewson.com) requests As Modified by Public Comment

Modify as follows:

## 2021 International Residential Code

**R303.8 Exterior stairway illumination.** Exterior *stairways* shall be provided with an artificial light source located at the top landing of the *stairway*. Exterior *stairways* providing access to a *basement* from the outdoor *grade* level shall be provided with an artificial light source located at the bottom landing of the *stairway*.

**Exception:** A light source shall not be required at the top of exterior stairways less than 30 inches (762 mm) in total rise and not serving as the required grade-level access for the required egress door.

**Commenter's Reason:** The committee disapproved the proposal because "stairways are the most unsafe areas in a dwelling". I do not disagree with this statement. This was also the emotional response expressed by the opposition that eliminated the opportunity to have a genuine and professional conversation about risk assessment and risk tolerance in American backyards. With this public comment, I will continue the effort to have that conversation.

The committee also stated that "Safety needs to consider guests as well as family members". The need to have safe access from the public way to the required egress door was the nature of this statement. Delivery personnel or other visitors to the private home are likely to approach on a path from the public way to the front door. This door is typically designed as the required egress door in section R311.2. This door requires access to grade. If this access is via a stairway, it is presumable that this will be the access the public will use. In recognition of this concern, we have modified the exception to not apply to the stairways that are serving the required grade level access. This will provide one stairway from grade with access to the egress door that has lighting readily available, while still providing more design freedom and affordability in the additional exterior stairways. Generally these will be located in the private backyards, and this is the overall intent of this entire proposal.

The following are examples of risk tolerance currently provided in the IRC for the benefit of our fellow Americans.

- 1) Traversing and interior stairway up to five risers (and more than 30 inches of total rise) without access to a light switch on the top and bottom. This results in traversing the stairway without illumination.
- 2) A deck up to 30 inches above grade with no fall protection (guards) at the perimeter and no lighting to alert an occupant of the fall hazard.
- 3) An exterior door with up to two risers (one tread) down to the exterior landing on a balcony with no grade level access. NO illumination is required outside the door, but your body is still traversing two risers and up to 15.5 inches of height.

Many decks are built less than 30 inches and without guards. If an owner were to chose to build a small flight of stairs with a few steps to grade, this could be a simple upgrade that would increase the safety of the deck by providing a safer path down than leaping 29 inches. However, the IRC would now require this owner to also install a light. What makes a deck 29 inches above grade with no guards, no lights, and no stairs LESS of a risk than a deck 12 inches above grade with no guards, no lights, and one single tread with two 6 inches risers to grade?

**Cost Impact:** The net effect of the public comment and code change proposal will decrease the cost of construction. This proposal and public comment modification will decrease the cost of construction when a homeowner chooses not to install lighting that would no longer be required.

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Public Comment# 3199



## **Proposed Change as Submitted**

**Proponents:** Dale Soos, representing Automotive Lift Institute, Inc. (ALI) (dale@autolift.org); RW Bob O'Gorman, representing Automotive Lift Institute (ALI) (bob@autolift.org)

### **2021 International Residential Code**

**Add new text as follows:**

**309.6 Automotive Lifts.** Where provided, automotive lifts shall comply with ANSI/ALI ALCTV and Sections 309.6.1 and 309.6.2.

**309.6.1 Installation.** Automotive lifts shall be installed in accordance with ANSI/ALI ALIS, the lift manufacturer's installation instructions, and listing and labeling requirements. Consideration shall be given to the foundation where an automotive lift will be affixed, to ensure it will support the weight and structural reactions of an installed automotive lift. Automotive lifts shall not be installed within the habitable space of a dwelling unit.

**309.6.2 Electrical Installation.** Automotive lifts shall be installed in accordance with NFPA 70, and shall be *listed* and *labeled* to UL 201 and other standards as determined by the listing agency when evaluated to the requirements of ANSI/ALI ALCTV.

**Add new standard(s) as follows:**

**ALI**

Automotive Lift Institute, Inc.  
P. O. Box 85  
Cortland, NY 13045

**ALI ALCTV-2017.** Standard for Automotive Lifts-Safety Requirements for Construction, Testing and Validation (ANSI)

**Reason:** The reason for adding this new section to the IRC is to close the loophole where uncertified products with a real threat to life-safety are being installed in the residence and bypassing all safety requirements and to make sure that automotive lift products are safe. Uncertified automotive lift products are available to the homeowner, who assumes that all products on the marketplace must be tested and certified to meet applicable product standards. This is not the case for automotive lift products. Retailers are often not aware they are marketing uncertified products. They are being dumped on the marketplace and the unsuspecting homeowner purchases these, to his detriment. By including already a requirement in the *International Building Code*, the homeowner can have a product which is backed by a valid certification such as those available in the workplace.

Other life-safety devices such as furnaces, boilers, water heaters, A/C units & heat pumps and more mundane products such as fans, water heaters, computers, televisions, luminaires, home appliances, etc. now carry product safety listings. The ANSI/ALI ALCTV automotive lift standard does not have separate performance criteria to establish or define commercial, industrial or homeowner categories. Chapter 30 of the *International Building Code* specifies in both Section & Table 3001.3 the ANSI/ALI ALCTV standard is used for the design, construction, installation, alteration, repair and maintenance of these automotive lifting products. This entry is an attempt to harmonize the *International Building Code* and the *International Residential Code* for these products.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. Other industries have discovered that, by making mandatory certification of products a requirement, there has been little to no increase in the overall cost to the consumer by increasing manufacturing efficiencies and having a defined standard to work toward. There are currently 21 reputable manufacturer's producing automotive lifts for the marketplace, both commercial and residential. Any impact created by inclusion of these requirements will be to those importers that are skirting North America's safety standards.

**Staff Analysis:** The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered a new standard. A review of the standard proposed for inclusion in the code, ALI ALCTV-2017 Standard for Automotive Lifts - Safety Requirements for Construction, Testing and Validation (ANSI), with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

RB87-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because the automotive lift requirements proposed did not include structural information and foundation requirements. (Vote: 7-3)

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** 309.6, 309.6.1, 309.6.2

**Proponents:** Dale Soos, representing Automotive Lift Institute, Inc. (ALI) (dale@autolift.org) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**309.6 Automotive Lifts.** Where provided, automotive lifts shall ~~comply~~ be listed and labeled in accordance with ANSI/ALI ALCTV and Sections 309.6.1 and 309.6.2.

**309.6.1 Installation.** Automotive lifts shall be installed in accordance with ~~ANSI/ALI ALIS~~ ANSI/ALI ALCTV, the listing, and the lift manufacturer's installation instructions ~~, and listing and labeling requirements. Consideration shall be given to the foundation where an automotive lift will be affixed, to ensure it will support the weight and structural reactions of an installed automotive lift.~~ Automotive lifts shall not be installed within the habitable space of a dwelling unit.

**309.6.2 Electrical Installation.** Automotive lifts shall be installed in accordance with NFPA 70, the listing, and the manufacturer's installation instructions ~~and shall be listed and labeled to UL 201 and other standards as determined by the listing agency when evaluated to the requirements of ANSI/ALI ALCTV.~~

**Commenter's Reason:** These Public Comments reflect changes made as a result of reviewing the *International Residential Code* Committee's reason for Disapproving the original submittal, as well as those changes made by a Floor Modification (RB87-22-SOOS-1) to more closely align with language present, and the terms defined, within the existing Code.

It should be noted the ANSI/ALI ALCTV standard does now and has always required a third-party product certification for any product claiming compliance. Part of the standard's evaluation criteria is examination of the lift product's strength factors, the minimum of which are defined within ALCTV, as well as specifications for the specific lift's foundation, floor and anchoring structural requirements. To clarify, the automotive lifts are to be installed per the standard, the product's listing requirements, and the manufacturer's instructions.

Originally submitted section 309.6.2 (Electrical Installation) is being removed because the electrical requirements are covered in the ANSI/ALI ALCTV standard and the previous paragraph.

As is noted in the original Reason Statement for RB87-22, this is an extremely important change to the Code for reasons of threat to life safety when using an automotive lift.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Other industries have discovered that, by making mandatory certification of products a requirement, there has been little to no increase in the overall cost to the consumer by increasing manufacturing efficiencies and having a defined standard to work toward. There are currently 21 reputable manufacturer's producing automotive lifts for the marketplace, both commercial and residential. Any impact created by inclusion of these requirements will be to those importers that are skirting North America's safety standards.

Public Comment# 3064

### **Public Comment 2:**

**Proponents:** Gareth Reece, representing self requests As Submitted

**Commenter's Reason:** This proposal addresses a major safety concern with respect to vehicle lifts installed in residences. Vehicle lifts are becoming more common for storing more vehicles in compact garages, and are a fairly frequent occurrence in our municipality for both storage and hobby maintenance in large custom homes. Including the reference to ALCTV in the IRC would simplify the administration of this type of device... Unlisted lifts are not supplied with adequate safety or structural specifications for the installation requirements to be clear. In researching this issue over the years, I've had conversations with reputable, established lift manufacturers who have introduced unlisted lifts into their catalog to compete on price and features (which may be prohibited under ALCTV) with manufacturers who are not testing for safety.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The net effect of this proposal will clarify an existing requirement of IBC which is enforceable under IRC via R301.1.3 (a structural element, here to support the live load of a vehicle, exceeding the limits of Section R301).



## **Proposed Change as Submitted**

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

### **2021 International Residential Code**

**Revise as follows:**

**R310.1.1 Operational constraints and opening control devices.** *Emergency escape and rescue openings* shall be operational from the inside of the room without the use of a key, tool, keys, tools or special knowledge, or effort. 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.

**R310.4.4 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 R310.2 through R310.2.2 and R310.4.1. Such devices shall be releasable or removable from the inside without the use of a key, tool, special knowledge or effort, ~~or tool or force greater than that required for the normal operation of the escape and rescue opening.~~

**R311.2 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* without the use of a key, tool, ~~or~~ special knowledge or effort.

**Reason:** The operational constraints of these three features need to be functional to one person. I presume this person's cognitive ability to operate these three features as described is not as varied as the requirements in these three sections.

The door can require a tool, but not effort. The EERO can't require special knowledge, but can require unlimited effort. The area well cover can require special knowledge but it can't require force. Well it can, but not more than the force to open the window... which is unlimited... What if I get a new window that opens easier? Now I have to get a new lighter cover?

In this proposal, no expectations of this occupant to free themselves from a building have been altered. The capabilities of the human are the same. The only terms proposed for modification are terms already used. I expect some may have small opposition to certain words in certain sections, but those words are capabilities that we already expect or don't expect of the occupant.

My motivation for this proposal was from developing and teaching a course specific to sections 310 and 311 where the complete intent of each section is discussed. I was unable to explain the rationale behind these three sections without leaving the student rolling their eyes and distrusting the inconsistency and seemingly arbitrary requirements. I was also quite surprised when "special knowledge" was removed from covers in 2021.

No effort, tools, keys or special knowledge to get you out of the house. Easy. Reliable. Understandable.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

Nothing in this proposal changes minimum code in a manner that would require the purchase or increase of cost of a construction product or required installation.

RB93-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal was disapproved. While this is correlation between sections, the proposal is moving in the wrong direction. Ambiguous terms should be removed from the code, not added back in. (Vote: 6-5)

RB93-22

## **Individual Consideration Agenda**

## Public Comment 1:

IRC: R310.1.1, R310.4.4, R311.2

**Proponents:** Glenn Mathewson, representing Self (glenn@glennmathewson.com) requests As Modified by Public Comment

**Modify as follows:**

## 2021 International Residential Code

**R310.1.1 Operational constraints and opening control devices.** *Emergency escape and rescue openings* shall be operational from the inside of the room without the use of a key; or tool, ~~special knowledge, or effort~~. 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.

**R310.4.4 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 R310.2 through R310.2.2 and R310.4.1. Such devices shall be releasable or removable from the inside without the use of a key; or tool, ~~special knowledge or effort~~.

**R311.2 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* without the use of a key; or tool, ~~special knowledge or effort~~.

**Commenter's Reason:** The intent of this proposal was to make the IRC as a whole more trustworthy and sensible. All three of these features require a human to operate them, so why wouldn't the operational limitations be the same? There was no opposition to this goal. The opposition was in the expanded use of "special knowledge" and "effort". If these human capabilities are not acceptable means to operate one of these features then they probably should not be acceptable for any. They have been removed to addresses the concerns of the committee and spoken opposition, while still achieving the goal of consistency in the IRC provisions.

NOTE: I do not believe these terms should be removed from my original proposal. However, I believe consistency and sensibility of the IRC is more important than my opinion of it.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The proposal and public comment simply offer more choice to the end user. Cost is only affected after they make a choice.

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Public Comment# 3359

## **Proposed Change as Submitted**

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

### **2021 International Residential Code**

**R311.3 Floors and landings at exterior doors.** There shall be a landing or floor on each side of each exterior door. The width of each landing shall be not less than the door served. Landings shall have a dimension of not less than 36 inches (914 mm) measured in the direction of travel. The slope at exterior landings shall not exceed  $\frac{1}{4}$  unit vertical in 12 units horizontal (2 percent).

**Exception:** Exterior balconies less than 60 square feet (5.6 m<sup>2</sup>) and only *accessed* from a door are permitted to have a landing that is less than 36 inches (914 mm) measured in the direction of travel.

**R311.3.1 Floor elevations at the required egress doors.** Landings or finished floors at the required egress door shall be not more than  $1\frac{1}{2}$  inches (38 mm) lower than the top of the threshold.

**Exception:** The landing or floor on the exterior side shall be not more than  $7\frac{3}{4}$  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 R311.8 or a *stairway* in accordance with Section R311.7.

**Revise as follows:**

**R311.3.2 Floor elevations at other exterior doors.** At exterior ~~Doors—doors~~ other than the required egress door, the exterior side shall be provided with landings or floors not more than  $7\frac{3}{4}$  inches (196 mm) below the top of the threshold.

**Exception:** ~~A top~~ An exterior landing or floor is not required at the exterior doorway where a *stairway* of not more than two *risers* is located on the exterior side of the door, provided that the door does not swing over the *stairway*.

**R311.3.3 Storm and screen doors.** Storm and screen doors shall be permitted to swing over exterior stairs and landings.

**Revise as follows:**

**R311.7.6 Landings for stairways.** There shall be a floor or landing at the top and bottom of each *stairway*. 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).

**Exception—Exceptions:**

1. A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided that a 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 (196 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.

**R311.7.8 Handrails.** *Handrails* shall be provided on not less than one side of each flight of stairs with four or more *risers*.

**Reason:** This proposal started as question – Can the landing or steps into a garage be the same as permitted for exterior doors or not?

The following are current requirements - There is a requirement for landings at exterior doors (R311.3) and a requirement for landings at the top and bottom of stairways (R311.7.6). The required egress door has to open directly into a public way, yard or court (R311.1), so it has to be an exterior door. Egress is not permitted through a garage (R311.1).

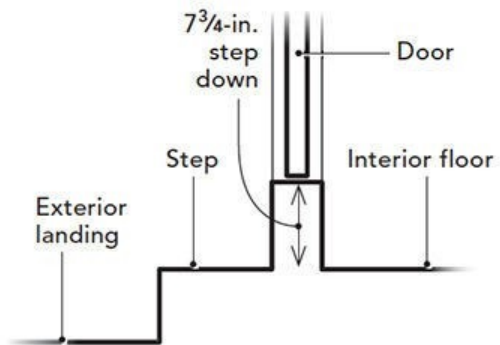
Interior doors not have requirements for landings, so going out to a single step or multiple steps would be covered by the stairway landing requirement in Section R311.7.6. The current exception clarifies that steps into a garage are considered interior stairways.

The modifications –

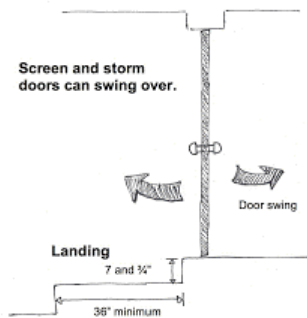
R311.3.2 – This is a requirement for a landing or floor at both sides of an exterior doorway. This section has 'exterior' in the title, and is a subsection of 'exterior doors', but does not have 'exterior' in the text. Since titles are not part of the text, this could be read as all door, or it could be read to allow a 7-3/4" drop between the floor and the threshold on both sides of the door. The modification to the body of the text would limit this to exterior doors and the exterior side for the step down. The current exception is for a stairway landing, not a door landing, so this needs to be more specific

to door landings to match the requirement in the main paragraph. "Floor" is added to address balconies and decks.

This is what is permitted with current text for exterior doors other than the means of egress doorway. While perhaps there should be a threshold limit (not proposed here), the current allowances is a serious tripping hazard.



Was this not the intended allowance?



R311.7.6 – This is the section for stairway landings. Interior doors do not have a doorway landing requirement in the IRC. The new exception #2 allows for a garage access door to swing out over a landing that is a step down, similar to an exterior door. The current exception #1 says the door has to swing in. Exception 3 for stairway landings at exterior stairways is added so that R311.3.2 and R311.7.6 are coordinated for landings at exterior doors with steps – literally this is the same landing space, but from two different requirements.

This is an example of the R311.7.6 with the current Exception 1.



This is an example of R311.7.6 new exception 2 – allowing for a step down to a landing or floor in a garage – the door can swing in or out. This is currently permitted for exterior doors (R311.3.2)







This is an example of R311.7.6 new exception 3 – which is equal to the intent of R311.3.2 exception.





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 2020 and 2021 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 code change proposal will not increase or decrease the cost of construction

This proposal clarifies existing requirements and provides additional design options for door leading into attached garages. This option could improve safety without additional costs.

RB100-22

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## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because a 7-3/4" high threshold is needed to help at exterior doors with snow and water intrusion. (Vote: 10-0).

RB100-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R311.3.2

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R311.3.2 Floor elevations at other exterior doors.** ~~At the~~ Exterior doors other than the required egress door, ~~the exterior side~~ shall be provided with landings or floors not more than  $7\frac{3}{4}$  inches (196 mm) below the top of the threshold.

**Exception:** An exterior landing or floor is not required at the exterior doorway where a *stairway* of not more than two *risers* is located on the exterior side of the door, provided that the door does not swing over the *stairway*.

**Commenter's Reason:** The testimony and committee reason were all against not losing the 7-3/4" threshold at exterior doors due to water and snow infiltration. That portion has been removed from the change with the above deletion. The rest of the language at this section is strictly a clarification that Section R311.3.2 is applicable to exterior doors. This was in the title, but not in the text.

The original intent of this proposal was to allow for a step or landing in step down at a door into a garage similar to what is permitted at an exterior door. That remains as submitted. There was no testimony against this idea.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal clarifies existing requirements and provides additional design options for door leading into attached garages. This option could improve safety without additional costs.

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Public Comment# 3093

## **Proposed Change as Submitted**

**Proponents:** Thomas Zuzik Jr, representing National Ornamental & Miscellaneous Metals Association (NOMMA) (coderep@railingcodes.com)

### **2021 International Residential Code**

#### **SECTION R312 GUARDS AND WINDOW FALL PROTECTION**

**Revise as follows:**

**R312.1.3 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. Opening Limitations shall be determined without any force applied to the sphere.

**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  $4\frac{3}{8}$  inches (111 mm) in diameter.

**Reason:** This code change simplifies any current and future debates by prescriptively clarifying that there is no force or load test on the sphere directly within the text of the IRC and is intended as written to be a simple dimensional measurement for pass or fail only.

**The Misconception**

For as long as the sphere measurement method for opening limitations in guards has been in the model codes and adopted by jurisdictions there has been a back room and front room debate as to the process.

It has been well established that the 4-inch, 4.375-inch and 6-inch sphere dimension is a dimensional measurement and not a load test.

Even with this, questions continue to be discussed across multiple local jurisdictions, forums and other forms of communication questioning if you are to take the correct dimensionally sized sphere and apply a force to shove it through the in-fill of guards and pool barriers, and what that force level should be. The direction of these debates goes on within many jurisdictions and amongst the building enforcement industry less and less as time passes, but as with anything as new eyes enter the field, this discussion returns to the debate floor.

**Standards & Criteria**

For years, fabricators within the guard industry used the in-fill (part C) method for load testing in-fill in ASTM E935-00 to the loads specified in the R301.5 table of the IRC and some also applied the cone test (part D) methodology published in ASTM Standard E935-00, the part D cone test in E935-00 and prior versions was a methodology to verify the in-fill spread of balusters, however this has never been required in or by the model IRC or IBC codes. When the Part D test methodology was removed from the standard and not included in the ASTM E935-13 edition, and furthermore was not replaced with any other similar in-fill load test directed at in-fill spread specifically, any pathway moving forward was removed as the newer standard signifies progress.

ICC-ES AC-273-17, Acceptance Criteria for Handrails and Guards, in sections 4.2.1, 4.2.4 & 4.5 directs and points to follow the 1sqft area method in Section 10.4 in ASTM E935-13, with no spread test on in-fill under load. Furthermore, the 1 square foot area is also repeated in ASTM D7032 Section 6.2.2 In-Fill Load Test for the Wood-Plastic Composite and Plastic Lumber.

The guard industry follows established engineering practices and when engineers are presented to review projects and prepare project calculation packages and sealed drawings, per the requirements set forth within the IRC, loads being applied to the 4-inch sphere are not within the requirements, nor is there a test method spelled out to follow for physical testing a load on the sphere directly. With the deletion of Part D of ASTM E935-00 in ASTM E935-13, the only similar in-fill spread testing method was removed. Why it was removed is not known to this author, but one can extrapolate or assume it was because the model codes, nor ASCE-7 provide a direction or requirement for this type of load being applied to guard in-fill. With the lack of a requirement, the Part D test method was deleted to streamline the standard to follow the model codes and ASCE-7.

What has been followed by engineers and industry is to apply the loads with designated safety factors designated in the test standards, acceptance criteria and within the code over a 1sqft area and then **MEASURE** for if a 4-inch sphere would pass through the in-fill without a load applied to the sphere directly, a simple measurement. This code change proposal removes any straying into whether inspectors should be carrying a certified fish-scale with an attachment method for 3 sizes of spheres for testing in-fill spreading and removes any mystery number pulled from the sky for improvised field test hanging 50-lbs kettle bells or even requesting a special inspection without a standard for the engineers to follow.

## NON-Applicable theories and information not in the Model Codes, Current Standards or ES Acceptance Criteria

To further extrapolate on a small and limited number of posts on forums that theorize applying a load directly to the sphere, we will theories how does one define the load? The requirements within the model 2021 IRC Table R301.5, under Guard in-fill components with note f, directs you to use a normal load of 50 pounds on an area equal to 1 square foot.

Now with the only in-fill load listed within the IRC in table R301.5 being for an area equal to 1 square foot established.

How does one extrapolate a number from this, we stipulate that it is not the intent of the code, nor listed in R301.5 for in-fill, however there are still inspectors who inject this undesignated structural failure test as being required by code and to use the 50 pounds listed for a 1 square foot area, on the sphere directly! We know the IRC does not specify this so,

Even if you pull from the sky and hypothesize a load should be applied to a sphere, which is only a portion of the 1 square foot area. Continuing with this unsupported hypothesis that the area of the sphere is somehow connected, what number do you use? Do you use the area of a 4-inch circle, or do you use half the surface area of a 4-inch sphere, both are an area measurement of the sphere?

If we first start a theory with using 1 square foot covers both non-contact and contact area of the in-fill area, and then input the area of a 4-inch diameter circle which is approximately 12.57 square inches, then divide the area of the circle by the area of 1 square foot, 144 square inches, we get 8.73%, and 8.73% of 50 pounds equals 4.367 lbs. Thus, we have extrapolated a hypothetical force for the sphere in direct proportion of 50 pounds on the area of 1 square foot to be equivalent to 4.367 pounds for the area of the circle.

However, some will argue that the actual number should be half the surface area of the sphere. If we follow this direction and start with a 4-inch sphere has an approximate surface area of 50.27 square inches, and since the 1 square foot area is not doubled for front and back, we need to remove the back half of the sphere and divide the sphere's surface area by 2. This reduces the surface area to 25.135 square inches. Next we divide the 25.135 square inches by 144 square inches, and we get 17.5% and applying this percentage to the 50 pounds, we extrapolate 8.75 pounds applied to a theoretical testing device not specified in any current testing standard or Acceptance Criteria published in the 2021 IRC Part IX - Referenced Standards or prior model IRC codes as a requirement.

We have walked through theories hypothesizing a 4-inch sphere's load, and we haven't even touched the surface as do these values change for each sphere designated in the exceptions? The simple thing is to return to reality and remember that none of these theories are actual code language within the IRC. For those inspectors that question that a guard's in-fill meets the requirements of the IRC, they can request that the owner supply engineering documents be provided establishing compliance with the code adopted in their jurisdiction, and the reality is none of these theories will be reviewed as they have never been a part of the model IRC.

The reason statement submitted for this proposal has walked through more than a few theories, however the defining facts are that the most current editions of ASTM E935 and ICC ES-AC273, and all published editions of the model IRC do not provided direction or a standard to follow for testing a load directly applied on any sphere for a measurement for guards.

**Bibliography:** ASTM Editions: ASTM E935-13e1, ASTM E935-00 & E935-83

ASTM E935-xx Current edition approved Aug. 1, 2021. Published September 2021. Originally approved in 1983. Last previous edition approved in 2013 as E935-13e1.

ICC ES AC273 Current edition editorially revised May 2021. Originally approved in 2004. Last previous edition approved in June 2017.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
No cost change, as this code change just clarifies that the dimensional measurement is not a load test.

RB118-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee agreed that guidance is needed for application of the force applied to the sphere used to test the opening limitations on guard openings, however, the concluded that this proposal needs further work. This proposal as written is may not be interpreted as intended, and the proposed text might make interpretations worse. The committee suggested it might be better located within the structural

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R312.1.3**

**Proponents:** Thomas Zuzik Jr, representing NOMMA (coderep@railingcodes.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R312.1.3 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. The opening limitation measurement for compliance ~~Opening Limitations~~ shall be determined without any force applied to the sphere.

**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  $4\frac{3}{8}$  inches (111 mm) in diameter.

**Commenter's Reason:** In addition to the reason statement in the original proposal the following information is being provided.

- During the committee action hearings, one opposition testimony brought to the attention that the wording should be directed at the compliance measurement for the opening limitation, which is what this modification by public comment addresses directly.
- Additional opposition testimony was stating that in order to measure the opening limitation for compliance an inspector must apply a physical load to the guard's infill to obtain a level of resistance before taking the measurement for opening limitation compliance.
  - By doing this, the inspector is performing a physical load test which is not specified as a requirement within R312.1.3 Opening Limitations, thus going beyond what the code stipulates.
  - An inspector doing this and then citing R312.1.3 for noncompliance is issuing a false statement, in that if the infill under load seems to be questionable the inspector should be citing that they need proof that the guard complies with the code, citing Table R301.5 for infill load, not R312.1.3 Opening Limitations.

All required guards must meet all the requirements specified in the model IRC for minimum compliance. Thus, the loads within Table R301.5 are an integral part in addition to the minimum requirements set in R312.1 for guards. Thus, many inspectors routinely cite section R312.1.3 for loose guard infill and the correct code section to cite is Live Load Table R301.5, guard in-fill components<sup>f</sup> which is the load test for the stability requirement within the IRC.

The correct route for an inspector to verify compliance for a questionable live load requirement is through an engineer's report.

This proposal does not remove an inspectors' ability to properly verify all the requirements for an installed guard system. The proposal does clarify that R312.1.3 Opening Limitations are a measurement taken in the field without any loads applied to the infill.

During the committee action hearings, opposition testimony questioned how the proposal states no cost increase if an engineer is required to verify compliance for the questioned loads? In either case, questioning that the infill underload is deflecting more than the code allows, can only be answered by an engineer review. The proponent of the proposal during the committee action hearings was not stating that an engineer's report is required for all projects, only that the opposition testimony questioning the infill's stability could not have a definitive conclusion without an engineer's report.

Lastly, it was mentioned during the committee action hearings that specifying into the model code clarifying that a load is not to be applied is not normal. However, the proponent stipulates this is not the case, as the code mentions many times that loads are not to be applied concurrently at the same time, and we stipulate this is no different for this proposal.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. No cost change, as this code change just clarifies that the dimensional measurement is not a load test.



## RB122-22

### **Proposed Change as Submitted**

**Proponents:** Jonathan Roberts, representing UL (jonathan.roberts@ul.com)

#### **2021 International Residential Code**

**Revise as follows:**

**R314.1.1 Listings.** Smoke alarms shall be listed and labeled in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be listed in accordance with UL 217 and UL 2034.

**Add new text as follows:**

**R314.1.2 Installation.** Smoke alarms shall be installed in accordance with their listing and the manufacturer's instructions.

**Reason:** This proposal adds requirement for these devices to be listed and labeled, since listed alarms will include a listing mark (label). It also requires smoke alarms to be installed in accordance with the listing and the manufacturer's installation instructions. "Listed" and "Labeled" are both defined terms.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

Listed smoke alarms are already identified by a label, and there is no additional cost associated with verifying they are installed in accordance with their listing and the manufacturer's instructions.

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RB122-22

### **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

**R314.1.1 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.

**Committee Reason:** The committee felt that the modification adding "and labeled" to the 2nd sentence of Section 314.1.1 is important for the combination smoke and carbon monoxide alarms - and would be consistent with the rest of the proposal. The committee concluded this proposal as modified is an improvement for the installation requirements for the alarms. The committee would like to see combination smoke and carbon monoxide alarms added to the installation Section R314.1.2 through public comment. See also RB124-22. (Vote 10-0)

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RB122-22

### **Individual Consideration Agenda**

#### **Public Comment 1:**

**IRC:** R314.1.2

**Proponents:** Jonathan Roberts, representing UL (jonathan.roberts@ul.com) requests As Modified by Public Comment

**Further modify as follows:**

#### **2021 International Residential Code**

**R314.1.2 Installation.** Smoke alarms and combination smoke and carbon monoxide alarms shall be installed in accordance with their listing and the manufacturer's instructions.

**Commenter's Reason:** This proposal adds the requirement for combination smoke and carbon monoxide alarms to be installed in accordance with the listing and the manufacturer's installation instructions. The same requirement currently exists for smoke alarms, and this expands the



requirement to include combination alarms as well similar to what was done in RB124-22.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Listed smoke alarms and combination smoke and carbon monoxide alarms are already being installed in the same fashion so there is no additional cost associated with verifying they are installed in accordance with their listing and the manufacturer's instructions.

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Public Comment# 3162

## RB129-22

### **Proposed Change as Submitted**

**Proponents:** Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com)

#### **2021 International Residential Code**

**Revise as follows:**

**R316.6 Specific approval.** Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically *approved* on the basis of one of the following *approved* tests: NFPA 286 with the acceptance criteria of Section R302.9.4, FM 4880, UL 1040 or UL 1715, ~~or fire tests related to actual end-use configurations~~. Approval shall be based on a large-scale test reflecting the actual end-use configuration and shall be 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.

**Reason:** This change correlates with a change made to the IBC by F60-21, Part II, which eliminated a loophole in the IBC that permitted creative testing of foam plastics without use of controls in Chapter 1 that are applicable to every other case where someone would want to propose an alternative method or material. When this "loose" code text was added to legacy codes, standardized testing of foam plastics had not yet reached maturity. Today however, we have several recognized and standardized tests for this purpose cited in the code text and additional options developed by evaluation services that can be considered as alternative methods under Chapter 1. Continuing to maintain "loose" text in this section that circumvents Chapter 1 is unjustified. If the general alternative methods provisions are good enough for everything else in the code, there is no reason for foam plastics to be treated differently. The technical committee agreed with this in Group A (vote 13-0), and the members rejected a public comment asking for that action to be overturned and upheld the committee in the OGCV.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. The proposal does not add any requirements but deletes a permitted approach for approval of foam plastic materials. There is the potential that materials that had been approved based on non-standard tests would have to be retested.

RB129-22

### **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal was disapproved because it eliminates a fire test option for compliance and the committee feels a large scale test is excessive for small applications that happen with residential. This requirement could actually increase costs. Some of the committee supported the proposal for its correlation with the the IBC and approved proposal F60-21 n Group A. The committee recommended that the proponents of RB129-22 and RB130-22 work together. (Vote: 6-5)

RB129-22

### **Individual Consideration Agenda**

#### **Public Comment 1:**

**IRC:** R316.6

**Proponents:** Jeffrey Shapiro, representing Self (jeff.shapiro@intlcodeconsultants.com) requests As Modified by Public Comment

**Modify as follows:**

#### **2021 International Residential Code**

**R316.6 Specific approval.** Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically *approved* on the basis of ~~one of the following approved tests: NFPA 286 with the acceptance criteria of Section R302.9.4, FM 4880, UL 1040 or UL 1715. Approval shall be based on a~~ an approved large-scale test reflecting the actual end-use configuration and ~~shall be 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, FM 4880, UL 1040 or UL 1715.

**Commenter's Reason:** There was significant support (a vote of 6:5) for this proposal in its original form. But rather than simply ask for APPROVAL AS SUBMITTED, this public comment seeks to address some of the opponent concerns expressed at the Rochester hearing. Primary opposition to the original proposal has related to the question of whether the text might have been read to require more than one test. This revision makes it clear that a only a single test is required. Regarding the committee statement suggesting that large scale tests might be excessive for residential applications, I've not heard any previous suggestions that we should be looking to permit foam plastics to skirt large scale testing. Would we now be looking for two approval levels for foam plastics that differ between residential and commercial applications? It is widely agreed by industry and the fire service that foam plastics need sufficient testing and approvals to ensure safe use in the built environment, both residential and commercial. This proposal sought to maintain that intent by ensuring that foam plastics that don't meet the prescriptive provisions of the code in R316 must go through the normal alternative method process for a thorough evaluation of equivalency.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The public comment is consistent with the intent of the original proposal.

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Public Comment# 3400

## **Proposed Change as Submitted**

**Proponents:** Eric Banks, representing North American Modern Building Alliance (NAMBA) (eric.banks@ewbanksconsulting.com)

### **2021 International Residential Code**

**Revise as follows:**

**R316.6 Specific approval.** Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically *approved* on the basis of one of the following ~~approved~~ tests:

1. NFPA 286 with the acceptance criteria of Section R302.9.4,
2. FM 4880,
3. UL 1040, or
4. UL 1715, ~~or fire tests related to actual end-use configurations.~~

Alternatively, foam plastics shall be permitted on the basis of the other approved large scale test.

**R316.6.1 Conditions of testing and approval.** Approval shall be based on tests of the actual end-use configuration and shall be performed on of the finished foam plastic assembly in with the foam plastic installed at 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. Foam plastics used as interior finish on the basis of these tests shall also conform to the flame spread and smoke developed requirements of Section R302.9.

**Reason:** This proposal is provided to improve and clarify guidance provided under IRC Section R316.6 regarding requirements for large scale tests required for the Specific Approval of foam plastics not meeting the requirements of Section R316.3 (surface burning characteristics), Section R316.4 (thermal barrier), and Section R316.5 (specific requirements).

Section R316.6 identifies five (5) testing options for the specific approval of foam plastics; four (4) standard test methods and, "...fire tests related to actual end-use configurations." Tests other than the four identified methods become necessary when the four standard methods are either inappropriate, inadequate, or cannot be configured to evaluate the actual intended end-use configuration. This proposed revision clarifies a hierarchy for testing whereby the four standard test methods are the requirement with the use of other large-scale tests (standard or non-standard) as a permitted alternate that must be *approved* by the building official.

The proposal also restructures Section R316.6 to (1) present the four identified standard test methods in a list format and (2) move requirements regarding conditions of testing and approval to a new sub-section R316.6.1. Moving the conditions of testing and approval in this fashion ensures their application to any testing conducted under Section R316.6.

Finally, a reference to Section R302.9 is included to ensure that conformance with interior finish requirements, when applicable, is required for these Specific Approvals.

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, Carlisle Construction Materials, 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 code change proposal will not increase or decrease the cost of construction  
The proposal does not change existing performance or construction requirements.

RB130-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal was disapproved because committee felt this proposal is confusing and does not correlate with the IBC proposal F60-21. The committee recommended that the proponents of RB129-22 and RB130-22 work together. (Vote: 10-0)

## **Individual Consideration Agenda**

### **Public Comment 1:**

#### **IRC: R316.6**

**Proponents:** Eric Banks, representing North American Modern Building Alliance (NAMBA) (eric.banks@ewbanksconsulting.com) requests As Modified by Public Comment

**Replace as follows:**

### **2021 International Residential Code**

**R316.6 Specific approval.** Foam plastic not meeting the requirements of Sections R316.3 through R316.5 shall be specifically *approved* on the basis of one of the following ~~approved tests listed below:~~ ~~NFPA 286 with the acceptance criteria of Section R302.9.4, FM 4880, UL 1040 or UL 1715, or fire tests related to actual end-use configurations.~~ Approval shall be based on testing of the actual end-use configuration and shall be 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.

1. NFPA 286 with the acceptance criteria of Section R302.9.4
2. FM 4880
3. UL 1040
4. UL 1715
5. Alternate large-scale fire test approved in accordance with Section R104.11

**Commenter's Reason:** This public comment is submitted to address concerns raised by the Residential Code Committee – Building. The Committee Reason provided in the Report of Committee Action Hearings indicated the committee felt RB130-22 was confusing and did not correlate with 2021 Group A proposal F60-21.

To address the issue of confusion, this Public Comment simplifies the reformatting of Section R316.6. Formatting the referenced tests as a list that includes the permitted use of other large-scale tests more clearly conveys the permissible testing options already prescribed by this section. To further minimize potential confusion, the revised language of the Public Comment no longer separates details, requirements, and limitations placed on the permitted testing and approval into a new subsection.

Regarding correlation with 2021 Group A's F60-21, the scope and use of the 2021 editions (and earlier) of IRC R316.6 and IBC Section 2603.9 (subject of F60-21 Part II) do not correlate, therefore, forcing correlation on the basis on F60-21 alone is not justified. The scope and use of IRC Section R316.6, however, is different and much broader than IBC Section 2603.9. IRC Section R316.6 provides for the approval of foam plastic that does not comply with surface burning characteristics (R316.3), thermal barrier separation (R316.4), and other specific requirements (R316.5) that regulate foam plastic and its uses under the IRC. For foam plastic not complying with Sections R316.3 through R316.5, alternate large-scale testing (Item 5 in the proposal) is often the final option available for foam plastic to demonstrate compliance with the intent of the IRC.

Our members request overturning the committee and approval of RB130-22 as Modified by this Public Comment. The proposed modifications to IRC Section R316.6 are a better and more clear way to present the referenced standard test methods, recognize the use of other large-scale testing, and important details required for all large-scale tests of assemblies.

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, Carlisle Construction Materials, Covestro, DuPont, EIFS Industry Members Association, GAF, Huntsman, Kingspan Insulation LLC, Metal Construction Association, Owens Corning, Polyisocyanurate Insulation Manufacturers Association, Rmax - A Business Unit of the Sika Corporation, and the EPS Industry Alliance.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The proposal and this public comment seek to more clearly present the testing prescribed and important code guidance as to key details and limitations placed on the testing.

## **Proposed Change as Submitted**

**Proponents:** Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

### **2021 International Residential Code**

**Revise as follows:**

**R317.1.1 Field treatment.** Field-cut ends, notches and drilled holes of preservative-treated wood shall be treated in the field in accordance with Section R317.1.1.1 or AWP M4.

**Add new text as follows:**

**R317.1.1.1 Preservatives.** Field treatment preservatives shall be the same type as the wood treatment and applied in accordance with the field-treatment manufacturer's installation instructions. Where the type of preservative of the treated wood cannot be effectively applied as a field treatment, the following treatments shall be permitted:

1. Copper naphthenate preservatives containing a minimum of 1.0% copper metal shall be permitted in above or below grade, interior or exterior applications.
2. Oilborne oxine copper preservatives containing a minimum 0.675% oxine copper (0.12% copper metal) shall be permitted in above grade, interior or exterior applications.
3. Inorganic boron preservatives having a minimum concentration of 1.5% shall be permitted for above grade, interior applications.
4. Coal-tar roofing cement complying with ASTM D5643 shall be permitted for treatment of holes in above or below grade, interior or exterior applications.

**Reason:** The reference to the AWP M4 standard for field treatment of treated lumber has been in the IRC since the 2006 edition. However, 15 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 AWP 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 inconvenient to access.

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.

It is, however, appropriate for the IRC to reference the many manufacturing standards that it does, such as the AWP U1 standard. The purchase and use of these standards are not required by the consumer end user. Investment in proper manufacturing standards is an investment in a business with a financial return. For nearly all other products, the manufacturer is referenced for the installation instructions, and they are generally provided with the purchase of the product. Treated lumber though... not the same.

As for the copyright of the AWP standard, this proposal is written in different form and without many of the unnecessary details in the M4 standard. Terms have been changed, requirements simplified and minimized, and the general presentation of the information is formatted uniquely. The knowledge of appropriate field treatments for preservative treated lumber is not solely in the possession of the AWP. The following information (below) can be found for free from the United States Forest Service, a Federal Government entity and thus public domain information. However, it is my expectation that the AWP membership and leadership will recognize the need to make this information more readily available to the public and recognize that the IRC is the most appropriate document to do so. I believe in the professionalism of their membership and that they will positively contribute their knowledge to the development of the IRC, ultimately helping their customers use their treated lumber as effectively and correctly as possible.

One important note. The AWP M4 standard requires copper naphthenate to have a minimum of 2% copper, but allows only 1% where 2% formulations are not regionally available. It does not seem appropriate to have different minimum standards based on the availability of a retail product to a region. If a 2% copper content product is not available everywhere in the US, it should not be the minimum. The end user of this code will purchase what is available to them. It is unlikely to presume they will be offered two choice or investigate the difference between them. Field treatment is not even standard practice, so a 1% formulation that's actually used is better than nothing.

The following information is available for FREE from the United States Forest Service at this link:

## Copper Naphthenate

Copper naphthenate is effective when used in ground contact, water contact, or aboveground. It is not standardized for use in saltwater applications. Copper naphthenate's effectiveness as a preservative has been known since the early 1900s, and various formulations have been used commercially since the 1940s. It is an organometallic compound formed as a reaction product of copper salts and naphthenic acids derived from petroleum. Unlike other commercially applied wood preservatives, small quantities of copper naphthenate can be purchased at retail hardware stores and lumberyards. Cuts or holes in treated wood can be treated in the field with copper naphthenate.

Wood treated with copper naphthenate has a distinctive bright green color that weathers to light brown. The treated wood also has an odor that dissipates somewhat over time. Depending on the solvent used and treatment procedures, it may be possible to paint wood treated with copper naphthenate after it has been allowed to weather for a few weeks.

Copper naphthenate can be dissolved in a variety of solvents. The heavy oil solvent (specified in AWP Standard P9, Type A) or the lighter solvent (AWPA Standard P9, Type C) are the most commonly used. Copper naphthenate is listed in AWP standards for treatment of major softwood species that are used for a variety of wood products. It is not listed for treatment of any hardwood species, except when the wood is used for railroad ties. The minimum copper naphthenate retentions (as elemental copper) range from 0.04 pounds per cubic foot (0.6 kilograms per cubic meter) for wood used aboveground, to 0.06 pounds per cubic foot (1 kilograms per cubic meter) for wood that will contact the ground and 0.075 pounds per cubic foot (1.2 kilograms per cubic meter) for wood used in critical structural applications.

When dissolved in No. 2 fuel oil, copper naphthenate can penetrate wood that is difficult to treat. Copper naphthenate loses some of its ability to penetrate wood when it is dissolved in heavier oils. Copper naphthenate treatments do not significantly increase the corrosion of metal fasteners relative to untreated wood.

Copper naphthenate is commonly used to treat utility poles, although fewer facilities treat utility poles with copper naphthenate than with creosote or pentachlorophenol. Unlike creosote and pentachlorophenol, copper naphthenate is not listed as an RUP by the EPA. Even though human health concerns do not require copper naphthenate to be listed as an RUP, precautions such as the use of dust masks and gloves should be used when working with wood treated with copper naphthenate.

## Oxine Copper (Copper-8-Quinolinate)

Oxine copper is effective when used aboveground. Its efficacy is reduced when it is used in direct contact with the ground or with water. It has not been standardized for those applications. Oxine copper (copper-8-quinolinate) is an organometallic compound. The formulation consists of at least 10 percent copper-8-quinolinate, 10 percent nickel-2-ethylhexanoate, and 80 percent inert ingredients. It is accepted as a standalone preservative for aboveground use to control sapstain fungi and mold and also is used to pressure-treat wood.

Oxine copper solutions are greenish brown, odorless, toxic to both wood decay fungi and insects, and have a low toxicity to humans and animals. Oxine copper can be dissolved in a range of hydrocarbon solvents, but provides protection much longer when it is delivered in heavy oil. Oxine copper is listed in the AWP standards for treating several softwood species used in exposed, aboveground applications. The minimum specified retention for these applications is 0.02 pounds per cubic foot (0.32 kilograms per cubic meter, as elemental copper).

Oxine copper solutions are somewhat heat sensitive, which limits the use of heat to increase penetration of the preservative. However, oxine copper can penetrate difficult-to-treat species, and is sometimes used to treat Douglas-fir used aboveground in wooden bridges and deck railings. Oilborne oxine copper does not accelerate corrosion of metal fasteners relative to untreated wood. A water-soluble form can be made with dodecylbenzene sulfonic acid, but the solution corrodes metals. Oxine copper is not widely used by pressure-treatment facilities, but is available from at least one plant on the West Coast.

Wood treated with oxine copper presents fewer toxicity or safety and handling concerns than oilborne preservatives that can be used in ground contact. Sometimes, it is used as a preservative to control sapstain fungi or incorporated into retail stains for siding, shingles, and cabin logs. Oxine copper is listed by the U.S. Food and Drug Administration (FDA) as an indirect additive that can be used in packaging that may come in direct contact with food.

Precautions such as wearing gloves and dust masks should be used when working with wood treated with oxine copper. Because of its somewhat limited use and low mammalian toxicity, there has been little research to assess the environmental impact of wood treated with oxine copper.

## Borates

Borate compounds are the most commonly used unfixed waterborne preservatives. Unfixed preservatives can leach from treated wood. They are used for pressure treatment of framing lumber used in areas with high termite hazard and as surface treatments for a wide range of wood products, such as cabin logs and the interiors of wood structures. They are also applied as internal treatments using rods or pastes. At higher rates of retention, borates also are used as fire-retardant treatments for wood.

Boron has some exceptional performance characteristics, including activity against fungi and insects, but low mammalian toxicity. It is relatively inexpensive. Another advantage of boron is its ability to diffuse with water into wood that normally resists traditional pressure treatment. Wood treated with borates has no added color, no odor, and can be finished (primed and painted).

While boron has many potential applications in framing, it probably is not suitable for many Forest Service applications because the chemical will leach from the wood under wet conditions. It may be a useful treatment for insect protection in areas continually protected from water.

Inorganic boron is listed as a wood preservative in the AWPA standards, which include formulations prepared from sodium octaborate, sodium tetraborate, sodium pentaborate, and boric acid. Inorganic boron is also standardized as a pressure treatment for a variety of species of softwood lumber used out of contact with the ground and continuously protected from water. The minimum borate (B<sub>2</sub>O<sub>3</sub>) retention is 0.17 pounds per cubic foot (2.7 kilograms per cubic meter). A retention of 0.28 pounds per cubic foot (4.5 kilograms per cubic meter) is specified for areas with Formosan subterranean termites.

Borate preservatives are available in several forms, but the most common is disodium octaborate tetrahydrate (DOT). DOT has higher water solubility than many other forms of borate, allowing more concentrated solutions to be used and increasing the mobility of the borate through the wood. With the use of heated solutions, extended pressure periods, and diffusion periods after treatment, DOT can penetrate species that are relatively difficult to treat, such as spruce. Several pressure treatment facilities in the United States use borate solutions.

Although borates have low mammalian toxicity, workers handling borate-treated wood should use standard precautions, such as wearing gloves and dust masks. The environmental impact of borate-treated wood for construction projects in sensitive areas has not been evaluated. Because borate-treated wood is used in areas protected from precipitation or water, little or no borate should leach into the environment. Borates have low toxicity to birds, aquatic invertebrates, and fish. Boron occurs naturally at relatively high levels in the environment. Because borates leach readily, extra care should be taken to protect borate-treated wood from precipitation when it is stored at the jobsite. Precipitation could deplete levels of boron in the wood to ineffective levels and harm vegetation directly below the stored wood.

Borate-treated wood should be used only in applications where the wood is kept free from rainwater, standing water, and ground contact.

**Cost Impact:** The code change proposal will decrease the cost of construction

This proposal will decrease the cost of the knowledge necessary for code compliant installations of treated lumber. This is a design cost. Therefore the overall cost of construction will be reduced.

RB132-22

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## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee decided this proposal adds confusion specifically with the statement, "where the type of preservative of the treated wood cannot be effectively applied as a field treatment," that triggers the four points that are being included in this proposal. Some support for the proposal pointed out the AWPA M4 is still an applicable standard in this proposal which gives the prescriptive work some guidance. (Vote: 6-4)

RB132-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R317.1.1, R317.1.1.1

**Proponents:** Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R317.1.1 Field treatment.** Field-cut ends, notches and drilled holes of preservative-treated wood shall be treated in the field in accordance with the treated wood manufacturer's recommendations. In the absence of manufacturer's recommendations, treatment shall be in accordance with Section



**R317.1.1.1 Preservatives.** Field treatment preservatives shall be ~~permitted in accordance with the following:~~~~the same type as the wood treatment and applied in accordance with the field treatment manufacturer's installation instructions.~~ ~~Where the type of preservative of the treated wood cannot be effectively applied as a field treatment, the following treatments shall be permitted:~~

1. Copper naphthenate preservatives containing a minimum of 1.0% copper metal shall be permitted in above or below grade, interior or exterior applications.
2. Oilborne oxine copper preservatives containing a minimum 0.675% oxine copper (0.12% copper metal) shall be permitted in above grade, interior or exterior applications.
3. Inorganic boron preservatives having a minimum concentration of 1.5% shall be permitted for above grade, interior applications.
4. ~~Coal tar roofing cement complying with ASTM D5643 shall be permitted for treatment of holes in above or below grade, interior or exterior applications.~~

**Commenter's Reason:** We stand on our previous reason statement, but we have also addressed the concerns of our opposition and the committee in this proposed modification.

The published committee reason for disapproval was that the following proposed language was confusing: "Where the type of preservative of the treated wood cannot be effectively applied as a field treatment, the following treatments shall apply". We agree and have addressed this in our proposed modification that requires the field treatment to be in accordance with the treated lumber manufacturer. They are the most appropriate source to know if their treatment process can be applied as a field treatment and how to apply it. If it cannot be applied as a field treatment, they are the most appropriate source to make a recommendation for another product. They can also chose to do nothing, and allow the AWP standard or prescriptive method to be selected by the end user. This is exactly how corrosion resistance of hardware in contact with treated lumber is addressed in section R317.3.1. The manufacturer gets a chance to specify proprietary requirements for their products. If they chose not to, it reverts to standards and code. Please review the precedence established in that section.

Opposition from treated wood representatives voiced concern that the IRC would not be updated frequently enough to allow for alternative field treatment methods that are expected in the future. With the modification we propose, the treated lumber manufacturer is the first authority to provide direction for what field treatment is required for their product to offer the service life they promote to the consumer. If they develop a new method to treat their products, they can recommend that product and, presumably, provide application instructions as part of the product purchase. New generic treatment methods that perform on all treated lumber types can still go through the AWP process for recognition in the M4 standard. For the commodity products that have been approved and available for many decades, they will simply be directly provided in the IRC as included in our original proposal.

Though the M4 standard clearly provides a method for using coal tar roofing cement in holes bored for connectors that would presumably apply to lumber applications under the IRC, we were informed by the opposing treated wood professionals that we misinterpreted that language in the \$40 M4 standard we purchased. We respect these professionals as having greater knowledge of their industry's standard practices, so we have deleted this application from our proposal. We also believe that our misinterpretation further reveals how inappropriate it is to send the general public and residential tradespeople over to a professional standard that may be difficult for them to understand.

We did not receive any communication from AWP representatives regarding the AWP stance on our original proposal. We publicly invited their contributions in our original proposal reason statement and can only take their continued silence as a neutral position.

We believe with this modification all reasonable opposition has been satisfied and The People will have much greater success in properly installing their treated lumber such that it can provide the expected useful life that has been promoted. They will also not be required by the building code to purchase installation instructions, which has always been our only goal.

**Cost Impact:** The net effect of the public comment and code change proposal will decrease the cost of construction

By providing the information for code compliant construction directly in the IRC and not in a fee-based standard, the design cost of construction will be lowered.

Public Comment# 3196

## **Public Comment 2:**

**IRC:** R317.1.1

**Proponents:** Josh Roth, representing Arxada (joshua.roth@lonza.com); Kristen Owen, representing Myself (kowen4568@gmail.com); Travis Hixon, representing Koppers Performance Chemicals (hixontd@koppers.com) requests As Modified by Public Comment

**Replace as follows:**

## 2021 International Residential Code

**R317.1.1 Field treatment.** Field-cut ends, notches and drilled holes of preservative-treated wood shall be treated in the field in accordance with the treated wood manufacture's recommendations. In the absence of the manufacture's recommendations, treatment shall be in accordance with AWPA M4.

**Commenter's Reason:** This is a change that the wood treating industry is behind. After the original proponet presented his argument we do agree that the language could be improved without adding language from a copyrighted standard in the code book.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal reflects accepted industry practice, so there will be no additional costs for construction.

Public Comment# 3491

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## **Proposed Change as Submitted**

**Proponents:** Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

### **2021 International Residential Code**

**Revise as follows:**

**R322.1.6 Protection of mechanical, plumbing and electrical systems.** Electrical systems, *equipment* and components; heating, ventilating, air-conditioning; plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* shall be located at or above the elevation required in Section R322.2 or R322.3. Replacement of exterior equipment and exterior appliances damaged by flood shall meet the requirements of this section. If replaced as part of a substantial improvement, electrical systems, *equipment* and components; heating, ventilating, air-conditioning and plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* shall meet the requirements of this section. Systems, fixtures, and *equipment* and components shall not be mounted on or penetrate through walls intended to break away under flood loads.

**Exception:** Locating electrical systems, *equipment* and components; heating, ventilating, air-conditioning; plumbing *appliances* and plumbing fixtures; *duct systems*; and other service *equipment* is permitted below the elevation required in Section R322.2 or R322.3 provided that they are designed and installed to prevent water from entering or accumulating within the components and to resist hydrostatic and hydrodynamic loads and stresses, including the effects of buoyancy, during the occurrence of flooding to the required elevation in accordance with ASCE 24. Electrical wiring systems are permitted to be located below the required elevation provided that they conform to the provisions of the electrical part of this code for wet locations.

**Reason:** Many buildings in floodplain were built before communities started regulating and requiring buildings to be elevated and constructed to minimize exposure to flooding. During a flood, exterior equipment that serves those buildings gets damaged, even when the building itself is not substantially damaged. When homes are flooded and elevated exterior equipment remains functional, clean up and drying out are easier and faster. This means dangerous mold conditions are less likely to develop and families can more quickly move back into safer homes. The code change requires replacement exterior equipment damaged by flood to be raised to or above the elevation required based on flood zone, unless the replacement equipment meets the limitations of the exception to be located below those elevations. Methods used to raise replacement exterior equipment are the same as the methods used when equipment is installed to serve new construction (pedestal, platforms, or platforms that are cantilevered from or knee braced to the structure). Photographs below show typical methods of elevating equipment that serves dwellings.

FEMA's Mitigation Assessment Team reports prepared after some significant flood events document widespread damage to non-elevated exterior equipment. Elevating equipment at the time of replacement also saves homeowners from having to pay for replacement equipment after the subsequent flood event.





Photographs are provided courtesy of: FEMA P-348, Rebecca Quinn, and Rebecca Quinn

**Cost Impact:** The code change proposal will increase the cost of construction

When nonconforming dwellings have non-elevated exterior equipment, this code change proposal requires compliance when the exterior equipment is replaced after being damaged by flooding. Most equipment is elevated; although most typical exterior equipment is not designed to satisfy the requirements and limitations of the exception, that option remains available. Increased costs incurred would be the cost of the pedestal or platform on which the replacement equipment is raised elevated and minor costs to extend wiring and piping, if necessary. The actual cost increase depends on the method of elevation (pedestal, platform, cantilevered/knee braced platform), how high above grade is necessary to meet the elevation requirements of R322.2 or R322.3, as applicable, and other factors such as soil type. The cost of a professionally built 6-foot high wooden platform is approximately \$500, with an additional estimated \$100 for 10 feet of copper refrigerant line, for a total of approximately \$600. At least two long-term benefits off-set the upfront additional installation costs: damage avoided and cost of complete replacement if flooded, and faster drying, clean-up, and reoccupancy after subsequent flood events.

RB136-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee could not determine whether or not this proposal applies to flooding not related to natural effects - this should be limited for flooding from natural effects. The trigger for replacement should be at the level of substantial damage/substantial improvement. (Vote: 10-0)

RB136-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov) requests As Submitted

**Commenter's Reason:** Many flood events are not severe enough to cause enough damage such that the cost to repair a building equals or exceeds 50 percent of the market value of the building – called “substantial damage.” In those cases, where flood-damaged exterior equipment must be replaced, this proposal would require replacement equipment to be elevated, thus minimizing future damage. Section R322.1.6, like all other flood provisions in the IRC, applies in flood hazard areas, thus the meaning of “flood” is understood as flooding from the source depicted on FEMA Flood Insurance Rate Maps or on other maps that may be adopted by some communities.

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction. The public comment does not impact the cost of the code change proposal. Therefore, the net effect of the public comment and code change proposal is equal to the cost impact of the code change proposal. No additional cost impact comments.

Public Comment# 3166

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## **Proposed Change as Submitted**

**Proponents:** Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov); Rebecca Quinn, representing DHS Federal Emergency Management Agency (rcquinn@earthlink.net)

### **2021 International Residential Code**

**Revise as follows:**

#### **R322.2.1 Elevation requirements.**

1. Buildings and structures in flood hazard areas, not including flood hazard areas designated as Coastal A Zones, shall have the lowest floors elevated to or above the base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.
2. In areas of shallow flooding (AO Zones), buildings and structures shall have the lowest floor (including *basement*) elevated to a height above the highest adjacent *grade* of not less than the depth number specified in feet (mm) on the FIRM plus 1 foot (305 mm), or not less than 3 feet (915 mm) if a depth number is not specified.
3. *Basement* floors that are below *grade* on all sides shall be elevated to or above base flood elevation plus 1 foot (305 mm), or the design flood elevation, whichever is higher.
4. Attached garages and carports ~~Garage and carport floors~~ shall comply with one of the following:
  - 4.1. ~~They~~ The floors shall be elevated to or above the elevations required in Item 1 or Item 2, as applicable.
  - 4.2. ~~They~~ The floors shall be at or above *grade* on not less than one side. Where ~~a~~ an attached garage or carport is enclosed by walls, the walls shall have flood openings that comply with Section R322.2.2 and the attached garage or carport shall be used solely for parking, building access or storage.
5. Detached accessory structures and detached garages shall comply with either of the following:
  - 5.1. The floors shall be elevated to or above the elevations required in Item 1 or Item 2, as applicable.
  - 5.2. The floors are permitted below the elevations required in Item 1 or Item 2, as applicable, provided such detached structures comply with all of the following:
    - 5.2.1. Are used solely for parking or storage.
    - 5.2.2. Are one story and not larger than 600 square feet (55.75 m<sup>2</sup>).
    - 5.2.3. Are anchored to resist flotation, collapse or lateral movement resulting from design flood loads.
    - 5.2.4. Have flood openings that comply with Section R322.2.2.
    - 5.2.5. Are constructed of flood damage-resistant materials that comply with Section R322.1.8.
    - 5.2.6. Have mechanical, plumbing and electrical systems, if applicable, that comply with Section R322.1.6.

**Exception:** Enclosed areas below the elevation required in this section, including *basements* with floors that are not below *grade* on all sides, shall meet the requirements of Section R322.2.2.

#### **R322.3.2 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.
2. *Basement* floors that are below *grade* on all sides are prohibited.
3. Attached garages ~~Garages~~ used solely 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 ~~6~~ 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. The floors are permitted below the elevations required in Item 1, provided such detached structures comply with all of the following:
    - 4.2.1. Are used solely for parking or storage.
    - 4.2.2. Are one story and not larger than 100 square feet (9.29 m<sup>2</sup>).
    - 4.2.3. Are anchored to resist flotation, collapse or lateral movement resulting from design flood loads.
    - 4.2.4. Are constructed of flood damage-resistant materials that comply with Section R322.1.8.
    - 4.2.5. Have mechanical, plumbing and electrical systems, if applicable, that comply with Section R322.1.6.
- ~~4.5.~~ The use of fill for structural support is prohibited.
- ~~5.6.~~ 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, pool decks, patios and walkways.
- ~~6.7.~~ Walls and partitions enclosing areas below the elevation required in this section shall meet the requirements of Sections R322.3.5 and R322.3.6.

**Reason:** The regulations of the National Flood Insurance Program require all structures to be elevated or dry floodproofed (nonresidential only). The regulations do not explicitly address accessory structures and detached garages. FEMA guidance issued in 1993 (NFIP Technical Bulletin 7) states that communities must use variances to authorize non-elevated detached accessory structures that are wet floodproofed. Wet floodproofing measures minimize flood damage by allowing certain areas to flood, relieving hydrostatic loads and using materials resistant to flood damage. In 2020, FEMA issued a policy and bulletin specifying requirements for communities to issue permits for non-elevated, wet floodproofed accessory structures rather than variances. Notably, the policy and bulletin establish size limits as a function of flood zone. In flood hazard areas identified as Zone A (all zones that start with "A"), the size limit is one-story two car garage (600 sq ft) and in areas identified as Zone V (start with "V"), the size limit is 100 sq ft. Detached accessory structures that are larger than these sizes must fully comply with the elevation or dry floodproofing requirements for buildings in flood hazard areas. Alternatively, communities may consider individual variances for those larger accessory structures (local floodplain management regulations have criteria for considering variances). FEMA expects to reissue Technical Bulletin 7 in early 2022, revised to be consistent with the policy.

The proposal adds provisions to the elevation requirements of Section R322, Flood-Resistant Construction, specifically to allow wet floodproofed accessory structures and detached garages in flood hazard areas with floors below the required lowest floor elevations. The IRC Section 105.2 states that accessory structures smaller than 200 square feet are exempt from permits but must not "be done in any manner in violation" of the code. Therefore, strictly read, accessory structures in flood hazard areas must be fully elevated or dry floodproofed. This proposal provides some relief to full compliance by allowing some accessory structures to be wet floodproofed (based on size). The proposal also modifies the requirements of R322.2.1 and R322.3.2 to apply to attached garages, with no size limits. Note that for floodplain management purposes, enclosures under elevated buildings used solely for parking, storage and building access are enclosures, not garages.

The proposal specifies that detached accessory structures and detached garages are allowed below the elevations required for other structures (or without dry floodproofing in Zone A/AE) if wet floodproofed and:

- In flood hazard areas other than coastal high hazard areas, the structures are one-story and not larger than 600 sq. ft. (approximately a two-car garage). Detached garages and accessory structures larger than the size limit are allowed if elevated and otherwise comply with the requirements or if dry floodproofed (treated as nonresidential), or if communities authorize them by variance. Note that Section R403.1.4.1 does not require footings for "free-standing accessory structures with an area of 600 square feet or less, of light-frame construction" to extend meet the frost protection requirements.
- In coastal high hazard areas (Zone V), the structures are not larger than 100 sq. ft. Note that breakaway walls and flood openings are not required. Detached accessory structures larger than the size limit are allowed if elevated and otherwise comply with the requirements, or if communities authorize them by variance.

**Bibliography:** The Floodplain Management Agricultural Structures Policy and FEMA P-2140, *Floodplain Management Bulletin: Requirements for Agricultural Structures and Accessory Structures*, are available here: <https://www.fema.gov/media-collection/floodplain-management-requirements-agricultural-and-accessory-structures>

**Cost Impact:** The code change proposal will decrease the cost of construction

Costs for many detached accessory structures will decrease because they will no longer be required to be elevated or dry floodproofed when they are smaller than the specified limits, and there are cost savings because communities will not be expected to approve non-elevated accessory structures by variance. The code change proposal limits the size of detached accessory structures and detached garages that can be wet floodproofed rather than elevated or dry floodproofed. An increase in costs occurs only when property owners want accessory structures or detached garages in flood hazard areas that are larger than the specified limits because those larger structures must be installed on elevated foundations (or dry floodproofed in Zone A/AE), unless approved by individually considered variances to be wet floodproofed. However, it is reasonable to assume that the larger the size, the more costly would be the losses resulting from flooding. Additional costs for those larger

structures to be elevated depend on the type of foundation chosen. In the report "Natural Hazard Mitigation Saves," the National Institute of Building Sciences estimated that for elevating a single-family home, the cost is \$33 per foot of elevation per pile and \$325 per foot of elevation for stairs. Therefore, for a 1152 square foot accessory structure (24 ft by 48 ft) with 15 piles spaced 12 feet on center, the added cost of elevation would be \$820 per foot of elevation. It is reasonable to assume the cost would be less when more typical pier foundation elements and anchoring are used.

Bibliography: Natural Hazard Mitigation Saves (2019), National Institute of Building Sciences. <https://www.nibs.org/projects/natural-hazard-mitigation-saves-2019-report>.

RB137-22

## **Public Hearing Results**

### **Committee Action:**

**Disapproved**

**Committee Reason:** The committee was in support of the general idea, but felt the issue of the the size of the garage did not seem vetted out completely. The 100 square feet seems really low where the IRC doesn't require permits until 200 square feet. (Vote: 10-0)

RB137-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Gregory Wilson, representing FEMA (gregory.wilson2@fema.dhs.gov) requests As Submitted

**Commenter's Reason:** Including the proposed requirements in the IRC will mean thousands of communities that participate in the NFIP will conform to the policy and bulletin issued by FEMA regarding wet floodproofed (non-elevated) accessory structures. It is only by FEMA policy that accessory structures smaller than specified sizes are not required to be elevated or dry floodproofed. The size limit is 100 sq ft for detached accessory structures in coastal high hazard areas (Zone V, where wave heights are 3 feet and higher) and Coastal A Zones (wave heights between 3 and 1.5 feet), and the size limit is one-story, 600 sq ft for detached garages and accessory structures in all other flood hazard areas. The committee questioned the 100 sq ft size limit established by FEMA for Zone V, in part because the IRC doesn't require permits for accessory structures that are less than 200 sq ft. However, even though permits are not required, compliance is required because accessory structures smaller than 200 square feet are exempt from permits must not "be done in any manner in violation" of the code. Including the proposed requirements for accessory structures establishes how accessory structures can be allowed and not violate the code. Without this proposal, 100-sq ft accessory structures in Zone V would have to be fully elevated.

The 100 sq. ft. size limit for Zone V and Coastal A Zone is consistent with FEMA guidance and letters of interpretation issued to communities since the mid-1980s. The first NFIP Technical Bulletin 5 on the NFIP free-of-obstruction requirements for Zone V was issued in 1993. It stated the following:

*"Unless properly elevated on piles or columns in accordance with Section 60.3(e)(4), accessory buildings in V zones must be limited to low-value or small structures such as small metal or wooden sheds that are "disposable." If a low-cost or small building is placed on a site, consideration must be given to the effects the debris from the building will have on the building or adjacent buildings. If the building is of significant size and strength to create either a debris impact or flow diversion problem, it must be elevated in accordance with Section 60.3(e)(4)."*

*"For purposes of defining and administering the floodplain ordinance, if a community wishes to allow unelevated accessory buildings, the community must establish the meaning of low-cost and small accessory buildings. FEMA recommends that low cost be defined as having a value of less than \$500 and small be defined as less than 100 square feet of floor space. Accessory buildings meeting these criteria must be unfinished on the interior, constructed with flood-resistant materials below the BFE, and used only for storage. Unless properly elevated on piles or columns in accordance with Section 60.3(e)(4), detached garages are not allowed in V zones."*

**Cost Impact:** The net effect of the public comment and code change proposal will decrease the cost of construction

The public comment does not impact the cost of the code change proposal. Therefore, the net effect of the public comment and code change proposal is equal to the cost impact of the code change proposal. No additional cost impact comments.

Public Comment# 3167



## **Proposed Change as Submitted**

**Proponents:** Stephen Skalko, representing Masonry Alliance for Codes and Standards (svskalko@svskalko-pe.com); Scott Campbell, representing NRMCA (scampbell@nrmca.org)

### **2021 International Residential Code**

**[RB] STORM SHELTER.** A building, structure or portion thereof, constructed in accordance with ICC 500 and designated for use during a severe wind storm event, such as a hurricane or tornado.

**Add new definition as follows:**

**Community storm shelter.** A storm shelter not defined as a "Residential storm shelter." This includes storm shelters intended for use by the general public, by building occupants or a combination of both.

**Residential storm shelter.** A storm shelter serving occupants of dwelling units and having a design occupant capacity not exceeding 16 persons.

**Add new text as follows:**

**R323.1.2 Shelters required.** In areas where the shelter design wind speed for tornados is 250 mph in accordance with Figure 304.2(1) of ICC 500, a storm shelter shall be provided in accordance with ICC 500. *Residential storm shelters* serving dwelling units shall be located in accordance with ICC 500 Section 403.2. *Community storm shelters* shall be located where the maximum distance of travel from not fewer than one exterior door of each dwelling unit to a door of the shelter serving that dwelling unit does not exceed 1,000 feet (305 m).

**Exception:** Dwellings meeting the requirements for shelter design in ICC 500.

**Reason:** Section R323 of the IRC tells the code user to use ICC 500, *Standard for the Design and Construction of Storm Shelters* for requirements to be met if storm shelters associated with one-and two-family dwellings are provided. However, the code does not require that such shelters be provided. Recent tornado events continue to show the need to provide such shelters for one-and two-family dwellings in high tornado wind regions. Experience has shown that storm shelters in high tornado wind regions provide protection for persons from injury or death due to structural collapse and/or wind-borne debris.

This proposal will require storm shelters be provided for one-and two-family dwellings built in areas where the tornado wind speeds are 250 mph or higher according to ICC 500 Figure 304.2(1). The area covered by this tornado wind speed is consistent with the areas in five states that recently experienced devastating damage, reportedly over 100 deaths and many more injured from a series of tornado events occurring within a 24-hour period December 10-11, 2021.

The proposal also permits a stand-alone shelter, either as an accessory building to the dwelling or a community shelter, to meet the requirements of this section. Where a stand-alone storm shelter is provided, the proposal limits the travel distance to the stand-alone shelter based on ICC 500 Section 403.2 for Residential storm shelters, or within 1000 feet from at least one exterior door of the dwelling unit to a Community storm shelter door.

**Bibliography:** Satellites Spot Tornado Tracks Across Midwest (nasa.gov)

**Cost Impact:** The code change proposal will increase the cost of construction

Including a storm shelter within a dwelling unit or as a stand-alone structure will increase the cost of construction. The actual costs will depend on the materials of choice and design features of the shelter. Insofar as any cost-benefit conclusion, that is extremely difficult to quantify when considering actions to save lives. However, it can be stated that a shelter does increase the probability that persons are more likely to survive an event with the shelter rather than being exposed to the elements outside the shelter.

RB144-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee felt that requiring a storm shelter is beyond reasonable expectation for a new dwelling or townhouse. Installation of a storm shelter should be something that is voluntary. This could be read to require community shelters and residential shelters for the same properties. The need for storm shelters should be based on the evaluation or risk. Not all home in the tornado belt are in exposed areas.

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: APPENDIX AY (New), (New), AY101 (New), AY101.1 (New), AY102 (New), AY102.1 (New), AY103 (New), AY103.1 (New), AY104 (New), AY104.1 (New)

**Proponents:** Stephen Skalko, representing Masonry Alliance for Codes and Standards (svskalko@svskalko-pe.com); Scott Campbell, representing NRMCA (scampbell@nrmca.org) requests As Modified by Public Comment

Replace as follows:

### **2021 International Residential Code**

#### **APPENDIX AY** **STORM SHELTERS**

**The provisions contained in this appendix are not mandatory unless specifically referenced in the adopting ordinance**

**User note:** About this appendix: Section 323 has the basic information to guide the code user on storm shelter design in accordance with ICC 500. Appendix AY provides the criteria to assist jurisdictions in determining where storm shelters should be provided. The provisions also allow an option to use Community Shelters within a reasonable distance of the dwelling units as an alternate to providing a storm shelter within the dwelling unit.

#### **AY101** **SCOPE**

**AY101.1 General.** This appendix applies to storm shelters where constructed as separate detached buildings or where constructed as safe rooms within buildings for the purpose of providing refuge from storms that produce high winds, such as tornados and hurricanes. In addition to other applicable requirements in this appendix, storm shelters shall be constructed in accordance with Section R323.

#### **AY102** **DEFINITIONS**

**AY102.1 General.** The following terms shall, for the purpose of this appendix, have the meaning shown herein.

**STORM SHELTER.** A building, structure or portion thereof, constructed in accordance with ICC 500 and designated for use during a severe wind storm event, such as a hurricane or tornado.

**Community storm shelter.** A storm shelter not defined as a "Residential storm shelter." This includes storm shelters intended for use by the general public, by building occupants or a combination of both.

**Residential storm shelter.** A storm shelter serving occupants of dwelling units and having a design occupant capacity not exceeding 16 persons.

#### **AY103** **WHERE REQUIRED**

**AY103.1 Shelters required.** A storm shelter shall be provided in areas where the shelter design wind speed for tornados is 250 mph in accordance with Figure 304.2(1) of ICC 500. Residential storm shelters shall be located within dwellings they serve or shall be located in accordance with ICC 500 Section 403.2. Where multiple dwelling units share a community storm shelter, the maximum distance of travel from at least one exterior door of each dwelling unit to a door of the shelter serving that dwelling unit shall not exceed 1,000 feet (305 m).

**Exception:** Dwellings meeting the requirements for shelter design in ICC 500.

#### **AY104** **REFERENCED STANDARDS**

**AY104.1 General.** See Table AY104.1 for standards that are referenced in various section of this appendix. Standards are listed by the standard indentification with the effective date, the standard title, and the section or sections of this appendix that reference this standard.

### **AY104.1 REFERENCED STANDARDS**

| <b><u>STANDARD ACRONYM</u></b> | <b><u>STANDARD NAME</u></b>  | <b><u>SECTIONS HEREIN REFERENCED</u></b> |
|--------------------------------|--|--|
| <u>ICC 500-2020</u>            | <u>ICC/NSSA Standard for the Design and Construction of Storm Shelters</u> | <u>AY103.1</u>                           |

**Commenter's Reason:** Section R323 of the IRC tells the code user to use ICC 500, *Standard for the Design and Construction of Storm Shelters* for requirements to be met if storm shelters associated with one-and two-family dwellings are provided. However, the code does not require that such shelters be provided. Recent tornado events continue to show the need to provide such shelters for one-and two-family dwellings in high tornado wind regions. Experience has shown that storm shelters in high tornado wind regions provide protection for persons from injury or death due to structural collapse and/or wind-borne debris.

The original code change proposal would make the use of shelters in the areas defined mandatory. This public comment places the requirements in an optional appendix in the IRC that State and local jurisdictions may adopt where they deem storm shelters are a necessary component for the safety of their citizens. If adopted, storm shelters would be required for one-and two-family dwellings built in areas where the tornado wind speeds are 250 mph or higher according to ICC 500 Figure 304.2(1). The area covered by this tornado wind speed is consistent with the areas in five states that experienced devastating damage, reportedly over 100 deaths, and many more injured from a series of tornado events occurring within a 24-hour period December 10-11, 2021.

The proposal also permits a stand-alone shelter (e.g., accessory to the dwelling or a community shelter) to be provided for dwellings. Where a community shelter option is used for multiple dwelling units, the shelter must be reached within 1000 feet of at least one exterior door to each dwelling unit served by that shelter.

Biography: [Satellites Spot Tornado Tracks Across Midwest \(nasa.gov\)](https://www.nasa.gov)

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction. Where jurisdictions adopt this appendix there will be an additional cost to provide the needed storm shelter protection.

Public Comment# 3244

## **Proposed Change as Submitted**

**Proponents:** Jason Laws - VBCOA, Chesterfield County, Virginia, representing VBCOA (lawsj@chesterfield.gov)

### **2021 International Residential Code**

**Delete and substitute as follows:**

**R324.6.1 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 fire fighters accessing the roof. Pathways shall be located in areas with minimal obstructions such as vent pipes, conduit, or mechanical equipment.

**R324.6.1 Pathways.** A minimum 36" wide pathway shall be provided on all roof planes with photovoltaic arrays. Each pathway shall provide access from the lowest roof edge to the ridge and be free of obstructions such as vent pipes, conduit, or mechanical equipment.

**Reason:** The purpose of this proposal is for clarification. The current code provision includes excessive, unneeded language which makes this section confusing and hard to follow.

The language requiring a pathway "on the street or driveway side of the roof" is not needed. If you have a pathway where ever a photovoltaic panel is installed, you will always meet this requirement. If panels are only on the rear of the house, the entire front roof plane is clear and creates a pathway by default. If you have panels on the front of the house, then a pathway is needed and would still meet this requirement.

The language requiring a pathway "on an adjacent roof plane, or straddling the same and adjacent roof planes." only creates confusion and could result in "pathways" that are not functional.

The language requiring "Pathways shall be over areas capable of supporting fire fighters accessing the roof." is not needed. The minimum design loads in R301.6 already cover this.

The intent of the code would remain the same but this proposal makes it much easier to understand, making it easier to design and enforce.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

The proposal does not increase or decrease the cost of construction. This proposal keeps the intent of the code the same, simply makes it easier for everyone to understand and apply.

RB148-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved because there was a consensus between the proponent and others to fix the proposed language and provide this in public comment, including issues such as the perpendicular running of conduit. (Vote: 10-0)

RB148-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R324.6.1, R324.6.1.1 (New)

**Proponents:** Kevin Scott, representing KH Scott & Associates LLC (khscottassoc@gmail.com) requests As Modified by Public Comment

**Modify as follows:**

## 2021 International Residential Code

**R324.6.1 Pathways.** A minimum 36" wide pathway shall be provided on all roof planes with photovoltaic arrays. Each pathway shall provide access from the lowest roof edge to the ridge and be free of obstructions such as vent pipes, conduit, or mechanical equipment. All buildings that have roof-mounted photovoltaic arrays shall provide a minimum of one pathway on each roof plane with photovoltaic panels.

**R324.6.1.1 Pathway design.** Pathways shall provide access from the lowest roof edge or eave to the ridge and have a minimum width of 36 inches (914 mm). Pathways shall be over areas capable of supporting the live load of fire fighters accessing the roof. Pathways shall be free of conduit, mechanical equipment, skylights, satellite dishes, ventilation hatches or other obstructions that would block the pathway or create a tripping hazard.

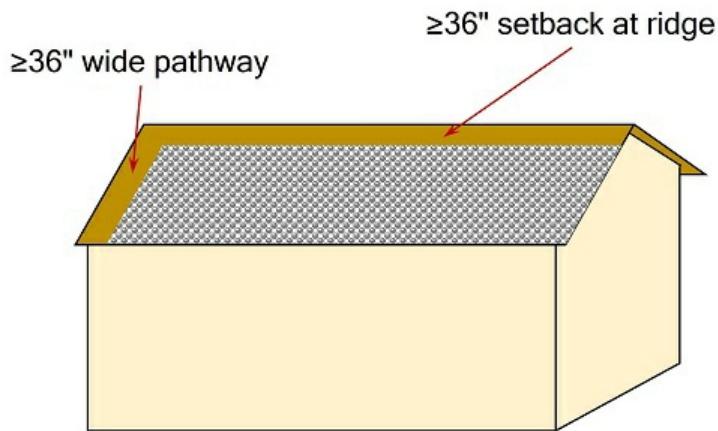
### **Exceptions:**

1. Conduit is allowed to traverse the pathway in buildings equipped throughout with an automatic sprinkler system.
2. Where two roof planes adjoin, the pathway width is permitted to span to the adjacent roof plane provided the combined pathway width is 36 inches (914 mm) or greater.

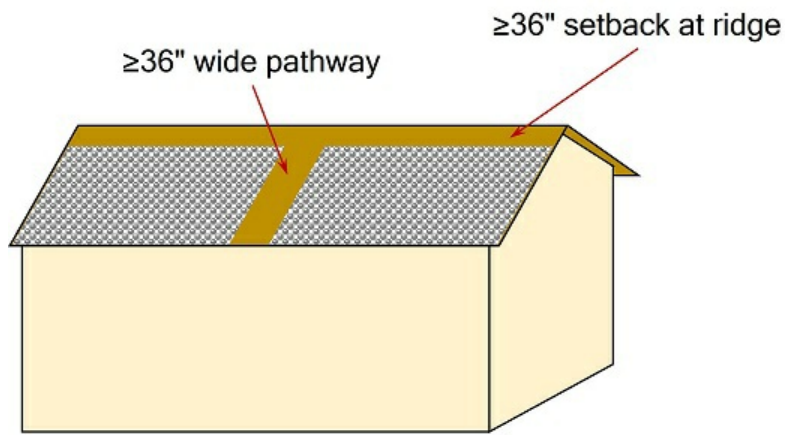
**Commenter's Reason:** The public comment intends to clarify the requirements by creating a section requiring the pathways (R324.6.1), and a section containing the pathway design criteria (R324.6.1.1). The current code requires two pathways to the ridge as soon as one PV panel is installed. This public comment requires only a single pathway, but there must be a pathway on every roof slope with PV panels. If a roof slope has no PV panels, then it does not need to provide a pathway. For example, if PV panels are only located on the back slope of the structure then only the back side needs to provide a pathway. Basically, if there are no PV panels, that particular roof slope is as unobstructed as it will get and requiring a second pathway does not make sense.

The current IRC also requires that a pathway is provided on the street or driveway side of the structure. If there are PV panels on that slope, then a pathway will be required. However, if there are no PV panels on that slope then no pathway is required.

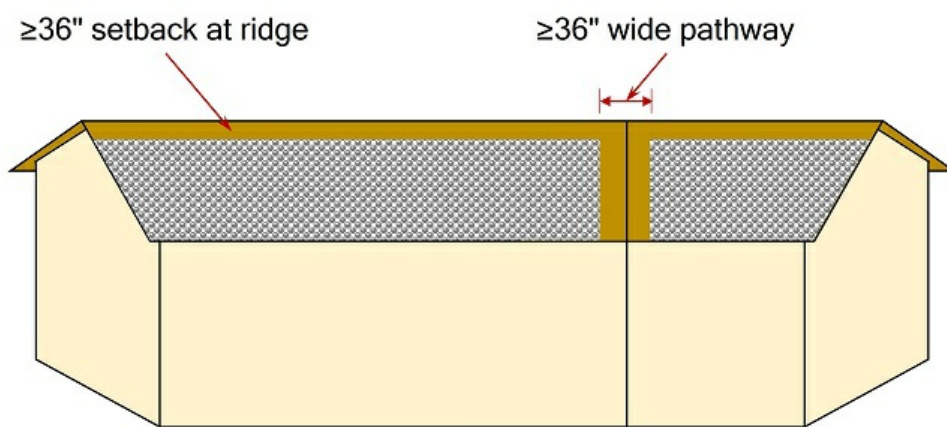
The public comment maintains the current safety for first responders with regard to pathway obstructions. Pathways are to be free of obstructions, including conduit. Most residential fires occur during the night, when lighting and visible is reduced. Therefore, the pathway should be free of all trip hazards. However, the likelihood of needing to access the roof for vertical ventilation during fire operations is greatly reduced when the dwelling is sprinklered. Therefore, an exception is added which allows the conduit to traverse the pathway if the building is sprinklered. Section R324.6.2 already requires a setback at the ridge. So the installation could look something like the 3 examples.



Example 1



Example 2



Example 3

**Cost Impact:** The net effect of the public comment and code change proposal will decrease the cost of construction. The current code requires 2 pathways for a roof with PV panels on only one slope of the roof. This public comment reduces that to one pathway on each slope with PV panels. Additionally, this proposal will allow conduit to traverse the pathway if the building is sprinklered.

Public Comment# 3528

## **Proposed Change as Submitted**

**Proponents:** Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

### **2021 International Residential Code**

**Add new text as follows:**

**R324.6.4 Building-integrated photovoltaic (BIPV) systems.** Where building-integrated photovoltaic (BIPV) systems are installed in a manner that creates areas with electrical hazards to be hidden from view, markings shall be provided to identify the hazardous areas to avoid for ladder placement. The markings shall be reflective and be visible from grade beneath the eaves or other location approved by the fire code official.

**Exception:** BIPV systems listed in accordance with UL 3741, where the removal or cutting away of portions of the BIPV system during fire-fighting operations have been determined to not expose a fire fighter to electrical shock hazards.

**Add new standard(s) as follows:**

**UL**

UL LLC  
333 Pfingsten Road  
Northbrook, IL 60062

3741-2020

Photovoltaic Hazard Control

**Reason:**

This aligns with IFC Section 1205.2.3 and F129-21 from the Group A cycle.

This provides fire fighters with means to determine where the BIPV is on the roof, and aligns with the requirements in the 2021 IFC Section 1205.2.3. The original intent is for reflective marking that could be under an eave and visible from grade, or could be in some other location visible from grade, such that the reflective marking identifies locations where a ladder should not be placed. The BIPV roof covering products themselves do not all need to be reflectorized.

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.

**Bibliography:** F129-21

IFC: 1205.2.3, UL Chapter 80 (New)

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

This proposal aligns with the fire code requirements.

**Staff Analysis:** A review of the standard proposed for inclusion in the code, UL 3741-2020 Photovoltaic Hazard Control, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

RB149-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposals because few manufacturers are using this detail now. The exception should be the rule or the charging statement. What are the roof access and pathway requirements? The phrase "under the eaves" is confusing for enforcement. The hazard exists on the roof, not under the eaves where this proposal requires markings are indicated - the markings should be on the roof. Most municipalities are also taking care of this locally; they should be able to continue to take care of it locally. The language needs to be reworked on the



## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R324.6.4, R324.3.1, R324.6, R324.6.3, UL Chapter 44

**Proponents:** Kota Wharton, representing City of Grove City (kwharton@grovecityohio.gov) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R324.6.4 Building-integrated photovoltaic (BIPV) systems.** Where building-integrated photovoltaic (BIPV) systems are installed in a manner that creates areas with electrical hazards to be hidden from view, markings shall be provided to identify the hazardous areas to avoid for ladder placement. The markings shall be reflective and be visible from grade beneath the eaves or other location approved by the fire code official.

**Exception:** BIPV systems listed in accordance with UL 3741, where the removal or cutting away of portions of the BIPV system during fire-fighting operations have been determined to not expose a fire fighter to electrical shock hazards.

**R324.3.1 Equipment listings.** Photovoltaic panels and modules shall be listed and labeled in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Inverters shall be listed and labeled in accordance with UL 1741. Building-integrated photovoltaic products and building-integrated photovoltaic roof shingles shall be listed and labeled in accordance with UL 3741. Systems connected to the utility grid shall use inverters listed for utility interaction. Mounting systems listed and labeled in accordance with UL 2703 shall be installed in accordance with the manufacturer's installation instructions and their listings.

**R324.6 Roof access and pathways.** Roof access, pathways and setback requirements shall be provided in accordance with Sections R324.6.1 through R324.6.2.1. 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, 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 Section 690.12(B)(2) of NFPA 70, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to not expose a fire fighter to electrical shock hazards.~~ Building-integrated photovoltaic products and building-integrated photovoltaic roof shingles.

**R324.6.3 Emergency escape and rescue openings.** Panels and modules installed on dwellings 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 Section 690.12(B)(2) of NFPA 70, where the removal or cutting away of portions of the BIPV system during fire-fighting operations has been determined to not expose a fire fighter to electrical shock hazards. Building-integrated photovoltaic products and building-integrated photovoltaic roof shingles.

UL

UL LLC  
333 Pfingsten Road  
Northbrook, IL 60062

3741-2020

Photovoltaic Hazard Control

**Commenter's Reason:** The proponents' intent was to eliminate risks of electrocution by building integrated photovoltaic systems during fire fighting operations by requiring certain labeling or identification of ladder hazard placement areas. While public comments could be introduced to clarify the labeling requirements, the issue that these systems still pose a hazard is missed and the continued permitted installation of them would be a disservice to the fire service and the public. The committee, rightfully, stated that because few manufacturers still producing products that do pose

risks of electrocution by building integrated photovoltaic system to firefighters during firefighting operations, rather than continue to allow hazardous systems to be equipped on new construction, the requirement for building integrated photovoltaic systems to be listed to a standard that provides that removal or cutting away of portions of a given BIPV system during firefighting operations does not expose a fire fighter to electric shock hazards should be adopted. UL 3741 addresses photovoltaic hazard control, specifically for firefighting operations, and can be used here. This proposal requires *building-integrated photovoltaic products* and *building-integrated photovoltaic roof shingles* to be listed and labeled in accordance with UL 3741, modifies Sections R324.6 and R324.6.3 for clarity, and moves the listing and labeling requirements to Section R324.3.1, which is more appropriate.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Products that pose hazards to firefighters during firefighting operations are not generally being used. While cost may hypothetically go up, where one is required to use a listed product, the cost is offset by the risk a listed product eliminates.

Public Comment# 3386

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## **Public Comment 2:**

**Proponents:** Larry Sherwood, representing Solar Energy Action Committee (larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Philip Oakes, representing National Association of State Fire Marshals (admin@firemarshals.org) requests As Submitted

**Commenter's Reason:** This proposed requirement already exists in the ICC codes (IFC Section 1205.2.3). That section was further refined by Proposal F129-21 that was approved by the membership in the Group A cycle. Consistency in code requirements in the family of ICC codes is important in order to have consistency in interpretation and enforcement. Roof access and pathway requirements are already covered in Section R324.6. The reason for the required markings to be located under the eaves is to enable the firefighters to properly locate their ladders as well as identify where the hazards may be in the event of a fire.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal aligns with the fire code requirements.

Public Comment# 3205

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## **Proposed Change as Submitted**

**Proponents:** Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

### **2021 International Residential Code**

**Add new definition as follows:**

**PHOTOVOLTAIC (PV) SUPPORT STRUCTURE, ELEVATED.** An independent photovoltaic (PV) panel support structure designed with useable space underneath with minimum clear height of 7 feet 6 inches (2286 mm), intended for secondary use such as providing shade or parking of motor vehicles.

**Add new text as follows:**

**R324.7 Elevated photovoltaic (PV) support structures.** Elevated PV support structures used as an accessory structure shall comply with either Section R324.7.1 or R324.7.2.

**R324.7.1 PV panels installed over open-grid framing or non-combustible deck.** Elevated PV support structures with PV panels installed over open-grid framing or over a noncombustible deck shall have PV panels tested, listed, and labeled with a fire type rating in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Photovoltaic panels marked "not fire rated" shall not be installed on elevated PV support structures.

**324.7.2 PV panels installed over a roof assembly.** Elevated PV support structures with a PV panel system installed over a roof assembly shall have a fire classification in accordance with Section R902.4.

#### **Reason:**

This is in alignment with G193-21 for the IBC in the Group A cycle.

The primary purpose of this proposal is to establish appropriate fire testing and listing criteria for overhead photovoltaic (PV) support structures that could have people or vehicles in the space beneath them. Sometimes referred to as "solar shade structures," they are most commonly constructed over vehicle parking spaces of surface parking lots, but could be built in a variety of locations with or without cars parked beneath.

This addresses structures with open grid framing and without a roof deck or sheathing, which supports the photovoltaic panel systems.

Most PV panels in the marketplace have been fire tested and assigned a "type rating" in accordance with UL 1703. However, some PV panels might not have that fire testing, and could be marked "not fire rated." This proposal clarifies that PV panels marked "not fire rated" cannot be used on elevated/overhead PV structures that could have people or cars beneath them, with or without a full roof assembly.

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.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

The code change proposal will not increase or decrease the cost of construction. This proposal provides more options in construction with clear requirements for another type of photovoltaic installation (i.e. an alternative to rooftop mounted PV or building-integrated PV).

RB150-22

## **Public Hearing Results**

### **Committee Action:**

**As Submitted**

**Committee Reason:** The committee concluded this proposal gives clarity for the type of photovoltaic support structures that's not currently addressed in the code. This gives the code user guidance and standards to comply with. It provides options that weren't there before. There were concerns raised about the definition and if this structure could be constructed over a roof. (Vote: 6-5)

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R324.7**

**Proponents:** Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee (jonsiuconsulting@gmail.com); Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov); C Ray Allshouse, representing Washington Association of Building Officials Technical Code Development Committee (rallshouse@shorelinewa.gov) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R324.7 Elevated photovoltaic (PV) support structures.** Elevated PV support structures used as an accessory structure shall comply with either Section R324.7.1 or R324.7.2. Elevated PV support structures shall be considered a roof for the purposes of establishing the number of stories and fire separation distances.

**Commenter's Reason:** This public comment is intended to address two issues: elevated PV structure on top of a building creates another story, and it creates a condition akin to having roof eaves extend close to the property line. It is intended to address the comment made by the Committee, as published in the 2022 Report of the Committee Action Hearings regarding the number of stories.

WABO TCD raised this issue at the 2021 Group A Public Comment Hearings, on a proposal that is closely related to RB150-22 (G193-21). We submitted a public comment to disapprove G193 because the definition implies the space below the elevated PV can be used for any occupancy, which could create confusion regarding story count and fire separation distances. However, under heavy pressure from several proponents of G193 (some of whom recognized the issues we were raising), we ultimately we agreed to provisionally support the proposal as submitted in order not to torpedo the whole proposal because it dealt with some other important fire safety issues. Story count and fire separation distance are still issues that will need to be addressed in the IBC, but unfortunately, the same issues are being propagated into the IRC via the identical definition.

As pointed out in our objections to G193 in Group A, this is not a theoretical issue. Since an accessory structure isn't necessarily detached from a building, Section R324.7.2 can be read to allow elevated PV to be mounted on the roof of a building. Once it is there, does it or does it not create a story? Our members have had to deal with projects submitted for permit with large elevated PV systems "shading" occupied roofs on mid-rise residential buildings, where the designers contended that they weren't a roof, and therefore, didn't create an additional story or create fire separation distance issues. For IRC structures, the issue is the same--would adding elevated PV above a roof deck (occupiable roof) on top of a 3-story house create a fourth story, thereby creating a non-conformity with the IRC? We contend the answer is "yes." We would also like to point out that no technical justification has been presented to demonstrate these should be treated differently, from a fire spread standpoint.

Instead of modifying the definition for elevated PV structures or arguing for disapproval, this public comment more directly addresses the issues we've raised by requiring the elevated PV to comply with story count and fire separation distances:

- We contend that an elevated PV structure, with a minimum of 7' clearance below creates a roof-like structure, as far as fire is concerned--it will contain heat and smoke just as much as a roof eave or a roof providing shade over an occupied roof. This is especially true given there are no requirements or criteria for openness of an elevated PV structure.
- The proposed definition clearly intends the space below to be usable, else there would be no reason for including "providing shade" in the definition. Once you have a usable space with a roof-like structure overhead, you clearly have created a story. If this does not create a story, then why would any other roof structure such as a 500 square foot hard roof over an occupiable roof create a story?
- Where there is occupiable space below the elevated PV, and where the PV extends close to the property line, you should be considering spread of fire to and from the adjacent property, which is the purpose of establishing fire separation distances.

In discussions with one of the organizers of the effort to introduce the code change, it was suggested that instead of language that would prohibit placing elevated PV on a roof where it would create an over-story condition, that we propose language instead that describes where it would be allowed. Because of the difficulty in trying to address all the variables of where this would be allowed, this public comment takes the approach of saying if you put elevated PV on a roof, treat it like another roof, just as you would any other roof structure.

We want to emphasize that this public comment states the elevated PV gets **treated as** a roof for story count and fire separation distance purposes. It does **not** say the PV **is** a roof--it's just treated as such for those two issues, and those two issues only. Effectively, elevated PV can't be put on top of a 3-story IRC building, because that would create a 4th story, which is not in the scope of the IRC. The building official can then apply their normal policies regarding roofs near the property line, for fire separation/adjacent property protection purposes.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The cost impact statement for the original proposal states the proposal will not increase or decrease the cost of construction, as it is just adding

## **Public Comment 2:**

**IRC: R324.7, R324.7.1, 324.7.2**

**Proponents:** Ardel Jala, representing Seattle Department of Construction & Inspections (ardel.jala@seattle.gov); Micah Chappell, representing Washington Association of Building Officials (micah.chappell@seattle.gov) requests As Modified by Public Comment

**Modify as follows:**

## **2021 International Residential Code**

**R324.7 Elevated photovoltaic (PV) support structures.** Elevated PV support structures located at grade and used as an accessory structure shall comply with ~~Section R324.7.1 or R324.7.2~~ Table R301.1(1) or Table R301.1(2) for fire separation distance. Elevated PV support structures located at grade with PV panels installed over open-grid framing or over a noncombustible roof deck shall have PV panels tested, listed, and labeled with a fire type rating in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Photovoltaic panels marked "not fire rated" shall not be installed on elevated PV support structures.

~~**R324.7.1 PV panels installed over open-grid framing or non-combustible deck.** Elevated PV support structures with PV panels installed over open-grid framing or over a noncombustible deck shall have PV panels tested, listed, and labeled with a fire type rating in accordance with UL 1703 or with both UL 61730-1 and UL 61730-2. Photovoltaic panels marked "not fire rated" shall not be installed on elevated PV support structures.~~

~~**324.7.2 PV panels installed over a roof assembly.** Elevated PV support structures with a PV panel system installed over a roof assembly shall have a fire classification in accordance with Section R902.4.~~

**Commenter's Reason:** This public comment is intended to reconcile the language of the proposal with the supporting testimony at the Committee Action Hearings.

This public comment adds an explicit requirement that elevated PV support structures shall comply with fire separation distance requirements. This clarification is needed given the committee question of whether fire separation distance requirements apply. Based on testimony, this appears to have been the proponent's intent.

The proponents stated that as an accessory structure, an elevated PV support structure could not and would not be placed on a roof. However, there are no provisions that prohibit an accessory structure such as this from being located on the roof. The proposed text in Section R324.7.2 appears to allow it ("...installed over a roof assembly...."). The proposal does not limit where the roof assembly is located.

This public comment removes ambiguity by limiting the scope of this section to elevated PV support structures located at grade, which appears to have been the proponent's intent. It also removes ambiguity by deleting Section R324.7.2. Where PV panels are installed over a roof assembly, the requirements for Rooftop-mounted photovoltaic systems in Section R902.4 already apply. There is no need for a pointer. Once Section R324.7.2 is deleted, it is not necessary to maintain the provisions in Section R324.7.1 in a separate subsection, so the provisions have been consolidated into Section R324.7.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The original cost impact statement says the proposal will not increase or decrease the cost of construction, since this is an option. This public comment only affects where the option can be utilized and therefore, has no effect on the original cost impact statement.

# RB151-22

## ***Proposed Change as Submitted***

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

### **2021 International Residential Code**

#### **SECTION R325 MEZZANINES**

**Revise as follows:**

**R325.2 Mezzanines.** The clear height above and below *mezzanine* floor construction shall be not less than 7 feet (2134 mm).

**Exception:** The ceiling height above the mezzanine shall be permitted to comply with Section R305.1 where the mezzanine meets the minimum room size in Section R304.

#### **SECTION R326 HABITABLE ATTICS**

**R326.2 Minimum dimensions.** A habitable attic shall have a floor area in accordance with Section R304 and a ceiling height in accordance with Section R305.

**Reason:** The provisions for minimum room area (R304) and ceiling height (R305) provide criteria for with habitable rooms/spaces and basements, but neither specifically mentions mezzanines (R325) or habitable attics (R326). Habitable attics does reference R304 and R305 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 I 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 (per R304), the proposal would allow for mezzanines with sloped ceilings beams where the mezzanine was the size of a room. Below are sections R304 and R305 for reference. Mezzanines are habitable spaces.

##### **SECTION R304**

##### **MINIMUM ROOM AREAS**

**R304.1 Minimum area.** Habitable rooms shall have a floor area of not less than 70 square feet (6.5 m<sup>2</sup>).

Exception: Kitchens.

**R304.2 Minimum dimensions.** Habitable rooms shall be not less than 7 feet (2134 mm) in any horizontal dimension.

Exception: Kitchens.

**R304.3 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.

##### **SECTION R305**

##### **CEILING HEIGHT**

**R305.1 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 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.

R305.1.1 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.

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 2020 and 2021 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 code change proposal will not increase or decrease the cost of construction  
This is a clarification only for mezzanines constructed under sloped roofs. It will increase design options without increasing requirements.

RB151-22

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## **Public Hearing Results**

This proposal includes unpublished errata

**In Section R325.2 Mezzanines, the reference in the new exception should be R305.1 instead of 305.1.**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee felt that this ceiling height limit could limit design options for bathrooms and closets on mezzanines and would not match the pointer to habitable space. Some of the committee supported the proposal feeling it makes sense that a mezzanine used for habitable space should meet the same ceiling height as the rest of the building. (Vote: 6-3)

RB151-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests As Submitted

**Commenter's Reason:** The BCAC is urging members to overturn the split committee decision for Disapproval of this code change proposal and support this public comment for (AS) Approval As Submitted. There was a concern that bathrooms are not addressed but bathrooms are allowed in Mezzanines. This proposed exception to Section R325.2 Mezzanines would allow the same ceiling height reductions above mezzanines that are currently allowed in the IRC for habitable attics.

This proposed language correlates Mezzanines requirements with current typical ceiling height requirements in R305.1. This exception is limited to spaces above the mezzanine only and addresses a common field condition of how to work with sloped roofs

We urge your support.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
This is a clarification only for mezzanines constructed under sloped roofs. It will increase design options without increasing requirements.

Public Comment# 3092

## **Proposed Change as Submitted**

**Proponents:** Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov)

### **2021 International Residential Code**

**Add new definition as follows:**

**SLEEPING LOFT.** A space on an intermediate level or levels between the floor and ceiling of a story, open on one or more sides to the room in which the space is located, and in accordance with Section R326.

**Add new text as follows:**

#### **SECTION R326** **SLEEPING LOFTS**

**R326.1 Sleeping lofts.** Where provided in dwelling units or sleeping units, sleeping lofts shall comply with this code as modified by Sections R326.2 through R326.5. Sleeping lofts constructed in compliance with this section shall be considered a portion of the story below. Such sleeping lofts shall not contribute to the number of stories as regulated by this code.

**Exception:** Sleeping lofts need not comply with Section R326 where they meet any of the following conditions:

1. The sleeping loft has a maximum depth of less than 3 feet (914 mm).
2. The sleeping loft has a floor area of less than 35 square feet (3.3 m ).
3. The sleeping loft is not provided with a permanent means of egress.

**R326.2 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. The sleeping loft ceiling height shall not exceed 7 feet (2134 mm) for more than one-half of the sleeping loft floor area.

The provisions of Sections R326.3 through R326.5 shall not apply to sleeping lofts that do not comply with Items 1 and 2.

**R326.3 Sleeping loft ceiling height.** The clear height below the sleeping loft floor construction shall not be less than 7 feet (2134 mm). The ceiling height above the finished floor of the sleeping loft shall not be less than 3 feet (914 mm). Spaces adjacent to the sleeping loft with a sloped ceiling measuring less than 3 feet (914 mm) from the finished floor to the finished ceiling shall not contribute to the sleeping loft floor area.

**R326.4 Sleeping loft area.** The aggregate area of all sleeping lofts and mezzanines within a room shall comply with Section R325.3.

**Exception:** The area of a single sleeping loft located within a dwelling unit or sleeping unit equipped with an automatic sprinkler system in accordance with Section P2094 shall not be greater than two-thirds of the area of the room in which it is located, provided that no other sleeping lofts or mezzanines are open to the room in which the sleeping loft is located.

**R326.5 Permanent egress for sleeping lofts.** A permanent means of egress shall be provided for sleeping lofts. The means of egress shall comply with Section 311 as modified by Sections R326.5.1 through R326.5.3.

**R326.5.1 Ceiling height at sleeping loft means of egress.** A minimum ceiling height of 3 feet (914 mm) shall be provided for the entire width of the means of egress from the sleeping loft.

**R326.5.2 Stairways.** Stairways providing egress from sleeping lofts shall be permitted to comply with Sections R326.5.2.1 through R326.5.2.3.

**R326.5.2.1 Width.** Stairways providing egress from a sleeping loft shall not be less than 17 inches (432 mm) in clear width at or above the handrail. The width below the handrail shall be not less than 20 inches (508 mm).

**R326.5.2.2 Treads and risers.** Risers for stairs providing egress from a sleeping loft shall be not less than 7 inches (178 mm) and not more than 12 inches (305 mm) in height. Tread depth and riser height shall be calculated in accordance with one of the following formulas:

1. The tread depth shall be 20 inches (508 mm) minus four-thirds of the riser height.
2. The riser height shall be 15 inches (381 mm) minus three-fourths of the tread depth.

**R326.5.2.3 Landings.** Landings at stairways providing egress from sleeping lofts shall comply with Section R311.7.6, except that the depth of



landings in the direction of travel shall be not less than 24 inches (508 mm).

**R326.5.3 Ladders.** Ladders complying with Sections R326.5.3.1 and R326.5.3.2 shall be permitted as a means of egress from sleeping lofts.

**R326.5.3.1 Size and capacity.** Ladders providing egress from sleeping lofts shall have a rung width of not less than 12 inches (305 mm), and 10-inch (254 mm) to 14-inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 300-pound (136 kg) load on any rung. Rung spacing shall be uniform within 3/8 inch (9.5 mm).

**R326.5.3.2 Incline.** Ladders shall be inclined at 70 to 80 degrees from horizontal.

## SECTION R314 SMOKE ALARMS

Revise as follows:

**R314.3 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~~ and sleeping lofts.
3. On each additional story of the *dwelling*, including *basements* and *habitable attics* and not including crawl spaces and uninhabitable *attics*. In *dwelling*s or *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.

## SECTION R325 MEZZANINES

Revise as follows:

**R325.1 General.** *Mezzanines* shall comply with Sections R325 through R325.5.

**Exception:** Sleeping lofts in dwelling units and sleeping units shall be permitted to comply with Section R326, subject to the limitations in Section R326.2.

**Reason:** Lofts in dwelling units and sleeping units are being designed and built around the country, but there is nothing in the codes to give designers or code officials guidance as to what's acceptable. This proposal places provisions into the body of the code that balance flexibility of design with maintaining a reasonable minimum standard of safety for these spaces.

A similar proposal placing this option into the appendix of the IBC was approved in Group A (G112-21, AMPC 2). Because we believe the issue of how to reasonably regulate sleeping lofts is prevalent and important enough to warrant placement in the body of the code, and because there was substantial support from a range of stakeholders at the Group A Public Comment Hearings (61% of the voters at the PCH supported the public comment that would have placed this in the body of the code), we are placing these provisions into the main body of the IRC, not in an appendix.

Figure 1 below shows a very recent example of an as-built (but not as-approved) sleeping loft constructed as part of a larger bedroom in a one-family dwelling in eastern Washington State. Figure 2 shows the same photo with an approximation of an IRC-compliant guard added.

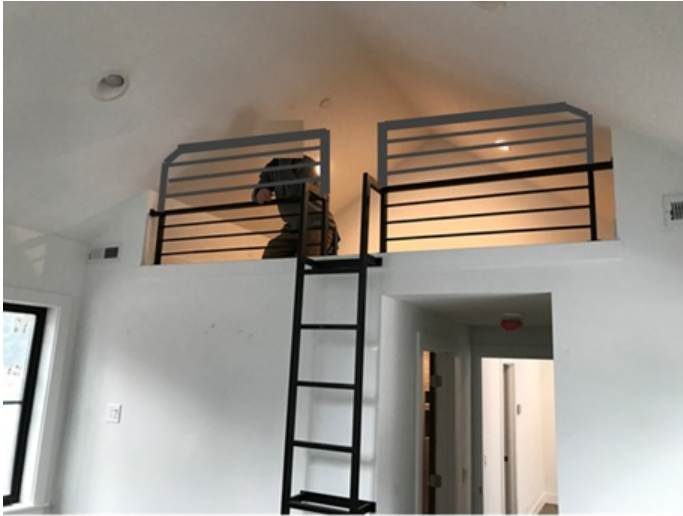
Technical features of this proposal:

- We've inserted the sleeping loft provisions into a new Section R326, between mezzanines and habitable attics. We think sleeping lofts are more closely related to mezzanines (R325) than they are to habitable attics (current R326). (Note: This does not replace the existing Section R326. We expect ICC Staff will renumber the remaining sections in the chapter.)
- Sleeping lofts are an option (R326.1, "Where provided....") It will be up to the designer to decide whether or not to designate these areas as sleeping lofts.
- Sleeping lofts are required to comply with the base code, except where the provisions of this new section modify them (R326.1).
- Small spaces that might technically meet the definition of a sleeping loft, or sleeping loft-like spaces that don't have a permanent means of egress are exempt from the requirements of this section (R326.1, Exception).

- Similar to mezzanines, sleeping lofts are considered a portion of the story to which they open, and do not add to the number of stories of the building (R326.1).
- Sleeping lofts must be smaller than 70 square feet, and any ceiling height above the sleeping loft cannot exceed 7 feet for more than half of its area. The intent is to keep sleeping lofts as small spaces. Once the space is provided with dimensions that are equivalent to habitable residential living spaces, the breaks for height, ceiling height, area, and means of egress in this section no longer apply, and the space must meet the full requirements of the code (R326.2)
- The requirement for 7 feet below the sleeping loft (R326.3) is drawn from Section R325.2 regarding clear height below mezzanines. This was added in our Group A proposal last year in response to comments we received from a General Committee member. We actually don't see an issue with having shorter, usable spaces below sleeping lofts, but the 7-foot dimension is consistent with the required height of spaces below mezzanines, and also reflects what we have seen in real-world project proposals (see Figure 1 below). Ceiling heights in sleeping lofts can be as little as 3 feet.
- One or more sleeping lofts and mezzanines are allowed, but only if the cumulative area complies with the Section R325.3 area limitations for mezzanines (R326.4). The exception allows a single sleeping loft in a smaller room in a sprinklered dwelling unit up to 69.9 square feet (R326.2), as long as the sleeping loft area does not exceed two-thirds of the area of the main room. The two-thirds figure is based on IBC allowances for mezzanines and equipment platforms (see IBC 505.2.1.1).
- A permanent means of egress is required for sleeping lofts complying with this new section (R326.5). (The exception to R326.1 kicks you out of this section if you don't have a permanent means of egress.) Although for the most part, the means of egress is required to comply with Section R311, this section allows some modifications:
  - Steeper and narrower stairs (R236.5.2) are allowed, based on the stair requirements in IRC Appendix Q for lofts in tiny houses.
  - Permanently installed ladders are permitted as the means of egress (R326.5.3), again using the tiny house parameters from IRC Appendix Q.
  - Note: Sections R311.7.11 and R311.7.12 already allow the use of alternating tread devices or ship's ladders "to be used as an element of the means of egress for **lofts** [emphasis added] ... of 200 gross square feet or less ...," and therefore do not need to be mentioned in this section.
- Smoke alarms are required to be installed in the "immediate vicinity" of sleeping lofts (revised R314.3, Item 2). At the Group A PCH last year, we received feedback from two former fire officials that smoke alarms shouldn't be required in the sleeping loft itself, but because there are cases where a smoke alarm may not be nearby, we believe one should be located in the vicinity of the loft to provide early warning. Looking at Figure 1 below, because this is a bedroom, a smoke alarm is required to be located in the vaulted area per the smoke alarm listing, not in the hallway as constructed. However, if instead this sleeping loft opened to a living room, the current Section R314.3 would not require a smoke alarm in the vaulted ceiling area.
- Sleeping lofts may be confused with mezzanines, so the exception to R325.1 points the user from the mezzanine section to the sleeping loft section.



**FIGURE 1:** Sleeping loft in a bedroom (as built)



**FIGURE 2:** Sleeping loft in a bedroom, with code-compliant guard

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

Because sleeping lofts are an option, not a requirement, this proposal has no impact on the cost of construction. When a sleeping loft is provided, this proposal provides a uniform set of requirements.

RB153-22

## **Public Hearing Results**

### **Committee Action:**

**As Modified**

### **Committee Modification:**

**R326.2 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. The sleeping loft ceiling height shall not exceed 7 feet (2134 mm) for more than one-half of the sleeping loft floor area.

~~The provisions of Sections R326.3 through R326.5 shall not apply to sleeping lofts that do not comply with Items 1 and 2.~~

**Committee Reason:** The modification removed the confusing sentence at the end of Section R326.2 which is also covered in the definition. The committee decided this proposal as modified provides an option for sleeping lofts that are becoming more popular in the design of homes. Despite expectations of more difficult access, the committee felt use of sleeping lofts will be more by youth that are adept at climbing ladders. Some of the committee was concerned about the safety aspects with the smoke detector in the general vicinity which means it's usually outside in the hallway. Concern was also expressed that the title sleeping lofts implies a sleeping room which then kicks in emergency escape and rescue and habitable space requirements. (Vote: 7-2)

RB153-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** SECTION R314, R314.3

**Proponents:** Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Public Comment

**Further modify as follows:**

## 2021 International Residential Code

### SECTION R314 SMOKE ALARMS

**R314.3 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 and sleeping lofts~~.
3. On each additional story of the *dwelling*, including *basements* and *habitable attics* and not including crawl spaces and uninhabitable *attics*. In *dwelling*s or *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.

**Commenter's Reason:** This public comment was developed in response to comments received from IRC-B Committee members and others after the Committee Action Hearings. It is intended to clarify that the smoke alarm that is required for sleeping lofts must be located in close proximity to the sleeping loft.

The approved code change proposal required that the smoke alarm be located "in the immediate vicinity" of the sleeping loft. Our intent was that a nearby device would provide early warning of a fire to anyone who was in the sleeping loft, to somewhat compensate for the non-traditional egress and lower ceiling height. The comment we received was that since the requirement appeared in the same item as bedrooms, if the loft was located within a bedroom, the code language could be interpreted to allow the required smoke alarm to be located in the hallway outside of the bedroom. In addition, as we were working on the public comment to clarify our intent, it was noted that if the sleeping loft opened into a very large room, the language should not allow the smoke alarm to be located at the far end of the room.

For this public comment, because we thought it would be clearer to separate the sleeping loft requirement from the current requirement for bedrooms, we are proposing a new Item 6 to deal with sleeping lofts, and have returned the text in Item 2 to the original language in the 2021 IRC. The new Item 6 clarifies:

1. The smoke alarm must be located within the room to which the sleeping loft opens. This should address the concern regarding locating the alarm in the hallway.
2. Within the room, the smoke alarm must be located in close proximity to the sleeping loft ("in the immediate vicinity"). This allows some flexibility in locating the smoke alarm, but should address the concern that it could be located a long distance away if the sleeping loft is open to a very large room.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This public comment is a clarification of the original proposal, and therefore has no effect on the cost impact statement for the original code change: "Because sleeping lofts are an option, not a requirement, this proposal has no impact on the cost of construction. When a sleeping loft is provided, this proposal provides a uniform set of requirements."

Public Comment# 3004

#### **Public Comment 2:**

**IRC: SECTION R310, R310.1**

**Proponents:** Jonathan Siu, representing Washington Association of Building Officials Technical Code Development Committee; Micah Chappell, representing Washington Association of Building Officials Technical Code Development Committee (micah.chappell@seattle.gov) requests As Modified by Public Comment

**Further modify as follows:**

## 2021 International Residential Code

### SECTION R310

## EMERGENCY ESCAPE AND RESCUE OPENINGS

**R310.1 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 having a minimum width of 36 inches (914 mm) that opens to a public way.*

### Exceptions:

1. *Storm shelters and basements used only to house mechanical equipment not exceeding a total floor area of 200 square feet (18.58 m<sup>2</sup>).*
2. *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:*
  - 2.1. *One means of egress complying with Section R311 and one emergency escape and rescue opening.*
  - 2.2. *Two means of egress complying with Section R311.*
3. *A yard shall not be required to open directly into a public way where the yard opens to an unobstructed path from the yard to the public way. Such path shall have a width of not less than 36 inches (914 mm).*

**Commenter's Reason:** This public comment is being submitted in response to concerns raised by IRC-B Committee members regarding "safety" during the Committee Action Hearings. In discussions with the members outside of the hearings after the proposal was heard, the specific safety concern appears to boil down to the fact that they felt the code should require an emergency escape and rescue opening (EERO) for occupants of the sleeping loft. In those discussions, we broached the concept being proposed in this public comment, and the members indicated they agreed it would address their concerns.

This public comment adds a requirement that an EERO is required to be provided from the room to which a sleeping loft opens. Whereas IRC Appendix Q for Tiny Homes requires an EERO or similar opening in the roof be provided from a loft, in this proposal, the EERO does not need to be located in the sleeping loft itself, since this would be impractical in many of the dwelling unit configurations that we have seen. Such a requirement would also severely limit designs wanting to incorporate sleeping lofts--the lofts would either have to abut an exterior wall or be located just below a roof. Given there will also be good early warning for sleeping loft occupants (the sleeping loft must be open to the space and have a smoke alarm in close proximity), having an EERO from the space should provide adequate safety.

We also received some comments to the effect that in some building officials' interpretations, opening a sleeping loft to another room makes that other room a sleeping room, and would thus require a EERO. This public comment will not conflict with that interpretation, but makes the requirement clear without codifying that interpretation, since not all building officials agree with it.

In bringing sleeping loft provisions into the appendix of the 2024 IBC during the 2021 Group A cycle (G112-21), we received conflicting comments from different members of the fire service on whether the EERO should be required. Ultimately, the appendix was approved without the EERO, but if this public comment is approved, our intent would be to align the IBC with the IRC in the next cycle.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. While this public comment could increase the cost of construction for sleeping lofts as compared to the original proposal, as stated for the original proposal, "because sleeping lofts are an option, not a requirement, this proposal has no impact on the cost of construction. When a sleeping loft is provided, this proposal provides a uniform set of requirements."

Public Comment# 3006

### Public Comment 3:

#### IRC: SECTION 202

**Proponents:** Jonathan Siu, representing Self (jonsiuconsulting@gmail.com); Micah Chappell, representing Self (micah.chappell@seattle.gov) requests As Modified by Public Comment

#### Further modify as follows:

### 2021 International Residential Code

**SLEEPING LOFT.** A space designated for sleeping on an intermediate level or levels between the floor and ceiling of a story, open on one or more sides to the room in which the space is located, and in accordance with Section R326.

**Commenter's Reason:** This public comment is being submitted in response to a last-minute observation from one of the supporting speakers at the Committee Action Hearings, that while the original proposal uses the term "sleeping loft" throughout, nowhere in the proposal does it actually say the space is used for sleeping. There was no testimony from the floor or by the committee on this issue, so everyone seems to understand that "sleeping" is part of what makes these "sleeping lofts." However, if others feel this is a hole in the proposal, this public comment adds to the definition, saying the space has to be designated for sleeping in order for it to be a sleeping loft. We anticipate that normally, the space would be designated as a "sleeping loft" on the plans.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The original cost impact statement states that since sleeping lofts are an option, there is no impact to the cost of construction. This public comment merely clarifies the definition to state the obvious, so there is no effect on the original cost impact statement.

Public Comment# 3489

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## **Public Comment 4:**

**IRC: R326.1; IBC: R326.6 (New)**

**Proponents:** David Renn, PE, SE, City and County of Denver, representing Code Change Committee of Colorado Chapter of ICC (david.renn@denvergov.org) requests As Modified by Public Comment

**Further modify as follows:**

## **2021 International Residential Code**

**R326.1 Sleeping lofts.** Where provided in dwelling units or sleeping units, sleeping lofts shall comply with this code as modified by Sections R326.2 through ~~R326.5~~ R326.6. Sleeping lofts constructed in compliance with this section shall be considered a portion of the story below. Such sleeping lofts shall not contribute to the number of stories as regulated by this code.

**Exception:** Sleeping lofts need not comply with Section R326 where they meet any of the following conditions:

1. The sleeping loft has a maximum depth of less than 3 feet (914 mm).
2. The sleeping loft has a floor area of less than 35 square feet (3.3 m<sup>2</sup>).
3. The sleeping loft is not provided with a permanent means of egress.

## **2021 International Building Code**

**R326.6 Emergency escape and rescue opening.** *An emergency escape and rescue opening complying with Section R310 shall be provided in the sleeping loft or in the room in which the sleeping loft is located.*

**Commenter's Reason:** This public comment further modifies the proposal by adding a subsection that requires an emergency escape and rescue opening (EERO) in the sleeping loft OR in the room in which the sleeping loft is located. The main use of a sleeping loft is for sleeping and Section R310 requires an EERO in all sleeping rooms - this code change clarifies that this applies to rooms that contain a sleeping loft. Since a sleeping loft is defined as a space within a room, this proposal allows the EERO to be located either in the sleeping loft or in the room in which the sleeping loft is located. Since sleeping lofts are not always located on an exterior wall, it is not practical to require the EERO to be in the sleeping loft so the second option of providing the EERO in the room is needed.

Please support this public comment that adds an important life safety feature to rooms with sleeping lofts, which is consistent with the current IRC requirement to provide an EERO in all sleeping rooms.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Since the main purpose of a sleeping loft is for sleeping, providing a sleeping loft within a room makes the room a sleeping room. Accordingly, this public comment is a clarification that current requirements for EERO's apply to rooms with sleeping lofts and, therefore, will not increase or decrease the cost of construction.

Public Comment# 3380

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## **Proposed Change as Submitted**

**Proponents:** Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

## **2021 International Residential Code**

**Revise as follows:**

**R328.3.1 Spacing.** Individual units shall be separated from each other by not less than 3 feet (914 mm) except where ~~smaller~~ other separation distances are ~~documented to be adequate based on large-scale fire testing complying with Section 1207.1.5 of the International Fire Code specified by the ESS listing and the manufacturer's installation instructions.~~

**R328.4 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.

ESS shall not be installed in sleeping rooms, or closets or spaces opening directly into sleeping rooms.

**Reason:** UL 9540 is in the process of being revised to strengthen the connection to UL 9540A large scale fire testing. UL 9540A captures data and introduces pass/fail performance criteria for spacings between units, and between unit and window/door openings, minimum room sizes, and clearances from combustible mounting substrates. The UL 9540 listing is contingent on this pass/fail criteria and the results are required to be included in the manufacturer's installation instructions.

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.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. This proposal provides an alternative in accordance with UL 9540, and part of the required listing.

RB155-22

## **Public Hearing Results**

**Committee Action:**

**As Submitted**

**Committee Reason:** This proposal will allow an option for the manufacturer's instructions to govern spacing based on an anticipated update to the UL9540 standard as it relates to UL9540A large scale fire testing. When there's a lack of direction from the manufacturer there is still a minimum spacing specified. Some of the committee was concerned about approving without the UL update being completed yet. (Vote 5-4)

RB155-22

## **Individual Consideration Agenda**

**Public Comment 1:**

**Proponents:** Brad Fox, Santa Clara County Fire Department, representing Santa Clara County Fire Department (brad.fox@sccfd.org) requests Disapprove

**Commenter's Reason:** Great effort has gone into aligning the residential ESS codes in IFC 1207.11 and IRC 328. This code change was not proposed during the Group A cycle for IFC 1207.11. If approved it will create fundamental differences between IFC and IRC requirements that were previously aligned, creating inconsistent application for the code user. If SEAC wishes to move forward with this proposal, it should be done during the next cycle for both the IFC and IRC.

The first part of the proposal seeks to shift approving UL9540A large scale fire testing reports from the AHJ (per IFC 1207.1.5) to the listing agency. While I believe this generally supports greater consistency, UL9540A testing is relatively new and changing rapidly. The UL9540A test reports my agency has reviewed vary greatly, and many miss or omit requirements of UL9540A. Like many other AHJ's in California, my agency has approved many UL9540A reports and disapproved others. At this time AHJ's need the ability to review large scale fire testing reports for conformance to UL9540A and confidently approve reduced spacing between ESS units.

The second change in the proposal seeks to allow reduced spacing (less than 3 feet) to dwelling unit windows and doors, if approved through UL9540A large scale fire testing. There is currently nothing in UL9540A which would test the safety of reducing ESS distances to doors or windows. The standard would need to be rewritten to address this safety concern. The proposal's reason section states UL9540A provides pass/fail criteria for spacing 'between unit and window/door openings', yet no such criteria exists. In fact the words 'door' and 'window' don't even exist in the Standard except in reference to BESS access doors.

During the CAH Mark Rodriguez, a SEAC member, gave supporting testimony stating installers need the ability to use exterior garage walls. ESS units on exterior garage walls are allowed under current code to encroach within 3 feet of windows and doors leading into the garage, as the garage is not part of the dwelling unit.

IRC 328 consistently seeks to maintain separation of ESS installations from the habitable space of dwelling units. It would be a huge mistake to allow installations in close proximity to dwelling unit unprotected openings without a means or method in UL9540A to evaluate the safety for occupants.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.

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Public Comment# 3367



## **Proposed Change as Submitted**

**Proponents:** Chad Sievers, representing Department of State (chad.sievers@dos.ny.gov)

### **2021 International Residential Code**

**Revise as follows:**

**R328.4 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.
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 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 door with a 20-minute fire protection rating. Doors shall be self-latching and equipped with a self-closing or automatic-closing device. Penetrations through the required gypsum wallboard 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.

**Reason:** The energy storage system presents a fire hazard to the occupants of the dwelling. The code already requires a fire protective envelope around ESS but the code has left holes in this envelope, including penetrations and the door. To reduce the chance of fire spread and allow its occupants ample amount of time to evacuate the building the envelope must be sealed. This can easily be done by requiring a fire-rated door or equivalent and to seal any penetrations.

**Cost Impact:** The code change proposal will increase the cost of construction

The additional cost of the door and sealants will increase the cost of a dwelling with an energy storage system but will be a small fraction of the total cost for an ESS installed.

RB157-22

## **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

**R328.4 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.
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) thick, or door with a 20-minute fire protection rating. Doors shall be self-latching and equipped with a self-closing or 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.

**Committee Reason:** The modification on Section R328.4 Item 4, by adding "into the dwelling", specified protected openings and penetrations relative to the dwelling and not to the outside. The proposal as modified makes the level of protection similar to garages for doors and penetrations, and having a car and an ESS in the garage should have at least the same level of protection. Concern was shared that these systems are evolving

## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Larry Sherwood, representing Solar Energy Action Committee (larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Robert Davidson, representing Myself (rjd@davidsoncodeconcepts.com); Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Philip Oakes, representing National Association of State Fire Marshals (admin@firemarshals.org) requests Disapprove

**Commenter's Reason:** This issue was heavily discussed when adding ESS requirements to the IFC, to the IRC and with the NFPA 855 Energy Storage Standard committee, and in all cases, it was rejected. This rejection was based upon a discussion of the practical difficulties, the long-term maintenance of such a requirement, and an industry conducted large-scale burn test of an ESS utilizing a space constructed of typical residential construction materials.

The majority of ESS are being installed in existing homes. The preferred location is inside garages or on the outside wall. Utility rooms, basements, storage, or utility spaces are secondary locations. One reason for this is the installation is more cost effective because the closer the installation is to the service entrance of the home, there is lower material and wiring costs.

When utilizing an existing utility room or space, the door in many cases is louvered to provide for makeup air because it is common to get that air from the dwelling unit. The use of a solid door negatively impacts the makeup air. Where would it come from? A part of the door discussion was how would the self- or automatic-closing feature be maintained? It was recognized that in many cases it likely would be disabled by a homeowner, particularly if the utility space contained a washing machine and/or dryer, because moving through the door carrying a laundry basket would cause some frustration. If there is an event, the preference is for the smoke to be able to leave the room.

A basement or utility room or space will have numerous existing penetrations, including dryer vents. This will present a practical difficulty to complying with Section R302.11, Item 4.

The current requirements in the code are based upon a large-scale burn test documenting that the existing construction methods prevent extension to the structure, that if there is a thermal runaway the unit produces smoke for as much as 20 minutes for those technologies that will self-ignite, and the requirement for an interconnected smoke alarm to be in the room or space the ESS is located in provides for the necessary life safety alerting of the dwelling's occupants. Compare the 20 minute lead time for alerting to a typical living room fire where flashover is possible within three and half minutes. It is because of that speed of development that NFPA and other safety organizations urge home occupants to escape within three minutes of a smoke alarm alerting.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. If there is no change to the code, due to this Public Comment, there will not be any effect on the cost of construction. If the code proposal is accepted, it will increase the cost of construction.

Public Comment# 3206

### **Proposed Change as Submitted**

**Proponents:** Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

## **2021 International Residential Code**

**Revise as follows:**

**R328.1 General.** *Energy storage systems (ESS)* shall comply with the provisions of this section.

**Exceptions:**

1. *ESS listed and labeled* in accordance with UL 9540 and marked "~~For~~ Suitable for use in residential ~~dwelling units~~ habitable spaces" where installed in accordance with the manufacturer's instructions and NFPA 70.
2. *ESS* less than 1 kWh (3.6 megajoules).

**Reason:** Intended to clarify what the product marking actually is. To align with the wording that will ultimately be in the standard.

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.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
It aligns with the marking requirements in UL 9540.

RB158-22

### **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee was not comfortable with the language for marking an ESS because the felt the proposed text is ambiguous and misleading when it comes to dwelling units. The testimony was that the testing standard, UL9540, is so high, no technology meets it yet. For ESS's in dwelling units it is important to be sure the standard is done correctly. (Vote 8-2)

RB158-22

### **Individual Consideration Agenda**

#### **Public Comment 1:**

**IRC:** R328.1

**Proponents:** Larry Sherwood, representing Solar Energy Action Committee (larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Philip Oakes, representing National Association of State Fire Marshals (admin@firemarshals.org) requests As Modified by Public Comment

**Replace as follows:**

## **2021 International Residential Code**

**R328.1 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 ~~marked "For use in residential dwelling units"~~ where installed in accordance with the listing, the manufacturer's instructions and NFPA 70.
2. *ESS less than 1 kWh (3.6 megajoules).*

**Commenter's Reason:** The purpose of this code change proposal is to provide clarity where there is currently confusion regarding product markings.

As background, the text for the product marking that is currently in the code is in the current edition of the product standard UL 9540. This was added in the code by Public Comment 1 to RB154-19. That Public Comment was a consensus of all the ESS stakeholders. As noted in the Reason Statement for that Public Comment, the marking proposed in Section R327.1 was intended to exempt a UL 9540 listed ESS that will not go into thermal runaway or produce flammable gas when subjected to the UL 9540A Cell Level Test (for further detail, please also see the reason statement for Proposal RB157-18).

There is currently a proposal to UL 9540 to change the text of that marking, as well as additional clarifications on the testing required for the ability to apply such marking on an ESS. The reason for the proposed change to UL 9540 is because there has been a lot of confusion in the field regarding the current markings in UL 9540A pertaining to residential systems that may or may not employ battery technologies that meet the cell level performance criteria of UL 9540A, which is that thermal runaway was not able to be initiated and there was no venting of flammable gas. This is a very severe criteria, but if met, it would suggest that the battery energy storage system (BESS) does not present any greater fire hazard than another electrical appliance and can be installed anywhere in a residence including the habitable spaces. As of this date, we are not aware of technologies that can meet these criteria. Further, this marking has created considerable confusion in the market.

The Standards Technical Panel for UL 9540 is working on improving the markings to clarify what ESS products have been tested to appropriate requirements to determine suitability for use in habitable spaces. UL's Collaborative Standards Development System (CSDS) provides online access to review and submit proposals for UL's Standards development process. General access is available for information on STP meetings, submitting proposals, and access to free proposals. **For more information, click here**, or go to [www.ul.com/standards](http://www.ul.com/standards).

To address the confusion of the text of the marking currently identified in the IRC, this Public Comment is proposing to identify the intent, which is that this exception applies only where the ESS has been listed and labeled for specific use in habitable spaces, based on specific testing criteria in UL 9540.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The modifications to this section removes confusion created by the specific text of the marking, will retaining the intent and purpose of the exception.

Public Comment# 3207

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## **Proposed Change as Submitted**

**Proponents:** Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

### **2021 International Residential Code**

#### **Revise as follows:**

**R328.5 Energy ratings.** Individual ESS units shall have a maximum rating of 20 kWh. The ~~aggregate rating ratings~~ of the ESS in each location shall not exceed the ratings in Table R328.5. ÷The total aggregate ratings of ESS on the property shall not exceed 600 kWh.

- ~~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*.

#### **Add new text as follows:**

**TABLE R328.5 MAXIMUM AGGREGATE RATINGS OF ESS**

| <b>LOCATION</b>   | <b>MAXIMUM AGGREGATE RATINGS (kWh)</b> | <b>INSTALLATION REQUIREMENTS</b>  |
|---|--|---|
| <u>Within utility closets, basements and storage or utility spaces located within dwellings</u> | <u>40</u>                              |   |
| <u>In attached garages</u>  | <u>100</u>                             |   |
|   | <u>100</u>                             |   |
| <u>On or within 3 feet of exterior walls of dwellings and attached garages</u>                  | <u>200</u>                             | <u>Exterior walls and eaves are constructed with noncombustible surfaces<sup>a</sup>.</u>                           |
| <u>In detached garages and detached accessory structures</u>                                    | <u>200</u>                             |   |
|   | <u>600</u>                             | <u>Detached garage or detached accessory structure is a minimum 10 feet away from property lines and dwellings.</u> |
| <u>Outdoors on the ground</u>   | <u>200</u>                             | <u>ESS is a minimum 3 feet away from property lines and dwellings.</u>  |
|   | <u>600</u>                             | <u>ESS is a minimum 10 feet away from property lines and dwellings.</u>   |

For SI: 1 foot = 304.8 mm

a. Noncombustible wall surface shall extend in accordance with all of the following:

1. A minimum of 5 feet horizontally from the edge of the ESS.
2. A minimum of 1 foot vertically below the bottom edge of the ESS.
3. A minimum of 8 feet vertically above the ESS, or to a non combustible eave, whichever is less.

The code official is authorized to approve reductions based on large-scale fire testing complying with Section 1207.1.5 of the International Fire Code.

**Reason:** The proposed changes to the first three sentences of R328.5 clarify the original intent for this section, which was to provide a maximum threshold for each location. It was not the intent to limit installations to one location on the property, or to limit to only 80 kWh for all ESS installed on the property.

Providing the various maximum thresholds in tabular form provides an easier method for the code user to determine the limits for each location.

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.

#### **Within utility closets, basements and storage or utility spaces**

:

The 40 kWh limit is unchanged from the 2021 IRC. That language clarifies that the 40 kWh limit does not apply to spaces or closets located within garages or accessory structures. It only applies to within the dwelling.

#### **In attached garages**

As the ESS industry has gained more experience with the needs of their customers and the grid, and the building safety community has gained more experience with ESS, it is becoming clear that the arbitrary capacity restrictions in the residential code are a hinderance to the deployment of clean energy technologies and are unneeded for safety. Hundreds of thousands of residential batteries have been installed and constructed to standards leading to greater levels of safety. Taken together these facts support a reasonable increase in kWh capacity to align with other anticipated hazards and fuel loads that may be present in a residential garage.

A modest increase in the allowable aggregate ESS capacity from 80 kWh to 100 kWh does not pose a significant elevated fire risk in the garage.

Manufacturers design ESS to well-established safety standards, have proven track records of operating without igniting in homes, and are built in ways to resist adding fuel to fires from other sources. In the rare event of an ESS fire, a fire from 100 kWh of energy storage does not pose a significantly greater threat to occupant safety and is not significantly more difficult to extinguish than a fire from 80 kWh of energy storage.

The fuel energy density and heat release rate potential presented by a 100-kWh energy storage system are comparable to that of vehicles parked in garages. 100 kWh is a typical capacity of currently available electric vehicles (EVs), which use lithium-ion chemistries as do many stationary ESS.<sup>1</sup> EVs also present significant additional fuel load through materials like upholstered seating and plastic trim. Internal combustion engine (ICE) vehicles have fuel, engine lubricants, and other components with the potential for very significant heat release rates. While the fuel load in a vehicle fueled by a gaseous fuel such as CNG or hydrogen can be less than that of a 100-kWh ESS in total energy output, the dynamics of a designed quick release of a gaseous fuel due to fire exposure in an attached garage can pose a significant concentrated fire exposure, or potentially a deflagration hazard risk to occupants and emergency responders.

This proposal allows homes to add an aggregate of 100 kWh of energy storage to an attached garage, while keeping the content fuel loads at safe levels. While actual fuel loads in garages can vary widely, this can be demonstrated using typical and conservative figures:

A reasonable fuel load for a garage is approximately 22,300 MJ. This assumes the garage is 20' x 20'<sup>2</sup> and that a reasonable fuel load density is 600 MJ/m<sup>2</sup>.<sup>3</sup> Parking two gasoline powered cars in the garage makes up approximately 10,600 MJ of fuel load.<sup>4</sup> Other garage items can make up approximately 3,300 MJ of fuel load.<sup>5</sup> The remaining fuel load available to an ESS (22,300 MJ minus 10,600 MJ minus 3,300 MJ) is 8,400 MJ. 8,400 MJ is equivalent to an ESS with an aggregate capacity of 100 kWh, assuming the ESS has a fuel load of 84 MJ/kWh.<sup>6</sup>

### **On or within 3 feet (914 mm) of exterior walls of dwellings and attached garages**

ESS on the exterior side of exterior walls pose less of a safety risk than ESS inside attached garages. If an ESS with an aggregate rating of 100 kWh in an attached garage is considered reasonable, then an ESS with an aggregate rating of 100 kWh on the exterior side of exterior walls should also be reasonable.

If an ESS with an aggregate rating of more than 100 kWh catches on fire, the non-combustible surface would protect occupant safety. Batteries that undergo burn tests on non-combustible surfaces, including masonry and cementitious board, perform well. Some tests have been done as part of 9540A.

### **In detached garages and detached accessory structures**

This scenario poses minimal risk to occupant safety, considering the distance from the dwelling and testing required of ESS. ESS in detached structures pose less of a safety risk than ESS on the exterior side of the dwelling. If an ESS with an aggregate rating of 200 kWh on the exterior side of the dwelling is considered reasonable, then an ESS with an aggregate rating of 200 kWh should be reasonable for ESS in detached structures.

600 kWh matches Table 1207.5 of the IFC. ESS in structures separated from the dwelling by 10 feet do not pose demonstrable risk to occupants.

### **Outdoors on the ground**

This scenario poses minimal risk to occupant safety, considering the distance from the dwelling and the testing required of ESS. Ground mount ESS pose less of a safety risk than ESS on the exterior side of the dwelling. If an ESS with an aggregate rating of 200 kWh on the exterior side of the dwelling is considered reasonable, then an ESS with an aggregate rating of 200 kWh should be reasonable for ESS mounted on the ground.

Additionally, 200 kWh is equivalent to two typical EVs that can be parked anywhere on the property.

600 kWh matches Table 1207.5 of the IFC. ESS separated from the dwelling by 10 feet do not pose demonstrable risk to occupants.

### **Endnotes**

1. Tesla Model X has a capacity of 100 kWh. Tesla Model S has a capacity of 70-85 kWh. Chevy Bolt has a capacity of 66 kWh. The electric Ford F150 has a capacity of 110-130 kWh or 150-180 kWh with extended range. Sources: <https://www.forbes.com/wheels/cars/tesla/model-x/>, <https://www.tesla.com/sites/default/files/tesla-model-s.pdf>, <https://media.chevrolet.com/media/us/en/chevrolet/vehicles/bolt-ev/2021.tab1.html>, <https://www.forbes.com/wheels/news/2022-ford-f-150-lightning-ev-pickup-debuts-300-mile-range-priced-at-40k>.

2. Builders' websites show the typical two-car garage is around 20' x 20'. For example, HWS Garages' website states that "The average 2-car garage size is anywhere from 18' x 20' to 22' x 22'." While some garages are one-car and some are three-car, a poll conducted by Garage Living shows

that 61 percent of garages are two-car. Sources: [www.hwsgarage.com/average-garage-sizes/](http://www.hwsgarage.com/average-garage-sizes/) and [www.garageliving.com/blog/home-garage-stats](http://www.garageliving.com/blog/home-garage-stats).

3. The average fuel load of a living room is 600 MJ/m<sup>2</sup>. 600 MJ/m<sup>2</sup> is also the business standard in NFPA 557. Sources: Alex Bwalya et al., "A Pilot Survey of Fire Loads in Canadian Homes," *National Research Council Canada*, March 9, 2004; National Fire Protection Association, "NFPA 557: Standard for Determination of Fire Loads for Use in Structural Fire Protection Design," 2020 Edition, Section 6.1.3.

4. 10,577 MJ (rounded to 10,600 MJ) assumes a small car (2,909 MJ) and large car (7,648 MJ). Sources: Mohd Tohir and Michael Spearpoint, "Distribution analysis of the fire severity characteristics of single passenger road vehicles using heat release rate data," *Fire Science Reviews*, 2013. Also see M.J. Spearpoint, et. al., "Fire load energy densities for risk-based design of car parking buildings," *Case Studies in Fire Safety*, 29 April 2015.

5. 3,341 MJ (rounded to 3,300 MJ) is equivalent to half the fuel load items in a typical basement living room. Source: Bwalya, A.C., et. al., "Survey Results of Combustible Contents and Floor Areas in Multi-Family Dwellings," *National Research Council Canada*, 24 October 2008.

6. 84 MJ/kWh is derived from the estimated fuel load of the gases released by an ESS in thermal runaway (44 MJ/kWh) and the estimated fuel load of the burnable contents inside the ESS (40 MJ/kWh). 44 MJ/kWh was derived from reviewing several studies referenced below. 40 MJ/kWh was derived from multiplying 2 kg/kWh (a conservative figure for burnable contents inside the ESS – the weight of internal contents for some ESS is 1.0-1.5 kg/kWh) by 20 MJ/kg (the typical fuel load of a computer). Sources for fuel load of gases: Frederik Larsson, "Toxic fluoride gas emissions from lithium-ion battery fires," *Scientific Reports*, 30 August 2017; David Sturk et. al., "Fire Tests on E-vehicle Battery Cells and Packs," *Traffic Injury Prevention*, 25 February 2015. Sources for kg/kWh weight of internal burnable contents: Tesla, SimpliPhi, and Solaredge. Source for fuel load of a computer: Alex Bwalya et al., "A Pilot Survey of Fire Loads in Canadian Homes," *National Research Council Canada*, March 9, 2004.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
It clarifies how the maximum thresholds are applied. Allows for more ESS while maintaining a level of safety.

RB159-22

## **Public Hearing Results**

### **Committee Action:**

**Disapproved**

**Committee Reason:** There is concern on the language of the last line of the proposal under Table R328.5 that sounds as if the burden of evaluating the testing is placed on the building official. There was also concern about cars and batteries increasing electric load in the garage, especially with two cars. The committee would like to see more study and information on this. Some support for the proposal was for the maximum aggregate ESS ratings and that the table provides great information for the user. (Vote: 7-3)

RB159-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Larry Sherwood, representing Solar Energy Action Committee ([larry@irecusa.org](mailto:larry@irecusa.org)); Kevin Reinertson, representing California Fire Chiefs Association FPO ([kevin.reinertson@fire.ca.gov](mailto:kevin.reinertson@fire.ca.gov)); Benjamin Davis, representing California Solar & Storage Association ([ben@calssa.org](mailto:ben@calssa.org)); Robert Davidson, representing Myself ([rjd@davidsoncodeconcepts.com](mailto:rjd@davidsoncodeconcepts.com)); Joseph Cain, representing Solar Energy Industries Association (SEIA) ([joecainpe@gmail.com](mailto:joecainpe@gmail.com)); Philip Oakes, representing National Association of State Fire Marshals ([admin@firemarshals.org](mailto:admin@firemarshals.org)) requests As Submitted

**Commenter's Reason:** The language at the end of the Table R328.5, "The code official is authorized to approve reductions based on large-scale fire testing complying with Section 1207.1.5 of the International Fire Code," is not a new concept. Similar language is currently in the 2021 IRC in Section R328.3.1:

*R328.3.1 Spacing. Individual units shall be separated from each other by not less than 3 feet (914 mm) except where smaller separation distances are documented to be adequate based on large-scale fire testing complying with Section 1207.1.5 of the International Fire Code.*

This is a core concept that is also found in the International Fire Code and NFPA 855 Energy Storage Systems. Conservative installation requirements regarding separation are specified with those separations permitted to be reduced based upon a large-scale fire test that documents the reduced separation is okay. The large-scale fire test assesses propagation from one unit to another at a given separation distance. If the fire propagates to the next unit, the test fails. A positive test means the distance is adequate. There is no more burden on a building official than receiving documentation of listings or checking manufacturer's installation instructions.



For the committee comment regarding “...*concern about cars and batteries increasing electric load in the garage, especially with two cars.*”, this is a situation that already exists. There are no restrictions on the fuels contained within vehicles. There could be one, two or more cars in a residential garage. They can be hydrogen fueled, compressed natural gas fueled, electric vehicles, or conventionally fueled with a plastic fuel tank. The code provides for separation of the garage from the dwelling. If the committee is concerned with the collective hazards (i.e., everything being consumed at once and the ability of the separation from the dwelling to perform), that is a separate discussion and, as recommended by the committee, code officials and industry would participate in a study of the issue. If the concern is electric loading on circuits, that is addressed with the electrical provisions of the IRC and the NEC.

A core discussion that did not occur during the CAH is that the increases proposed are aggregate in response to the needs of homeowners based upon industry experience. When the original limits were established, the numbers were plucked out of the air as part of a “give-and-take” consensus process amongst work group participants. As with any new topic in the codes, it was expected that changes would be made as the industry and technology matures and more information becomes available. The important issue to identify here is that the core safety level of residential ESS installations has not changed, that safety level is the restriction of the individual unit being limited to 20kWh, and that spacing be such that if a unit goes into thermal runaway the spacing is such that the event does not propagate. Only one unit would be involved. Though the aggregates are increased, that means additional units of no more than 20kWh can be added with required spacing, keeping an event to no more than 20kWh.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. It clarifies how the maximum thresholds are applied. Allows for more ESS while maintaining a level of safety.

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Public Comment# 3208

## **Proposed Change as Submitted**

**Proponents:** Larry Sherwood, representing Sustainable Energy Action Committee (Larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Philip Oakes, representing National Association of State Fire Marshals; Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com)

### **2021 International Residential Code**

**Revise as follows:**

**R328.7 Fire detection.** ESS installed in *dwelling units* and attached garages shall comply with the following:

1. Rooms and areas within *dwelling units*, *sleeping units*, basements and attached garages in which ESS are installed shall be protected by smoke alarms in accordance with Section R314.
2. A ~~heat detector, listed and interconnected to the smoke alarms,~~ *listed heat alarm* shall be installed in locations ~~within dwelling units and attached garages~~ where smoke alarms cannot be installed based on their listing.

**Reason:**

This proposal aligns with F154-21 in the Group A cycle for the IFC.

The purpose of this proposal is to:

1. Divide the single paragraph into distinct parts for clarity, separating the charging language from the provisions to provide single-station or multi-station smoke alarms per the code.
2. Correct the section pointer to section 907.2.10 to the revised location in the 2021 IFC, 907.2.11.
3. Clarify the intent is to provide both heat detection and alarm annunciation in the ESS location through the use of listed heat alarms.

The term heat detector was replaced because the heat detectors do not include a local annunciator. A heat detector is only required to detect a heat event, and safety officials want an audible alarm. The term interconnected is removed from this section as the requirements for interconnection are provided in section 907.2.11 of the code.

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.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. This proposal clarifies existing code language, and aligns with the IFC.

RB160-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** There was concern about losing the interconnection with the smoke alarms in the dwelling unit. The UL listed heat alarms for complying with this requirement are not yet available. (Vote: 6-4)

RB160-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Larry Sherwood, representing Solar Energy Action Committee (larry@irecusa.org); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov); Benjamin Davis, representing California Solar & Storage Association (ben@calssa.org); Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com); Philip Oakes, representing National Association of State Fire Marshals (admin@firemarshals.org) requests As Submitted

**Commenter's Reason:** This proposal aligns with F154-21 in the Group A cycle for the IFC. The requirement for interconnection with the smoke alarms is not lost, because of the requirement to comply with Section R314. There are already heat alarms available today that would be in compliance with these requirements. UL 539, *Heat Alarms*, has been updated to include requirements for heat alarms located in unconditioned spaces, such as garages. The next edition of this code will not be adopted and used for at least another two to three years from now, which should provide time for manufacturers to develop products.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal clarifies existing code language, and aligns with the IFC.

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Public Comment# 3209

## **Proposed Change as Submitted**

**Proponents:** Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

### **2021 International Residential Code**

Add new text as follows:

#### **SECTION R331** **ALTERATIONS**

**R331.1 Alterations to an existing building.** Where an *existing building* with the alteration is within the scope of the International Residential Code, *alterations* to the *existing building* shall comply with this section and other applicable provisions of this code. New elements shall meet all of the requirements of this code for new construction. 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.

**R331.1.1 Alterations that decrease structural capacity.** Where an *alteration* causes a decrease in capacity in any structural component, that structural component shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8.

**R331.1.2 Alterations that increase structural 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.

**R331.1.2.1 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.

**Exception:** 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 (0.1437 kN/m<sup>2</sup>) or less over an existing single layer of roof covering.

**R331.1.2.2 Live load increase.** An increase in *live load* shall be determined based on Table R301.5.

**R331.1.2.3 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.

**R331.1.2.4 Wind load increase.** Wind load shall be considered to be increased for purposes of this section when the surface area of any exterior elevation subject to wind pressure is increased by more than 5%.

**R331.1.2.5 Seismic load increase.** Seismic load shall be considered to be increased for purposes of this section where the actual dead load has increased by more than 5% in *existing buildings* assigned to Seismic Design Category C, D<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub> and subject to the seismic provisions of Section R301.2.2.

**Reason:** This proposal clarifies current IRC provisions as they apply to structural alterations of existing buildings within the scope of the IRC. IRC Section R102.7.1 provides broad guidance for alterations but does not provide clear direction on how to apply this guidance in common and specific circumstances. Use of the IEBC is permitted but is not consistent with the intent of the IRC to function as a standalone code. This proposal facilitates use of the IRC as a standalone code for both new and existing buildings within the scope of the IRC.

The language used in this proposal has been laid out to be consistent with the IRC approach and to keep the intended users (not engineers) in mind. The alteration provisions have been separated into 2 conditions:

- A decrease in structural capacity
- An increase in the supported loads

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This proposal is a clarification of existing, but ambiguous, rules already provided in Section R102.7.1.

## **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

### **SECTION R301 ALTERATIONS**

### **SECTION AJ109 ALTERATIONS**

~~**AJ109.4 Structural.** The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the alteration and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.~~

~~**R301.1**~~ **AJ109.4 Alterations to an existing building.** Where an *existing building* with the alteration is within the scope of the International Residential Code, *alterations* to the *existing building* shall comply with this section and other applicable provisions of this code. New elements shall meet all of the requirements of this code for new construction. 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.

~~**R301.1.1**~~ **AJ109.4.1 Alterations that decrease structural capacity.** Where an *alteration* causes a decrease in capacity in any structural component, that structural component shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8.

~~**R301.1.2**~~ **AJ109.4.2 Alterations that increase structural 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.

~~**R301.1.2.1**~~ **AJ109.4.2.1 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.

**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 (0.1437 kN/m<sup>2</sup>) or less over an existing single layer of roof covering.

2. Installation of rooftop-mounted *photovoltaic (PV) panel systems* weighing 4 pounds per square foot or less over an existing single layer of roof covering.

~~**R301.1.2.2**~~ **AJ109.4.2.2 Live load increase.** An increase in *live load* shall be determined based on Table R301.5.

~~**R301.1.2.3**~~ **AJ109.4.2.3 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.

~~**R301.1.2.4**~~ **AJ109.4.2.4 Wind load increase.** Wind load shall be considered to be increased for purposes of this section when the surface area of any exterior elevation subject to wind pressure is increased by more than 5%.

~~**R301.1.2.5**~~ **AJ109.4.2.5 Seismic load increase.** Seismic load shall be considered to be increased for purposes of this section ~~where the actual dead load has increased by more than 5% in *existing buildings* assigned to Seismic Design Category C, D0, D1, or D2 and subject to the seismic provisions of Section R301.2.2;~~ 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% of the total roof area.

2. Brick veneer or cladding of similar weight is installed on walls above the second story.

**Committee Reason:** The modification inclusive of AJ109.4 through AJ109.4.2.5 moves the section to the appendix and it fixes some issues with the existing structural loads. Another modification to AJ109.4.2.5 eliminates the 5% trigger for seismic upgrading and makes it easier for the code user. The modification for AJ109.4.2.1 makes sense with a lot of PV panels being placed on existing roofs. Some of the committee were concerned about potential confusion and misinterpretation of the two exceptions. The committee decided this proposal as modified is a good start to clarify structural alterations in the IRC provisions. In consideration of needed improvement, some of the committee preferred disapproval and resubmitting with appropriate modifications for public comment. (Vote: 6-4)

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: AJ109.4, AJ109.4.1, AJ109.4.2, AJ109.4.2.1, AJ109.4.2.4, AJ109.4.2.5**

**Proponents:** Julie Furr, representing FEMA ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

**AJ109.4 Alterations to an existing building.** Where an *existing building* with the alteration is within the scope of the International Residential Code, *alterations* to the *existing building* shall comply with this section and other applicable provisions of this code. New elements shall meet all of the requirements of this code for new construction. 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.

**AJ109.4.1 Decreased structural capacity ~~Alterations that decrease structural capacity.~~** Where an *alteration* causes a decrease in capacity in any structural component, that structural component shall be shown to comply or shall be altered to comply with the applicable provisions of Chapters 3, 4, 5, 6, and 8.

**AJ109.4.2 Increased design loads ~~Alterations that increase structural 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.

**AJ109.4.2.1 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.

#### **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 (0.1437 kN/m<sup>2</sup>) or less over an existing single layer of roof covering.
2. Installation of rooftop-mounted *photovoltaic (PV) panel systems* weighing 4 pounds per square foot or less over an existing single layer of roof covering.

These exceptions shall not be applied simultaneously.

**AJ109.4.2.4 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%.

**AJ109.4.2.5 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<sub>0</sub>, D<sub>1</sub>, or D<sub>2</sub> 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% of the total roof area.
2. Brick veneer or cladding of similar weight is installed on walls above the second story.

**Commenter's Reason:** This public comment clarifies specific points of concern that were raised in testimony during the code action hearings. In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.

[https://www.cdaccess.com/public-comment/3135/27714/files/download/3680/FEMA\\_IRC%20APP%20J%20compiled%2007-21-22.docx](https://www.cdaccess.com/public-comment/3135/27714/files/download/3680/FEMA_IRC%20APP%20J%20compiled%2007-21-22.docx)

This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB162, RB163, RB206, and RB297.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal is a clarification of existing, but ambiguous, rules already provided in Section R102.7.1. The public comment is editorial clean-up to address committee comments and the redirection to locate this in Appendix AJ.

**Staff Analysis:** Public comments to RB7, RB162, RB163, RB206 and RB297 addresses requirements for Appendix J in a different or contradicting manner. Approved proposal to Appendix J but without a public comment are RB99, RB296, RB298 and RB299. The membership is urged to make their intention clear with their actions on these public comments.

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Public Comment# 3135

## **Proposed Change as Submitted**

**Proponents:** Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

### **2021 International Residential Code**

Add new text as follows:

#### **SECTION R331** **ADDITIONS**

**R331.1 Additions to an existing building.** Where *existing buildings* with the addition are within the scope of the International Residential Code, additions shall comply with this section and other applicable provisions of this code. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section.

**R331.1.1 Horizontal Attached Addition.** Where an *addition* involves new construction next to and attached to an *existing building* and includes *alterations* to the *existing building*, the new construction shall meet all of the requirements of this code for new construction. Alterations to the *existing building* shall comply with the requirements governing alterations within this code. The addition structural components shall be connected to the *existing building* in accordance with accepted engineering practice.

**Exception:** 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).

**R331.1.2 Horizontal Detached Addition.** Where an *addition* involves new construction next to an *existing building*, without structural alterations to the *existing building*, the *existing building* need not comply with the requirements of this code for new construction. The addition shall meet all of the requirements of this code for new construction and a minimum clear space not less than 6-inches shall be provided between the addition structural components and the *existing building*. Exterior and interior finish materials and non-structural framing infill shall be permitted to bridge the clear space between the addition and *existing building*. Existing foundations shall not be used to support the addition.

**Exceptions:**

1. At parallel wall lines between the *existing building* and the *addition*, the existing foundation is permitted to be altered to support the addition provided the modified foundation is designed in accordance with Section R301.1.3.
2. At parallel wall lines between the *existing building* and the *addition*, an existing window opening is permitted to be altered to create a shared door, provided there are no modifications to the existing wall framing above and beside the existing opening, or to the existing braced wall panels.

**R331.1.3 Vertical Addition.** 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 meet all of the requirements of this code for new construction.

**Reason:** This proposal provides model prescriptive provisions for additions to existing buildings within the scope of the IRC. The current governing language on existing IRC buildings (R102.7.1) leaves significant questions open to broad interpretation by the user and AHJ, which is clarified by these provisions. The language used in this proposal has been laid out to be consistent with the IRC approach and to keep the intended users (not engineers) in mind. This code change proposal does not add new requirements, but rather explains in more detail how the existing general requirements should be implemented.

The addition provisions have been separated into 3 conditions:

- Horizontal Attached Addition – additions that do rely on the existing structure for stability
- Horizontal Detached Addition – additions that do not rely on the existing structure for stability
- Vertical Addition – vertical additions that rely on the existing structure below to provide adequate support without failure or excessive deformation.

The model code that governs existing buildings (IEBC) includes multiple exceptions that allow the user to use the IRC for one- and two-family dwellings and townhouses. Once under IRC Section R102.7.1, questions arise on how to apply new code provisions to an existing structure, short of triggering a full upgrade or engaging a registered design professional. The ambiguity of R102.7.1 has resulted in AHJ's developing their own local amendments, to establish when existing conditions must be upgraded to comply with new code provisions.



Note:

A separate proposal has been submitted to create a new IRC Chapter 44 for Existing Buildings with new sections for existing provisions. If both proposals are approved, the sections proposed here would be relocated into Chapter 44 and appropriately renumbered.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. This proposal is a clarification of existing, but ambiguous, rules already provided in R102.7.1.

RB163-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal points everything in it to comply with the IRC including references to engineered design where appropriate, yet additions are already included under the scope of the IRC as stated in Section 102.7.1. Comment was made that the topic of detached additions is a topic not needed since detached structures can already be done under the IRC. The language of the latter part of the Vertical Addition section appears to require the existing building to meet all requirements of the IRC. Support for the proposal was expressed for the clarity and direction it gives on dealing with additions. Some felt this is a good start and encouraged modifications for the Public Comment Hearings. (Vote: 7-3)

RB163-22

## **Individual Consideration Agenda**

**Public Comment 1:**

**IRC:** SECTION R331, R331.1, R331.1.1, R331.1.2, R331.1.3

**Proponents:** Julie Furr, representing FEMA ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

#### **SECTION AJ110 R331 ADDITIONS**

**AJ110.1 R331.1 Additions to an existing building.** Where *existing buildings* with the addition are within the scope of the International Residential Code, additions shall comply with this section and other applicable provisions of this code. Engineered design in accordance with Section R301.1.3 shall be permitted to meet the requirements of this section.

**AJ110.2 R331.1.1 Structure for Horizontal Additions Horizontal Attached Addition.** Where an *addition* involves new construction ~~next to and attached to an existing building and includes alterations to the 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). ~~The addition structural components shall be connected to the existing building in accordance with accepted engineering practice.~~

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

~~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).~~

**R331.1.2 Horizontal Detached Addition.** ~~Where an addition involves new construction next to an existing building, without structural alterations to the existing building, the existing building need not comply with the requirements of this code for new construction. The addition shall meet all of the requirements of this code for new construction and a minimum clear space not less than 6 inches shall be provided between the addition structural components and the existing building. Exterior and interior finish materials and non-structural framing infill shall be permitted to bridge the clear~~

~~space between the addition and existing building. Existing foundations shall not be used to support the addition.~~

**Exceptions:**

- 1- ~~At parallel wall lines between the existing building and the addition, the existing foundation is permitted to be altered to support the addition provided the modified foundation is designed in accordance with Section R301.1.3.~~
- 2- ~~At parallel wall lines between the existing building and the addition, an existing window opening is permitted to be altered to create a shared door, provided there are no modifications to the existing wall framing above and beside the existing opening, or to the existing braced wall panels.~~

**AJ110.3 R331.1.3 Structure for Vertical Additions-Vertical Addition.** 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 ~~meet all of the~~ 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.

**Commenter's Reason:** Multiple questions were raised by the committee and opposition testimony, that highlighted differing interpretations of the originally proposed language. This public comment simplifies and clarifies the proposed language to address those points. The 2 primary changes are:

- 1- The horizontal addition provisions have been condensed into one section that uses prescriptive language in-line with the IRC practice. The language used in this public comment was developed in collaboration by all interested parties, including input from the Home Builders Association.
- 2 - Both the horizontal and vertical addition sections have been clearly limited in scope to structural requirements only. The original proposed language was more broad and encompassed all disciplines, which exceeded the intended purpose of this section.

In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.

[https://www.cdpassess.com/public-comment/3134/27715/files/download/3684/FEMA\\_IRC%20APP%20J%20compiled%2007-21-22.docx](https://www.cdpassess.com/public-comment/3134/27715/files/download/3684/FEMA_IRC%20APP%20J%20compiled%2007-21-22.docx)

This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB7, RB162, RB163, RB206, and RB297.

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction

This proposal is a clarification of existing, but ambiguous, rules already provided in R102.7.1. However, the cost of construction will increase as a result of the more clear direction and ease of enforcing the more prescriptive requirements laid out herein.

**Staff Analysis:** Public comments to RB7, RB162, RB163, RB206 and RB297 addresses requirements for Appendix J in a different or contradicting manner. Approved proposal to Appendix J but without a public comment are RB99, RB296, RB298 and RB299. The membership is urged to make their intention clear with their actions on these public comments.

Public Comment# 3134

## **Proposed Change as Submitted**

**Proponents:** Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com)

### **2021 International Residential Code**

#### **Revise as follows:**

**R403.1.1 Minimum size.** The minimum width, W, and thickness, T, for concrete footings shall be in accordance with Tables R403.1(1) through R403.1(3) and Figure R403.1(1) or R403.1.3, as applicable, but not less than 12 inches (305 mm) in width and 6 inches (152 mm) in depth. The footing width shall be based on the load-bearing value of the soil in accordance with Table R401.4.1. Footing projections, P, shall be not less than 2 inches (51 mm) and shall not exceed the thickness of the footing. Footing thickness and projection for fireplaces shall be in accordance with Section R1001.2. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1. Footings for wood foundations shall be in accordance with the details set forth in Section R403.2, and Figures R403.1(2) and R403.1(3). Footings for precast foundations shall be in accordance with the details set forth in Section R403.4, Table R403.4, and Figures R403.4(1) and R403.4(2). Crushed stone footings for masonry or cast-in-place concrete foundations shall be in accordance with Section R403.5.

#### **Add new text as follows:**

**R403.5 Crushed stone footings for cast-in-place foundations.** Crushed stone footings for masonry or cast-in-place concrete foundations complying with Section R404.1 shall comply with Section R403.4.1 except they shall be installed in accordance with Figures R403.5(1) or R403.5(2).





This proposal uses identical requirements for crushed stone and its placement as those for analogous pre-cast concrete foundations in Section R403.4.1 (by reference), and for footing width and depth in the associated Table R403.4. The proposal limits the proposed use of crushed stone to Seismic Design Categories A, B, and C, by reference as stated in Section R403.4.1. New Figures R403.5(1) and (2) illustrate the requirements, including minimums regarding the top of the footing relative to undisturbed ground surface. The Figures illustrate two conditions for crushed stone footings: 1) masonry or concrete wall foundation, and 2) slab-on-ground with turned down foundation. Conservatively, not less than one #4 bar is required for these foundations over a crushed stone footing. This is not currently required for plain concrete footings or turned-down footings in Seismic Design Categories A, B, and C. Minimum clearances for the #4 bar and the sill plate anchor are also stated in the Figures.

**Cost Impact:** The code change proposal will decrease the cost of construction

This proposal adds a less material-intensive, less labor-intensive and therefore less expensive foundation option, by allowing the use of crushed stone instead of concrete for footings in some situations.

RB166-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal addresses requirements for crushed stone footings for masonry or cast-in-place concrete foundations. The committee determined that the proposal requires an engineering design while the IRC includes prescriptive provisions. Therefore, the committee suggested that the proponent look into prescriptive provisions and cooperate with FEMA. The committee was also concerned about potential issues with drainage and stabilization (10-0).

RB166-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R403.1.1, R403.5, TABLE R403.5 (New), FIGURE R403.5(1), FIGURE R403.5(2), R403.5(3) (New)

**Proponents:** Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Eisenberg, representing DCAT (strawnet@gmail.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net) requests As Modified by Public Comment

**Modify as follows:**

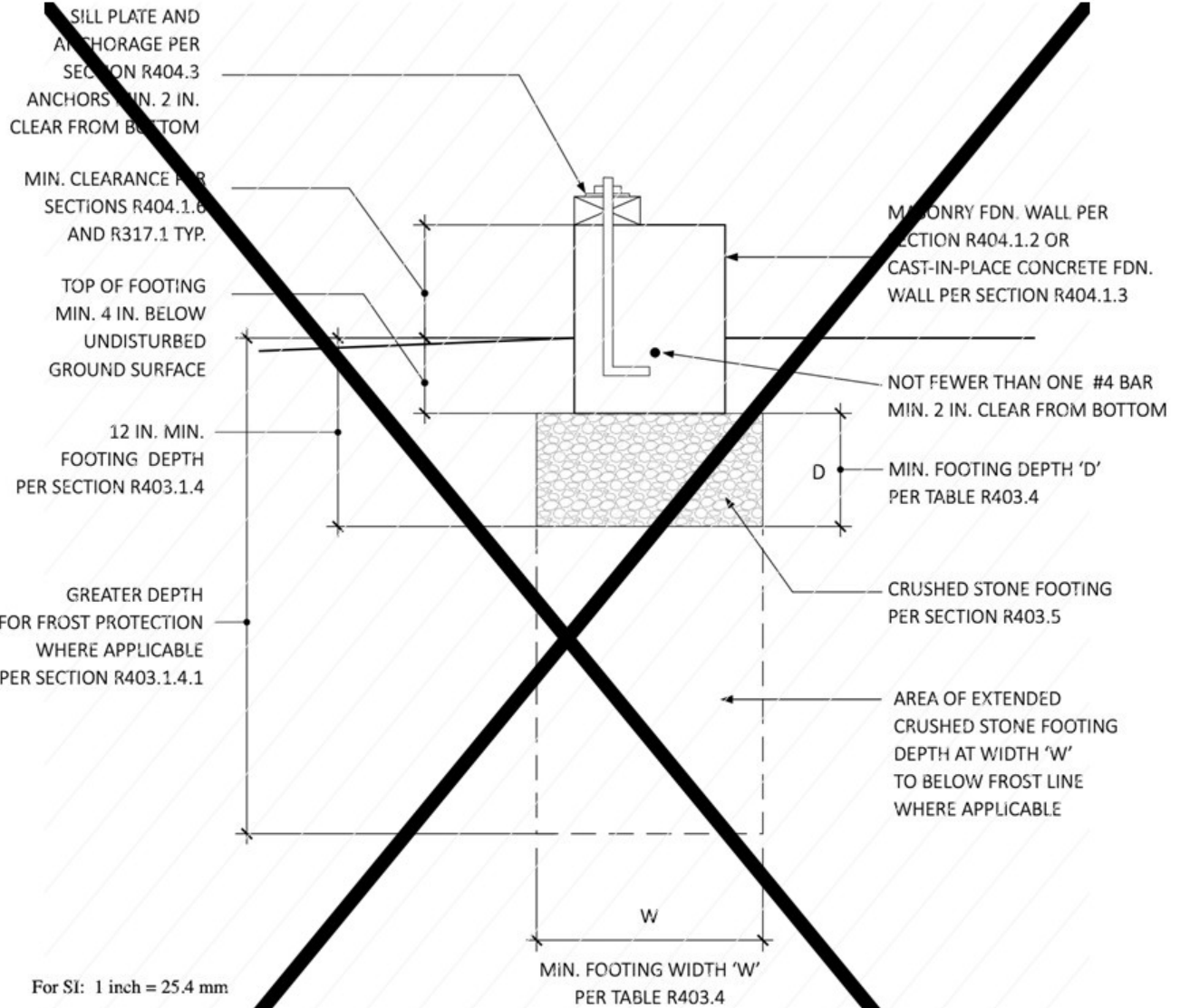
### **2021 International Residential Code**

**R403.1.1 Minimum size.** The minimum width, W, and thickness, T, for concrete footings shall be in accordance with Tables R403.1(1) through R403.1(3) and Figure R403.1(1) or R403.1.3, as applicable, but not less than 12 inches (305 mm) in width and 6 inches (152 mm) in depth. The footing width shall be based on the load-bearing value of the soil in accordance with Table R401.4.1. Footing projections, P, shall be not less than 2 inches (51 mm) and shall not exceed the thickness of the footing. Footing thickness and projection for fireplaces shall be in accordance with Section R1001.2. The size of footings supporting piers and columns shall be based on the tributary load and allowable soil pressure in accordance with Table R401.4.1. Footings for wood foundations shall be in accordance with the details set forth in Section R403.2, and Figures R403.1(2) and R403.1(3). Footings for precast foundations shall be in accordance with the details set forth in Section R403.4, Table R403.4, and Figures R403.4(1) and R403.4(2). Crushed stone footings for ~~masonry or~~ cast-in-place concrete foundations shall be in accordance with Section R403.5.

**R403.5 Crushed stone footings for cast-in-place concrete foundations.** Crushed stone footings ~~for masonry or cast-in-place concrete foundations complying in accordance with Section R403.4.1 shall comply.~~ be permitted for non-retaining cast-in-place concrete foundations complying with Section R404.1 R404.1.3 and this section except they. The footing and foundation wall shall be installed in accordance with Figures R403.5(1); or Figure R403.5(2) and Table R403.5, or Figure R403.5(3). Crushed stone footings for cast-in-place concrete foundations shall be permitted for townhouses in Seismic Design Categories A and B and one- and two-family dwellings in Seismic Design Categories A, B and C.

**TABLE R403.5 MINIMUM CAST-IN-PLACE CONCRETE FOUNDATION WALL DIMENSIONS, REINFORCEMENT, AND MAXIMUM  
BRACED WALL LINE SPACING**

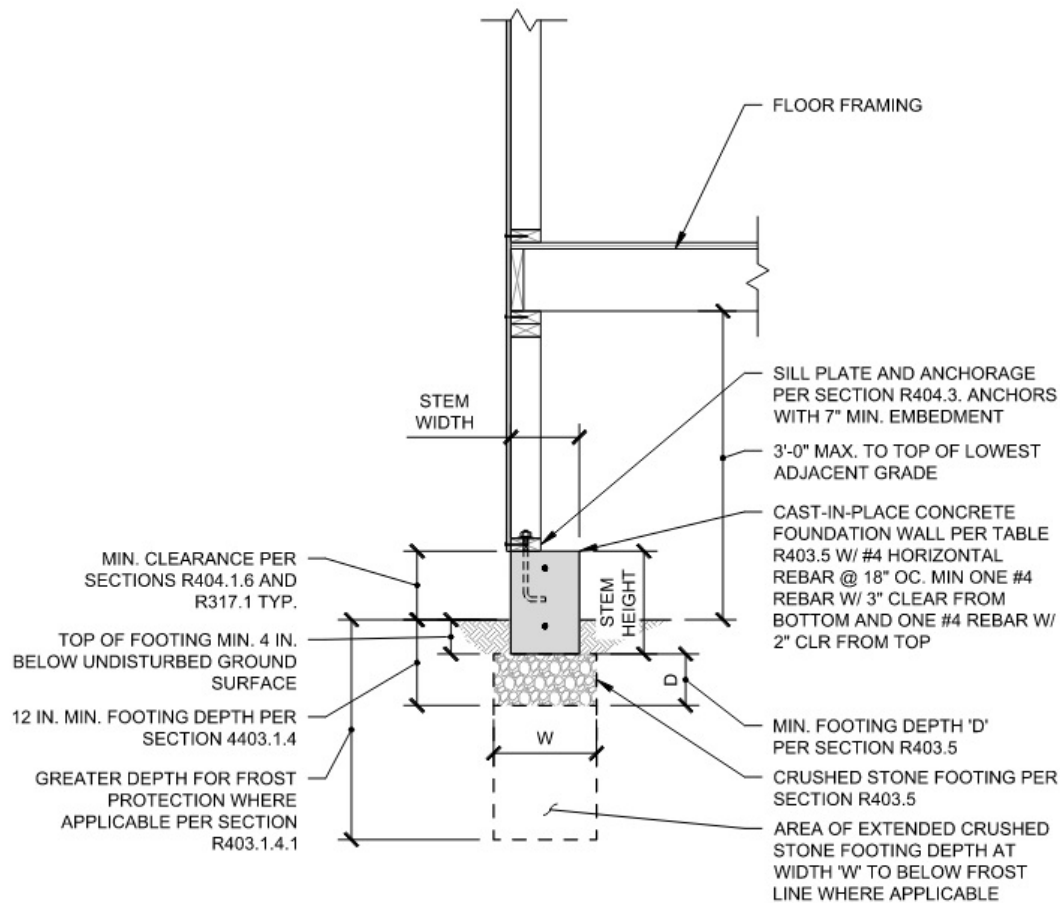
| <b><u>WIND EXPOSURE<br/>CATEGORY</u></b> | <b><u>ULTIMATE DESIGN WIND<br/>SPEED (MPH)</u></b> | <b><u>MIN. STEM WALL<br/>WIDTH (IN.)</u></b> | <b><u>MIN. STEM WALL<br/>HEIGHT (IN.)</u></b> | <b><u>MIN.<br/>HORIZONTAL<br/>REBAR</u></b> | <b><u>MAX. BRACED WALL LINE<br/>SPACING (FT.)</u></b> |
|--|--|--|---|---|---|
| <u>B</u>                                 | <u>≤ 140</u>                                       | <u>6</u>                                     | <u>12</u>                                     | <u>(2) - #4</u>                             | <u>28</u>   |
| <u>C and D</u>                           | <u>≤ 140</u>                                       | <u>8</u>                                     | <u>18</u>                                     | <u>(3) - #4</u>                             | <u>25</u>   |



1 MASONRY OR CAST-IN-PLACE CONCRETE FOUNDATION WALL  
NOT TO SCALE

FIGURE R403.5  
CRUSHED STONE FOOTINGS  
FOR CAST-IN-PLACE FOUNDATIONS  
IN SEISMIC DESIGN CATEGORIES A, B, AND C





For SI: 1 inch = 25.4 mm

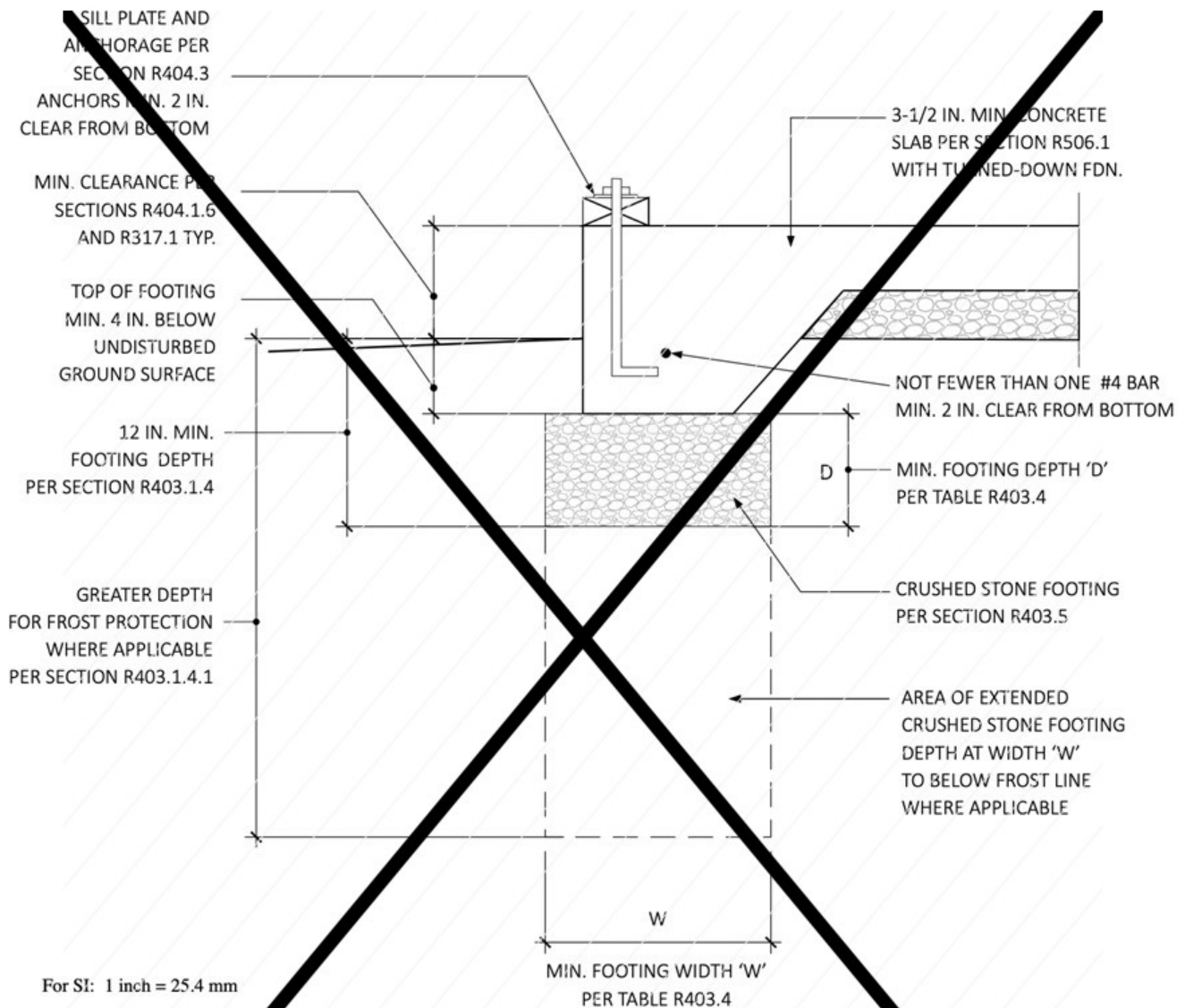
1

## CAST-IN-PLACE CONCRETE FOUNDATION

### WALL W/ WOOD CRIPPLE WALL

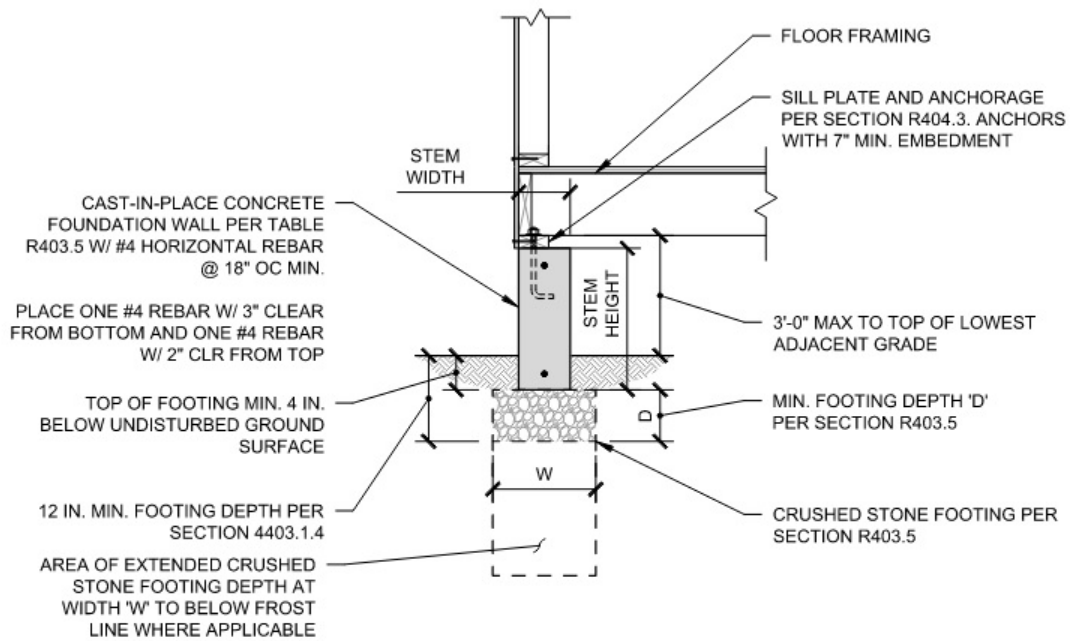
NOT TO SCALE

**FIGURE R403.5(1) CRUSHED STONE FOOTINGS FOR CAST-IN-PLACE CONCRETE FOUNDATIONS IN SEISMIC DESIGN CATEGORIES A, B, AND C AND WIND EXPOSURE CATEGORIES B, C, AND D - CAST-IN-PLACE CONCRETE FOUNDATION WALL WITH WOOD CRIPPLE WALL**

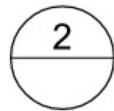


2 CONCRETE SLAB-ON-GROUND WITH TURNED-DOWN FOUNDATION  
NOT TO SCALE

FIGURE R403.5  
CRUSHED STONE FOOTINGS  
FOR CAST-IN-PLACE FOUNDATIONS  
IN SEISMIC DESIGN CATEGORIES A, B, AND C



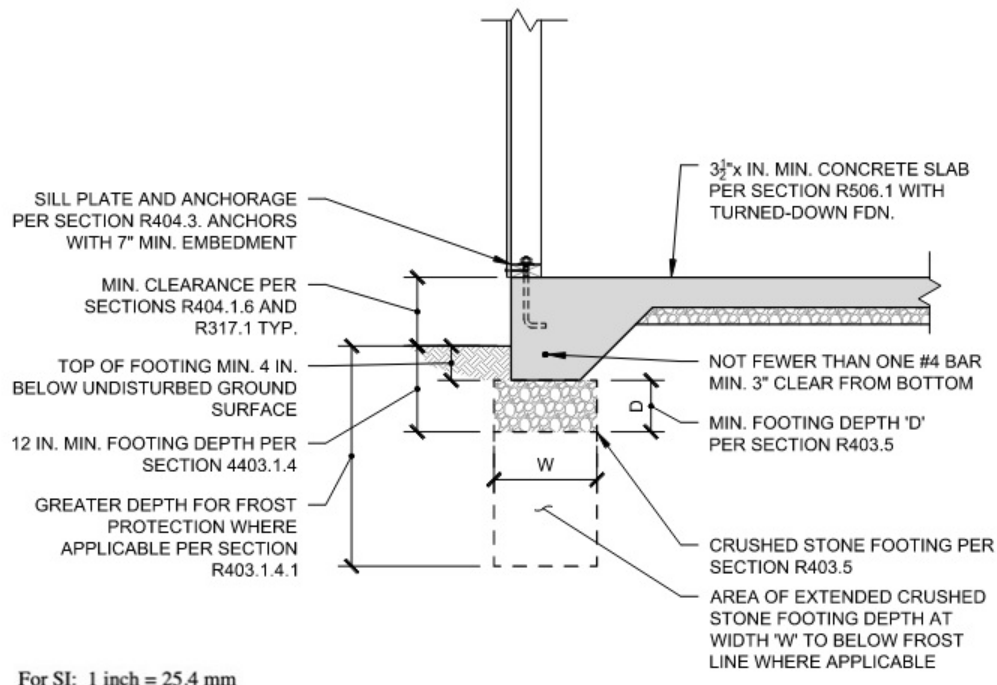
For SI: 1 inch = 25.4 mm



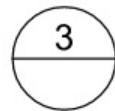
## CAST-IN-PLACE CONCRETE FOUNDATION W/ NO CRIPPLE WALL

NOT TO SCALE

**FIGURE R403.5(2) CRUSHED STONE FOOTINGS FOR CAST-IN-PLACE CONCRETE FOUNDATIONS IN SEISMIC DESIGN CATEGORIES A, B, AND C AND WIND EXPOSURE CATEGORIES B, C, AND D - CONCRETE SLAB-ON-GROUND WITH TURNED DOWN FOUNDATION CAST-IN-PLACE CONCRETE FOUNDATION WALL WITH NO CRIPPLE WALL ABOVE**



For SI: 1 inch = 25.4 mm



### CONCRETE SLAB-ON-GROUND W/ TURNED-DOWN FOUNDATION

NOT TO SCALE

#### **R403.5(3) CRUSHED STONE FOOTINGS FOR CAST-IN-PLACE CONCRETE FOUNDATIONS IN SEISMIC DESIGN CATEGORIES A, B, AND C AND WIND EXPOSURE CATEGORIES B, C, AND D - CONCRETE SLAB-ON-GROUND WITH TURNED DOWN FOUNDATION**

**Commenter's Reason:** Crushed stone footings for wood foundations and precast concrete foundations are currently permitted in IRC Sections R403.2 and R403.4.1 respectively. Proposal RB166 as modified by this Public Comment simply allows these provisions with similar or greater limitations to be used for cast-in-place concrete foundation walls and concrete slabs with turned-down foundations. This Public Comment maintains key aspects of the original proposal, while making modifications that address concerns expressed in CAH testimony or by IRC Committee comments, or that further limit its use.

##### A. Key Aspects of the Original Proposal Maintained:

1. Like the original proposal the modified proposal uses identical requirements for crushed stone and its placement as those for analogous pre-cast concrete foundations in Section R403.4.1 (by reference), and for footing width and depth in the associated Table R403.4.
2. Conservatively, #4 bars are required for cast-in-place foundation walls over a crushed stone footing and turned-down foundations for slabs. Minimum clearances and quantities for the #4 bars and embedment for the sill plate anchors are stated in the Figures. By comparison, no reinforcing is currently required in the IRC for plain concrete footings and their foundation walls, or turned-down foundations in Seismic Design Categories A, B, and C.
3. Limited to use for one- and two-family dwellings in Seismic Design Categories A, B, and C.

##### B. Public Comment Modifications Addressing Concerns Expressed at the CAH:

1. Limited to use for townhouses in Seismic Design Categories A, B, consistent with the split in Section R301.2.2. (An appropriate clarification suggested by FEMA representatives.)
2. For non-retaining use only. (An appropriate limitation identified by FEMA representatives.)
3. The prescribed stem walls have been analyzed for resistance to out-of-plane wind and seismic design loads and their lateral span limits between perpendicular braced wall lines and their associated foundations. The maximum spacing of perpendicular braced wall lines is listed in the newly proposed Table R403.5. (Addresses the out-of-plane resistance concern raised by FEMA representatives.) (See <https://verdantstructural.com/RB166-22-crushed-stone-footing-calculation-packet.pdf> for supporting calculations.)
4. The provisions are now entirely prescriptive, no longer requiring an engineered design. (The engineered design requirement, added as a floor modification at the CAH to address FEMA representatives' concerns that are now addressed in this Public Comment, was a primary reason the IRC

Committee disapproved RB166. The IRC's stated purpose is to provide prescriptive requirements.)

C. Improvements or Additional Limitations:

1. New or revised Figures R403.5(1), (2), and (3) illustrate the requirements of these provisions, referencing applicable section numbers. The Figures illustrate three conditions: (1) concrete foundation wall with a cripple wall (added with this Public Comment), (2) concrete foundation wall with no cripple wall, and (3) concrete slab-on-ground with turned-down foundation.

2. Removes masonry foundation walls, therefore is allowed for cast-in-place concrete foundation walls only.

The foundation drainage concern expressed by an IRC Committee member was explained in CAH proponent testimony. That is, the same requirements in the IRC for other foundation and footing systems apply to this crushed stone footing use. More specifically, foundation drainage in the IRC is required only for "... foundations that retain earth and enclose habitable or usable spaces located below grade." (Section R405.1). This Public Comment and Proposal allow neither. However, crushed stone footings provide potential beneficial use as a foundation drainage medium, as alluded to in some subsections of Section R405.1.

**Bibliography:** <https://verdantstructural.com/RB166-22-crushed-stone-footing-calculation-packet.pdf>

**Cost Impact:** The net effect of the public comment and code change proposal will decrease the cost of construction

This Proposal allows the less material-intensive, less labor-intensive and therefore less expensive footing option of crushed stone instead of concrete for cast-in-place foundation walls, though this cost savings is partly offset by required reinforcing steel in the foundation wall or turned-down foundation of a slab.

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Public Comment# 3358

## **Proposed Change as Submitted**

**Proponents:** Borjen Yeh, representing APA - The Engineered Wood Association (borjen.yeh@apawood.org)

### **2021 International Residential Code**

**Revise as follows:**

**R403.1.2 Continuous footing in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>.** Exterior walls of buildings located in *Seismic Design Categories* D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Table R403.1.2. Other footing materials or systems shall be designed in accordance with accepted engineering practice. ~~Required interior braced wall panels in buildings located in *Seismic Design Categories* D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> with plan dimensions greater than 50 feet (15 240 mm) shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Section R403.1.3.4, except for two-story buildings in *Seismic Design Category* D<sub>2</sub>, in which all braced wall panels, interior and exterior, shall be supported on continuous foundations.~~

**Exception:** ~~Two-story buildings shall be permitted to have interior braced wall panels supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that:~~

- ~~1. The height of cripple walls does not exceed 4 feet (1219 mm);~~
- ~~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.~~

**Add new text as follows:**

**TABLE R403.1.2 CONTINUOUS FOOTING REQUIREMENTS IN SEISMIC DESIGN CATEGORIES D<sub>0</sub>, D<sub>1</sub> AND D<sub>2</sub>**

| PLAN DIMENSIONS                  | 1-STORY         |                |                |                |                |                | 2-STORY         |                |                |                |                |                |
|----------------------------------|-----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|
|                                  | 50 feet or less |                |                | > 50 feet      |                |                | 50 feet or less |                |                | > 50 feet      |                |                |
| SDC                              | D <sub>0</sub>  | D <sub>1</sub> | D <sub>2</sub> | D <sub>0</sub> | D <sub>1</sub> | D <sub>2</sub> | D <sub>0</sub>  | D <sub>1</sub> | D <sub>2</sub> | D <sub>0</sub> | D <sub>1</sub> | D <sub>2</sub> |
| <b>Exterior Brace Wall Panel</b> |                 |                |                |                |                |                |                 |                |                |                |                |                |
| Continuous Footings              | R               | R              | R              | R              | R              | R              | R               | R              | R              | R              | R              | R              |
| <b>Interior Brace Wall Panel</b> |                 |                |                |                |                |                |                 |                |                |                |                |                |
| Continuous Footings              | NR              | NR             | NR             | R <sup>a</sup> | R <sup>a</sup> | R <sup>a</sup> | NR              | NR             | R <sup>a</sup> | R <sup>a</sup> | R <sup>a</sup> | R <sup>a</sup> |

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. NR when the following conditions are all met:

1. The height of cripple walls does not exceed 4 feet (1219 mm).
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:** Section R403.1.2 contains exceptions over exceptions and is confusing with various possible interpretations. The intent of this change proposal is to tabulate the provision in the new Table R403.1.2 without changing the intent of the existing provisions. Please note that Footnote (1) to Table R403.1.2 are identical to the exceptions contained in the existing Section R403.1.2. Table R403.1.2 is consistent with the IRC with the only exception for the 1-story with plan dimension of greater than 50 feet in interior brace wall panels, in which the "IRC Commentary Figure R403.1.2" indicates continuous footings are required. However, under the same conditions, the IRC indicates continuous footings are not required for 2-story buildings if the exceptions listed in the existing Section R403.1.2 are met. It seems irrational that 2-story buildings (more mass in seismic loading) are not required to have continuous footings, while 1-story buildings (less mass in seismic loading) are required to have continuous footings under the same plan dimension and interior brace wall panel. Therefore, the proposed new Table R403.1.2 conservatively applies the same 2-story building requirements to 1-story buildings.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

This code change proposal will not increase or decrease the cost of construction because the proposal is intended to present the current code requirements in a tabulated format for ease of understanding and implementation.

RB169-22

## **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

**R403.1.2 Continuous footing in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>.** Exterior walls and required interior braced wall panels of buildings located in *Seismic Design Categories* D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Table R403.1.2. Other footing materials or systems shall be designed in accordance with accepted engineering practice.

**TABLE R403.1.2 CONTINUOUS FOOTING REQUIREMENTS IN SEISMIC DESIGN CATEGORIES D<sub>0</sub>, D<sub>1</sub> AND D<sub>2</sub>**

| <u>BUILDING</u> PLAN DIMENSIONS  | 1-STORY         |                |                |                |                |                | 2-STORY         |                |                |                |                |                | 3-STORY              |                      |  |
|--|-----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------------|----------------------|--|
|  | 50 feet or less |                |                | > 50 feet      |                |                | 50 feet or less |                |                | > 50 feet      |                |                | <u>Any</u>           |                      |  |
| SDC  | D <sub>0</sub>  | D <sub>1</sub> | D <sub>2</sub> | D <sub>0</sub> | D <sub>1</sub> | D <sub>2</sub> | D <sub>0</sub>  | D <sub>1</sub> | D <sub>2</sub> | D <sub>0</sub> | D <sub>1</sub> | D <sub>2</sub> | <u>D<sub>0</sub></u> | <u>D<sub>1</sub></u> |  |
| <b>Exterior Brace Wall Panel</b>   |                 |                |                |                |                |                |                 |                |                |                |                |                |                      |                      |  |
| Continuous Footings <u>Supporting Exterior Walls</u>                       | R               | R              | R              | R              | R              | R              | R               | R              | R              | R              | R              | R              | <u>R</u>             | <u>R</u>             |  |
| <b>Interior Brace Wall Panel</b>   |                 |                |                |                |                |                |                 |                |                |                |                |                |                      |                      |  |
| Continuous Footings <u>Supporting Required Interior Braced Wall Panels</u> | NR              | NR             | NR             | R <sup>a</sup> | R <sup>a</sup> | R <sup>a</sup> | NR              | NR             | R <sup>a</sup> | R <sup>a</sup> | R <sup>a</sup> | R <sup>a</sup> | <u>R</u>             | <u>R</u>             |  |

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. NR when the following conditions are all met:

1. The height of cripple walls does not exceed 4 feet (1219 mm).
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.

**Committee Reason:** The committee concluded that the modification provides ease of use for the proposed change without any technical changes. The committee concluded that the proposal as modified provides the necessary clarifications and better organization of the continuous footing requirements in the seismic design category, D<sub>0</sub>, D<sub>1</sub>, and D<sub>2</sub>, to the code users. The proposal tabulates the provisions in a new Table R403.1.2 without changing the intent of the existing provisions (Vote: 10-0).

RB169-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R403.1.2, TABLE R403.1.2**

**Proponents:** Borjen Yeh, representing APA - The Engineered Wood Association (borjen.yeh@apawood.org) requests As Modified by Public Comment

**Further modify as follows:**

## **2021 International Residential Code**

**R403.1.2 Continuous footing in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>.** Exterior walls and required interior *braced wall panels* of buildings located in *Seismic Design Categories* D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub> shall be supported by continuous solid or fully grouted masonry or concrete footings in accordance with Table R403.1.2. Other footing materials or systems shall be designed in accordance with accepted engineering practice.



**TABLE R403.1.2 CONTINUOUS FOOTING REQUIREMENTS IN SEISMIC DESIGN CATEGORIES D<sub>0</sub>, D<sub>1</sub> AND D<sub>2</sub>**

| BUILDING PLAN DIMENSIONS  | 1-STORY         |                |                |                |                |                | 2-STORY         |                |                |                |                |                | 3-STORY        |                |
|---|-----------------|----------------|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|   | 50 feet or less |                |                | > 50 feet      |                |                | 50 feet or less |                |                | > 50 feet      |                |                | Any            |                |
| SDC   | D <sub>0</sub>  | D <sub>1</sub> | D <sub>2</sub> | D <sub>0</sub> | D <sub>1</sub> | D <sub>2</sub> | D <sub>0</sub>  | D <sub>1</sub> | D <sub>2</sub> | D <sub>0</sub> | D <sub>1</sub> | D <sub>2</sub> | D <sub>2</sub> | D <sub>1</sub> |
| Continuous Footings Supporting Exterior Walls                       | R               | R              | R              | R              | R              | R              | R               | R              | R              | R              | R              | R              | R              | R              |
| Continuous Footings Supporting Required Interior Braced Wall Panels | NR              | NR             | NR             | R <sup>a</sup> | R <sup>a</sup> | R <sup>a</sup> | NR              | NR             | R <sup>a</sup> | R <sup>a</sup> | R <sup>a</sup> | R <sup>a</sup> | R              | R              |

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. ~~NR~~ Buildings shall be permitted to have interior braced wall panels supported on continuous foundations at intervals not exceeding 50 feet (15 240 mm) provided that ~~when~~ the following conditions are all met:
1. The height of cripple walls does not exceed 4 feet (1219 mm).
  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.

**Commenter's Reason:** RB169-22 was approved by the IRC Committee as modified at the last hearing. However, it was realized after the hearing that Footnote (a) in Table R403.1.2 should have integrated the limitation of 50-foot intervals for braced wall panels for 2-story buildings, as specified in the Exception of the current Section R403.1.2. Note that while the Exception in the current Section R403.1.2 addresses 2-story buildings, it was explained in the Reasoning Statement of the original proposal that the same requirement could be conservatively applied to 1-story buildings. This was recognized by the IRC Committee and is covered in Footnote (a) of this public comment. This public comment corrects the oversight from the proposal based on the interpretation published in the IRC Commentary Figure R403.1.2.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This PC does not change the scope of the original proposal. This code change proposal will not increase or decrease the cost of construction because it is intended to clarify the existing code requirements.

Public Comment# 3350

## **Proposed Change as Submitted**

**Proponents:** David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org)

### **2021 International Residential Code**

**Add new text as follows:**

**R502.11 Floor framing supporting guards.** The framing at the open edge of a floor supporting a required guard assembly not exceeding 44 inches (1118 mm) in height shall be constructed in accordance with Sections R502.11.1 or R502.11.2 or shall be designed in accordance with accepted engineering practice to support the guard assembly. Trusses and I-joists are prohibited as edge framing members supporting guards except where the effects of the guard loads are specifically considered in the design of the edge member.

**R502.11.1 Conventional edge framing.** The framing at the edge of the floor shall consist of a solid or built-up wood member having a minimum net width of 3 inches (76mm) and a minimum net depth of 9-1/4 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section 502.11.3 with a roll brace aligned with each guard post.

**502.11.2 Timber edge framing.** The framing at the edge of the floor shall consist of a minimum 6x10 sawn timber or a minimum 5-1/8 inch x 9-1/4 inch (130 mm x 235 mm) glued laminated timber and shall be braced to resist rotation by roll bracing as described in Section 502.11.3 at intervals of 48 inches (1219 mm) or less.

**502.11.3 Roll bracing.** Each roll brace shall be a joist or blocking matching the depth of the edge member and extending perpendicular to the edge member a minimum of 16 inches (406 mm) from the edge. Blocking shall have end connections with a minimum of six (6) – 16d common nails. Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge and shall be fastened to each roll brace with a minimum of twelve (12) – 10d common nails and shall be fastened to the edge member with a minimum of twelve (12) – 10d common nails within 12 inches (305 mm) of the roll brace.

#### **Reason: The Problem:**

Guards are required to transfer the outward and downward loads applied at the top of the guard to the structure. If the structure fails, the guard cannot perform its defined function to minimize the possibility of a fall. Many floor systems (both conventional and engineered) are not being designed and constructed to resist guard loads at the edge of walking surfaces where guards are required. Manufacturers and designers of engineered floor systems (e.g., trusses and I-joists) and plan reviewers are commonly unaware of guard attachment requirements and do not ensure that framing is adequate to support guards. Inadequate framing is commonly encountered with costly reinforcement (and possibly redesign) needed at the time of guard installation.

In current practice where inadequate framing is encountered, flooring or ceilings are ripped out to install blocking to harden the edge beam for attachment of the guard. Such fixes are not engineered and, in many cases, occur after the rough inspection. The problem will persist unless a solution can be codified.

#### **A Collaborative Formed:**

The SMA surveyed our membership and found the problem to be chronic across the nation and assembled a task group representing manufacturers of, trusses, I-joists, framing and post connection hardware, and guard components as well as, home builders, guard fabricators, guard installers, stairbuilders, and others from industry at large, some 18 participants in all. About half of the team are engineers, and about half have extensive involvement in code and standard development. Meeting biweekly since early fall of 2021 this team has worked together to develop consensus upon an engineered solution presented here with two prescriptive options suitable for inclusion in the 2024 IRC.

#### **A Prescriptive Solution:**

By recommendation of the manufacturers of I-joists and trusses and consensus of the entire task group this proposal prohibits the use of I-joists and trusses *as edge framing members supporting guards except where the effects of the guard loads are specifically considered in the design of the edge member*. This is based upon the limited embedment of fasteners in the thickness of the joist and truss materials, open areas/voids, and surfaces where fasteners cannot be used that would weaken the component or connections between the truss/I-joist components.

Both top mount and side mount guards are suitable provided there is sufficient material to engage threaded fasteners and the edge beam/joist is not subject to rotation or torsion. Based upon calculation of the loads transferred to the structure from the top of the guard, two options are provided. (Calculations may be reviewed at the link below.)

**R502.11.1 Conventional edge framing**, describes the minimal thickness to resist withdrawal of fasteners and height of the edge beam/joist as that of a common double 2 x 10. Blocking/roll bracing is aligned with the post locations to resist rotation and eliminate torsion induced by guard loads.

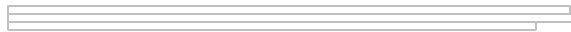
**R502.11.2 Timber edge framing**, provides specifications to allow use of a thicker timber or glulam which is sized to resist torsion allowing roll

bracing to be spaced at a maximum distance of 48 inches on center to alleviate the need for precise alignment of the post with the roll bracing or a joist.

Although the minimum guard height in the IRC is 36 inches it is not unusual that portions of the guard, post caps, or finials extend above the guard height. We agreed that a height of 44 inches would be reasonably conservative to use for the purpose of calculating the edge beam size and roll bracing requirements. To restrict outward movement of the top of the edge beam, specific nailing of the floor sheathing is called out at the location of roll bracing. Floor sheathing must be continuous for a minimum distance from the open edge to assure the structural integrity of the bracing and edge beam. The nailing requirements for attachment of the blocking used as roll bracing to the joists prevents uplift of the blocking, and the minimum length allows it to fit into one joist bay where joist spacing is taken from the open edge of the edge beam. These details are specified in **R502.11.3 Roll Bracing**.

This proposal has been clearly and carefully constructed to be understood and enforced without figures referenced in the code text. We have included drawings to aid understanding among the many proposals to be considered in this cycle. The drawings submitted would however be suitable for inclusion in the commentary.

Engineering Calculations supporting this proposal can be found at this link: <https://stairways.org/guard-calculations/>



**Cost Impact:** The code change proposal will decrease the cost of construction

This proposal will decrease the cost of construction due to the elimination of necessary after-the-fact demolition and repair to install blocking at each post location. An average job with guards has three or more posts with 1 to 2 hours each for blocking plus repairs to finish surfaces estimated at approximately \$400 - \$800 in extra charges per 3 post job. This does not include any engineering fees if applicable.

RB173-22

## **Public Hearing Results**

### **Committee Action:**

**As Submitted**

**Committee Reason:** The committee concluded that the proposal provides a prescriptive solution to correct the requirements of guards transferring the outward and downward loads applied at the top of the guard to the structure and the effect of the structure failing on the guard. The committee encourages the proponent to look into adding clarifying diagrams and adding engineering products to the conventional edge framing during the public comment phase (Vote: 5-4).

RB173-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R502.11, R502.11.1, 502.11.2, 502.11.3

**Proponents:** David Cooper, representing Stairbuilders and Manufacturers Association (coderep@stairways.org) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R502.11 Floor framing supporting guards.** The framing at the open edge of a floor supporting a required guard assembly ~~not exceeding 44 inches (1118 mm) in height~~ shall be constructed in accordance with Sections R502.11.1 or R502.11.2 for guard assemblies not exceeding 44 inches (1118mm) in height or shall be designed in accordance with accepted engineering practice to support the guard assembly. Where T-trusses and I-joists are used prohibited as edge framing members supporting guards, except where the effects of the guard loads shall be specifically considered in the design of the edge member.

**R502.11.1 Conventional edge framing.** ~~Where a roll brace is aligned with each guard post, the~~ The framing at the edge of the floor shall consist of a solid or built-up ~~wood~~ member of lumber, structural glued laminated timber, or structural composite lumber having a minimum net width of 3 inches (76mm) and a minimum net depth of 9-1/4 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section R502.11.3 ~~with a roll brace aligned with each guard post.~~

**R502.11.2 Timber edge framing.** ~~Where a roll brace is not aligned with each guard post, the~~ The framing at the edge of the floor shall consist of a minimum 6x10 sawn timber or a minimum 5-1/8 inch x 9-1/4 inch (130 mm x 235 mm) structural glued laminated timber and shall be braced to resist rotation by roll bracing as described in Section R502.11.3 at intervals of 48 inches (1219 mm) or less.

**R502.11.3 Roll bracing.** Each roll brace shall be a joist or blocking matching the depth of the edge member and extending perpendicular to the edge member a minimum of 16 inches (406 mm) from the edge. Blocking shall have end connections with a minimum of six (6) – 16d common nails. Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge and shall be fastened to each roll brace with a minimum of twelve (12) – 10d common nails and shall be fastened to the edge member with a minimum of twelve (12) – 10d common nails within 12 inches (305 mm) of the roll brace.

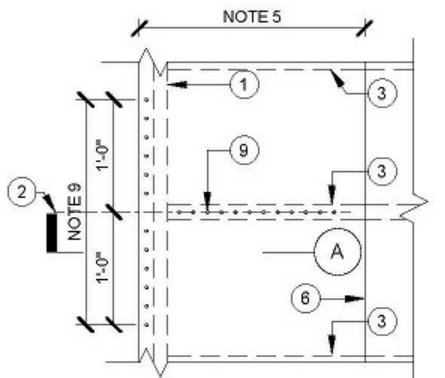
**Commenter's Reason:** The Committee approved this proposal because it provides a prescriptive solution for floor framing supporting guards that will resist required design loads applied to the top of the guard and ***corrects a serious deficit*** in the current requirements for floor framing ***that void the warranties of engineered floor systems and allows the potential failure of the floor and connected guard assembly/system.*** However the Committee specifically requested clarification by public comment. The changes included in this modification are described below. They address not only the Committee's request but also those issues raised in testimony, further collaboration of industry and editorial changes to aid in understanding.

1. Moving the text "*not exceeding 44 inches (1118 mm) in height*" and adding the words "*for guard assemblies*" to the moved phrase eliminates a possible interpretation that R502.11 would not allow engineered design for guards in excess of 44 inches in height, which is certainly not the intent.
2. Subsequent to the CAH, with recent input from truss and I-joist manufacturers participating in the task group, the inference of conditional prohibition was rephrased to more clearly state that "*Where trusses and I-joists are used as edge framing members supporting guards the guard loads shall be specifically considered in the design of the edge member.*"
3. Questions from the committee and testimony inquired as to the difference between the application of R502.11.1 and R502.11.2. The purposeful application of each section has been clarified by moving the text related to the *alignment of roll bracing with the guard posts* to the beginning of both sections to clearly establish and differentiate the dependent condition for use of each section.
4. Some of the Committee members questioned that it was not clear that R502.11.1 does not preclude the use of Structural Composite Lumber. To clarify this the phrase "...*member of lumber, structural glued laminated timber, or structural composite lumber*" has been substituted for "*wood*" to specifically include these options. Structural composite lumber would include: LVL, PSL, LSL, or OSL. The drawings included for the commentary have also been clarified.
5. Editorial changes include correction of the section titles and references to include "R" and adding "structural" prior to glued laminated timber to use the accepted terminology as in the code and related standard ANSI A190.1 *Product Standard for Structural Glued Laminated Timber*.
6. Please note the addition of many of the task group members as proponents of this public comment.

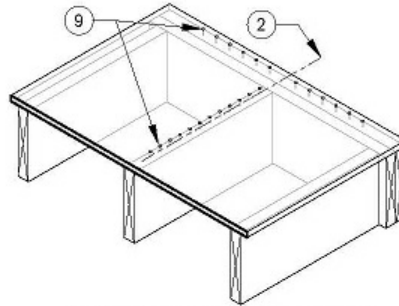
In the original published version of the monograph the drawings submitted with the proposal for inclusion in the commentary were not printed with the proposal. Although they were and continue to be accessed at the link provided in the reason statement they were requested by the committee to be included for the commentary. In the version of the proposal now available online the drawings have been included however the quality is poor. The drawings have been resubmitted with this proposal with the change to the drawing notes to clarify that in addition to lumber, structural composite lumber is included as described in point 3 above.

The committee requested a better understanding of only the cost differential between current deficient construction of floors supporting guards and one that complies with the proposal without consideration of the corrective measures cited in the original cost impact statement. Please see the revised cost impact statement included in this public comment. Related to cost it is worthwhile to note that 2 x 8 floor systems are not precluded however a prescriptive solution is not offered here. It was our intent to provide a prescriptive that could be simply done with available materials and nails. Special hardware options similar to those provided for the hardening of 2 x 8 deck systems are not excluded and could be used to resist the additional rotation.

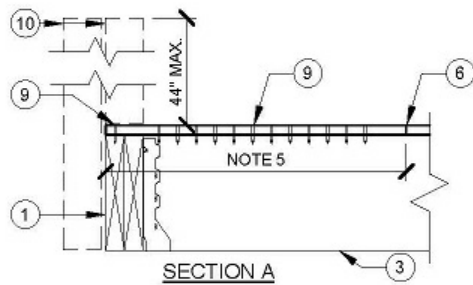
It cannot be emphasized strongly enough that ***this proposal corrects a dangerous deficit to building safety. Current code actually requires nullification of manufacturers' warranties*** as it is not possible to connect guard posts to voids in a floor system that has not been engineered for guard connection. Current code does not provide a hardened floor system that is capable of resisting the required guard design load applied to the top of the guard. Specifically when guards and/or blocking are added subsequent to engineering of a floor system and are not included in the engineered design it not only nullifies the engineered solution and any warranty of serviceability but could result in the failure of the guard system to serve its defined purpose to "...minimize the possibility of a fall from the walking surface to a lower level".



TOP VIEW: JOISTS PERPENDICULAR TO  
EDGE, GUARD POST ALIGNED WITH JOIST



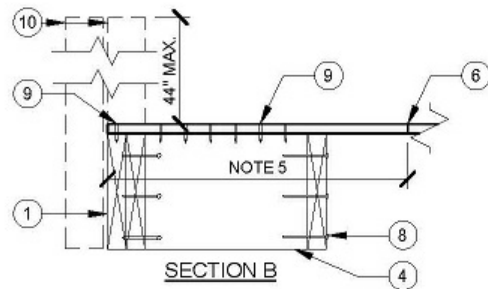
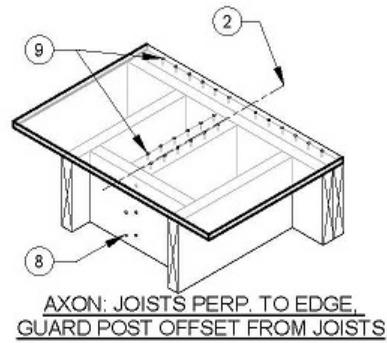
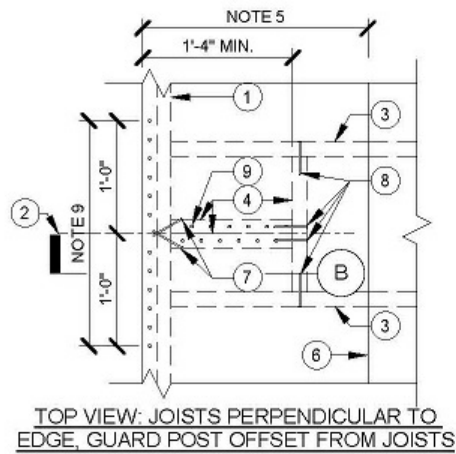
AXON: JOISTS PERP. TO EDGE,  
GUARD POST ALIGNED WITH JOIST



SECTION A

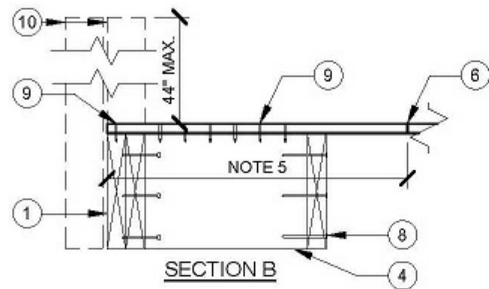
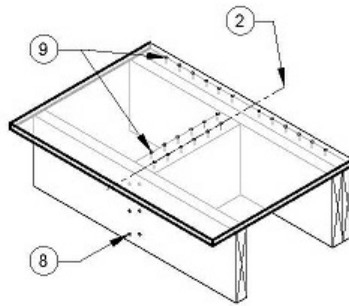
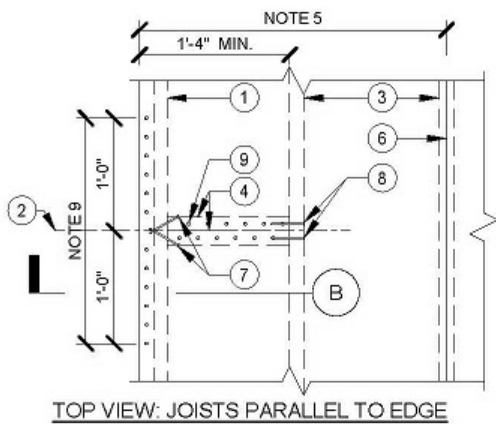
NOTES:

1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
5. FLOOR SHEATHING TO BE CONTINUOUS FOR A MIN. OF 2'-0" FROM EDGE, TYP.
6. JOINT IN FLOOR SHEATHING.
7. 6 - 16d COMMON (3 1/2" x 0.162") TOENAILS, STAGGERED, TYP.
8. 6 - 16d COMMON (3 1/2" x 0.162") NAILS, TYP.
9. 12 - 10d COMMON (3" x 0.148") NAILS BETWEEN FLOOR SHEATHING AND EDGE BEAM, JOIST OR BLOCKING, TYP.
10. TOP- OR SIDE-MOUNTED GUARD POST.



NOTES:

1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
5. FLOOR SHEATHING TO BE CONTINUOUS FOR A MIN. OF 2'-0" FROM EDGE, TYP.
6. JOINT IN FLOOR SHEATHING.
7. 6 - 16d COMMON (3 1/2" x 0.162") TOENAILS, STAGGERED, TYP.
8. 6 - 16d COMMON (3 1/2" x 0.162") NAILS, TYP.
9. 12 - 10d COMMON (3" x 0.148") NAILS BETWEEN FLOOR SHEATHING AND EDGE BEAM, JOIST OR BLOCKING, TYP.
10. TOP- OR SIDE-MOUNTED GUARD POST.



**NOTES:**

1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
5. FLOOR SHEATHING TO BE CONTINUOUS FOR A MIN. OF 2'-0" FROM EDGE, TYP.
6. JOINT IN FLOOR SHEATHING.
7. 6 - 16d COMMON (3 1/2" x 0.162") TOENAILS, STAGGERED, TYP.
8. 6 - 16d COMMON (3 1/2" x 0.162") NAILS, TYP.
9. 12 - 10d COMMON (3" x 0.148") NAILS BETWEEN FLOOR SHEATHING AND EDGE BEAM, JOIST OR BLOCKING, TYP.
10. TOP- OR SIDE-MOUNTED GUARD POST.

***Your approval of this public comment will correct a serious deficit in the code and improve building safety.***

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. An edge member of 16 linear feet would be comparable to the 3 post example cited in the original cost impact statement.

Prices below are based on an internet search on 5/28/22 that provided the following prices for 16 foot members:

**2x10 Perpendicular Joist Header three Posts**

2x10x16 Double Header +\$28.00 (Single Joist Addition)

2x10 Bridging +\$0 (3- scrap cut-offs)

Nails for toenail Fasteners +\$2; Joist Hangers +\$58

SCL Substitution for 2x10x16 Double Header +\$250, Hangers +\$58

SLT Substitution for 2x10x16 Double Header +\$330, Joist Hangers +\$58

**2x10 Parallel Joist Header three Posts**

Open Web Truss = -\$75; I- Joist = -\$65

2x10x16 Double Header +\$56.00

2x10 Bridging +\$7.00

Nails for toenail Fasteners +\$2; Joist Hangers +\$0

SCL Substitution for 2x10x16 Double Header +\$250, Joist Hangers +\$0

SLT Substitution for 2x10x16 Double Header +\$330, Joist Hangers +\$0

The options underlined are the most expensive material substitutions. The labor differential is negligible when considered in the original design from the start. It would be conservative to assume less than a \$500.00 increase in materials. Compared to the costs of \$400 - \$800 to inadequately remedy the building safety deficit allowed in the code as identified in the proposal, **it would be conservative to indicate there would be no impact on the cost of construction.**

Public Comment# 3052

## **Public Comment 2:**

**IRC: R502.11, R502.11.1, 502.11.2, 502.11.3, R502.11.3 (New), R502.11.4 (New), R502.11.6 (New)**

**Proponents:** Marvin Strzyzewski, representing Truss Engineering Company (marvins@mii.com); Jay Jones, representing Truss Plate Institute (jpjones@tpinst.org) requests As Modified by Public Comment

**Modify as follows:**

## **2021 International Residential Code**

**R502.11 Floor framing supporting guards.** The framing at the open edge of a floor supporting a required guard assembly ~~not exceeding 44 inches (1118 mm) in height~~ shall be constructed in accordance with Sections R502.11.1 ~~or~~ R502.11.2, R502.11.3, or R502.11.4 for guard assemblies not exceeding 44 inches (1118 mm) in height or shall be designed in accordance with accepted engineering practice to support the guard assembly. ~~Where trusses and I-joists are used, prohibited as edge framing members supporting guards, except where the effects of the guard loads shall be specifically considered in the design of the edge member.~~

**R502.11.1 Conventional edge framing.** ~~Where a roll is aligned with each guard post, the~~ The framing at the edge of the floor shall consist of a solid or built-up ~~wood~~ member of lumber, structural glued laminated timber, or structural composite lumber having a minimum net width of 3 inches (76mm) and a minimum net depth of 9-1/4 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section R502.11.3 ~~5, with a roll brace aligned with each guard post.~~

~~502.11.2~~ **R502.11.2 Timber edge framing.** ~~Where a roll brace is not aligned with each guard post, the~~ The framing at the edge of the floor shall consist of a minimum 6x10 sawn timber or a minimum 5-1/8 inch x 9-1/4 inch (130 mm x 235 mm) structural glued laminated timber and shall be braced to resist rotation by roll bracing as described in Section R502.11.3 ~~5~~ at intervals of 48 inches (1219 mm) or less.

~~502.11.3~~ **R502.11.5 Roll bracing for lumber edge members.** Each roll brace shall be a joist or blocking matching the depth of the edge member and extending perpendicular to the edge member a minimum of 16 inches (406 mm) from the edge. Blocking shall have end connections with a minimum of six (6) – 16d common nails. Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge and shall be fastened to each roll brace with a minimum of twelve (12) – 10d common nails and shall be fastened to the edge member with a minimum of twelve (12) – 10d common nails within 12 inches (305 mm) of the roll brace.

**R502.11.3 Truss edge framing for Top Mount Guard Post.** Where trusses are used as the floor edge framing member supporting top mount guards, the truss shall have a double top chord and double 4x2 vertical webs spaced 24 inches (610 mm) o.c. The truss shall have a minimum net width of 3-1/2 inches (90 mm) and a minimum net depth of 12 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section R502.11.6 with a roll brace aligned with each guard post or at intervals of 24 inches (610 mm) or less.

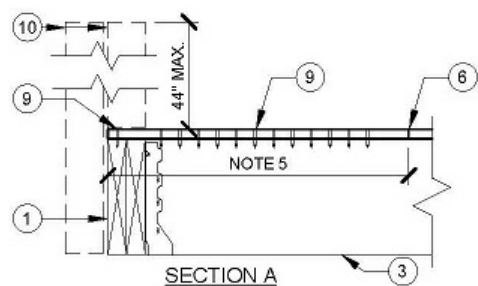
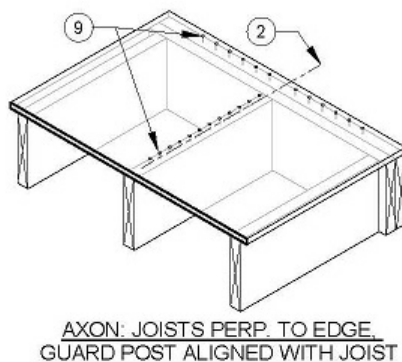
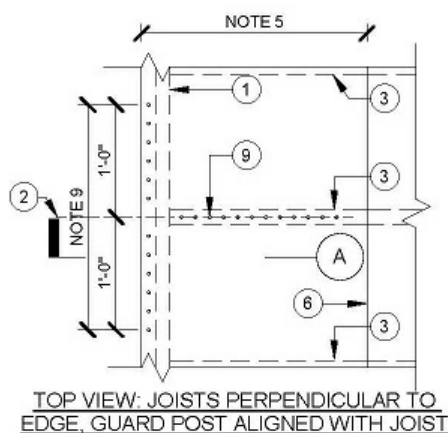
**R502.11.4 Truss edge framing for Side Mount Guard Post.** Where trusses are used as the floor edge framing member supporting side mounted guards, the trusses shall have a double top chord and 4x4 vertical webs spaced 24 inches (610 mm) o.c. The trusses shall have a minimum net width of 3-1/2 inches (90 mm) and a minimum net depth of 12 inches (235 mm) and shall be braced to resist rotation by roll bracing as described in Section R502.11.6 with a roll brace aligned with each guard post. Guard posts shall be fastened only at 4x4 locations on the edge truss.

**R502.11.6 Truss roll bracing.** Each roll brace shall be a truss matching the depth of the edge member, shall fit between the edge truss and the common truss, and shall have a minimum length of 12.5 inches (317 mm). Roll braces shall be connected to the edge and common truss at each



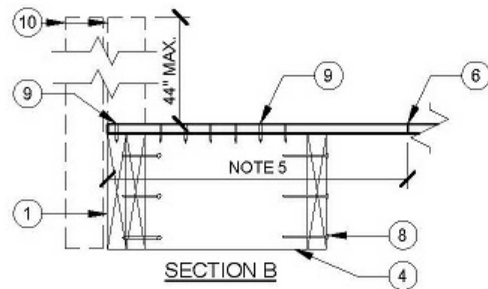
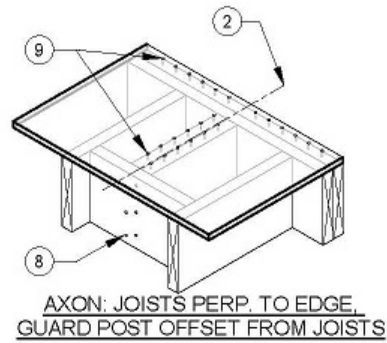
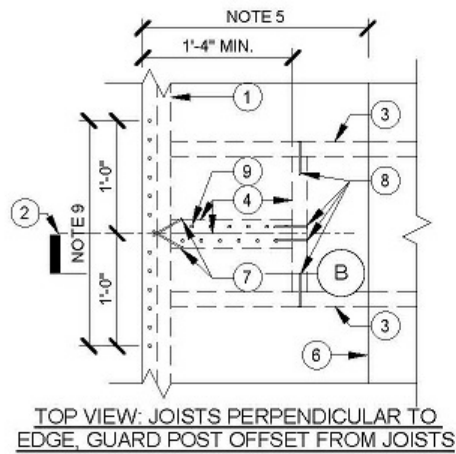
corner on each face with one 16d common nail, toe nailed. The bottom of the roll brace shall be connected to the bottom of the edge and common truss with a 3.125-inch x 7-inch (76 mm x 179 mm) 20-gauge steel strap with six (6) 8d nails (1.5inch x 0.131 inch) in each member in accordance with Figure R502.11.6(2) or R502.11.6(6) or 3.125 inch x 9 inch (76 mm x 229 mm) 20-gauge steel strap with six (6) 8d nails (1.5inch x 0.131 inch) in each member in accordance with Figure R502.11.6(4). When a side mount post connection is required the roll brace shall be connected to edge truss with a 3.125-inch x 5-inch (76 mm x 127 mm) 20-gauge steel strap with five (5) 8d nails (1.5inch x 0.131 inch) in each member in accordance with Figure R502.11.6(6). Floor sheathing shall be continuous for a minimum of 24 inches (610 mm) from the edge truss and shall be fastened to the edge truss with 8d common nails at 3 inches (76 mm) on center along the length of the floor opening, and to each roll brace with eight (8) – 8d common nails, four (4) nails in two rows. Floor sheathing shall be nailed to the common truss with 8d common nails at 3 inches (76 mm) o.c. within 24 inches of each guard post, and 6 inches (152 mm) o.c. o.c. for the balance of the span. Floor sheathing connection in accordance with Figure R502.11.6(1), Figure R502.11.6(3) or Figure R502.11.6(5).

**Commenter's Reason:** The proponents of these comments agree that there is a need for adequate guard post connection. We have added a prescriptive method to include open webbed metal plate connected wood trusses to stair opening edge framing.



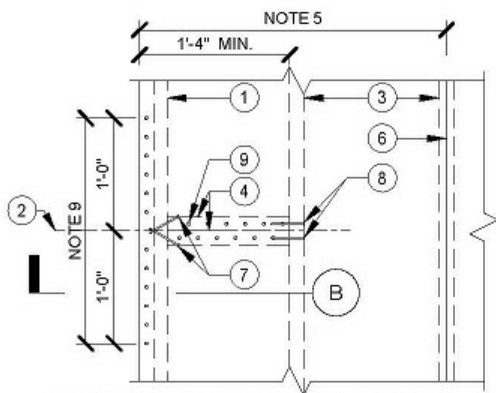
**NOTES:**

1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
5. FLOOR SHEATHING TO BE CONTINUOUS FOR A MIN. OF 2'-0" FROM EDGE, TYP.
6. JOINT IN FLOOR SHEATHING.
7. 6 - 16d COMMON (3 1/2" x 0.162") TOENAILS, STAGGERED, TYP.
8. 6 - 16d COMMON (3 1/2" x 0.162") NAILS, TYP.
9. 12 - 10d COMMON (3" x 0.148") NAILS BETWEEN FLOOR SHEATHING AND EDGE BEAM, JOIST OR BLOCKING, TYP.
10. TOP- OR SIDE-MOUNTED GUARD POST.

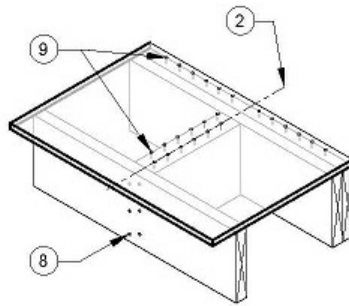


NOTES:

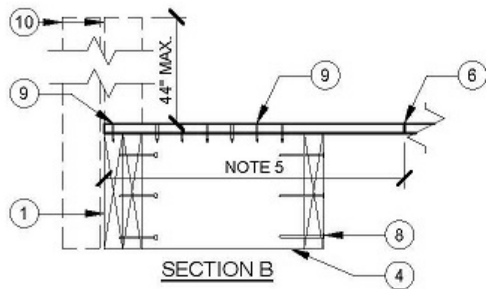
1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
5. FLOOR SHEATHING TO BE CONTINUOUS FOR A MIN. OF 2'-0" FROM EDGE, TYP.
6. JOINT IN FLOOR SHEATHING.
7. 6 - 16d COMMON (3 1/2" x 0.162") TOENAILS, STAGGERED, TYP.
8. 6 - 16d COMMON (3 1/2" x 0.162") NAILS, TYP.
9. 12 - 10d COMMON (3" x 0.148") NAILS BETWEEN FLOOR SHEATHING AND EDGE BEAM, JOIST OR BLOCKING, TYP.
10. TOP- OR SIDE-MOUNTED GUARD POST.



TOP VIEW: JOISTS PARALLEL TO EDGE



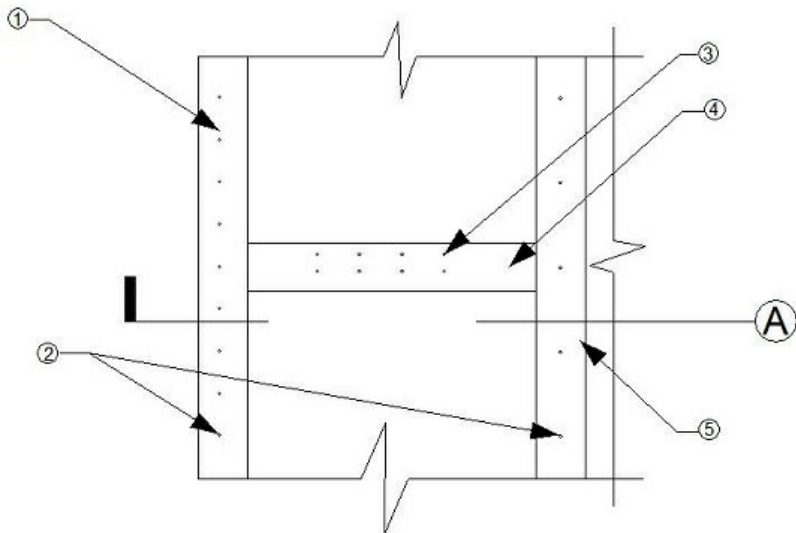
AXON: JOISTS PARALLEL TO EDGE



SECTION B

**NOTES:**

1. EDGE MEMBER WITH MIN. 3" NET WIDTH, MIN. 9-1/4" HEIGHT.
2. CENTER LINE OF TOP- OR SIDE-MOUNTED GUARD POST WITH 44" MAX HEIGHT.
3. TYPICAL JOIST (NOMINAL OR ENGINEERED LUMBER) WITH MIN. 9-1/4" HEIGHT.
4. FULL DEPTH BLOCKING WITH MIN. 9-1/4" HEIGHT.
5. FLOOR SHEATHING TO BE CONTINUOUS FOR A MIN. OF 2'-0" FROM EDGE, TYP.
6. JOINT IN FLOOR SHEATHING.
7. 6 - 16d COMMON (3 1/2" x 0.162") TOENAILS, STAGGERED, TYP.
8. 6 - 16d COMMON (3 1/2" x 0.162") NAILS, TYP.
9. 12 - 10d COMMON (3" x 0.148") NAILS BETWEEN FLOOR SHEATHING AND EDGE BEAM, JOIST OR BLOCKING, TYP.
10. TOP- OR SIDE-MOUNTED GUARD POST.

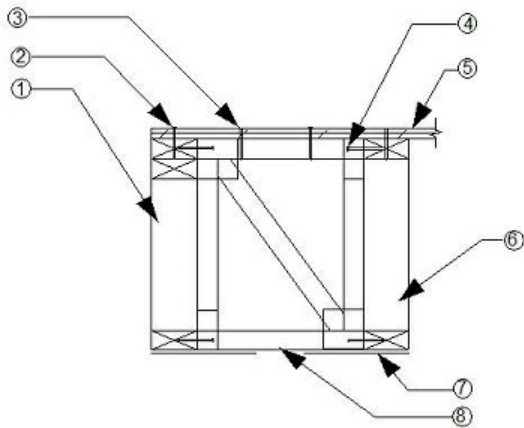


PLAN VIEW - COMMON TRUSS PARALLEL WITH EDGE TRUSS

TOP MOUNT CONNECTION

- NOTES:
- 1 EDGE TRUSS
  - 2 8d COMMON NAILS 3 INCH o.c. IN TO THE EDGE TRUSS
  - 3 (2) ROWS OF 8d COMMON NAILS AT 3 INCH o.c. IN ROLL BRACE
  - 4 ROLL BRACE
  - 5 COMMON TRUSS

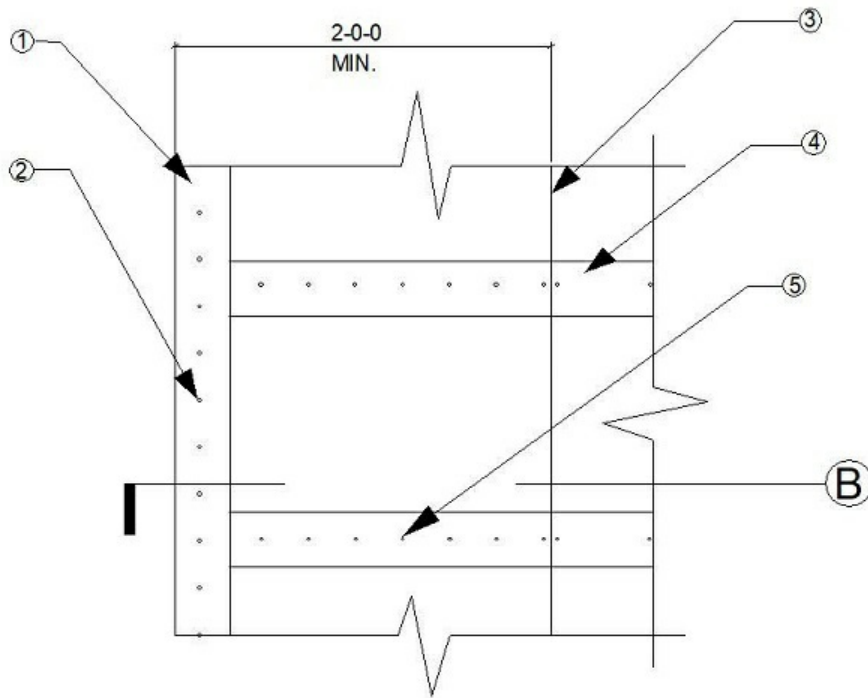
Figure R502.11.6(1)



SECTION-A TOP MOUNT CONNECTION

- NOTES:
- 1 EDGE TRUSS
  - 2 8d COMMON NAILS 3 INCH o.c. IN TO EDGE TRUSS
  - 3 (2) ROWS OF 8d COMMON NAILS AT 3 INCH o.c. IN ROLL BRACE
  - 4 (1) 16d COMMON TOE-NAIL IN EACH CORNER OF ROLL BRACE TO EACH FACE
  - 5 FLOOR SHEATHING
  - 6 COMMON TRUSS
  - 7 3-1/8 INCHx 7 INCHx 20 ga STEEL STRAP WITH (6) (1.5 INCHx 0.131 INCH) NAILS PER MEMBER
  - 8 ROLL BRACE

Figure R502.11.6(2)



PLAN VIEW - COMMON TRUSS PERPENDICULAR TO EDGE TRUSS

NOTES:

1 EDGE TRUSS

2 8d COMMON NAILS 3 INCH O.C.

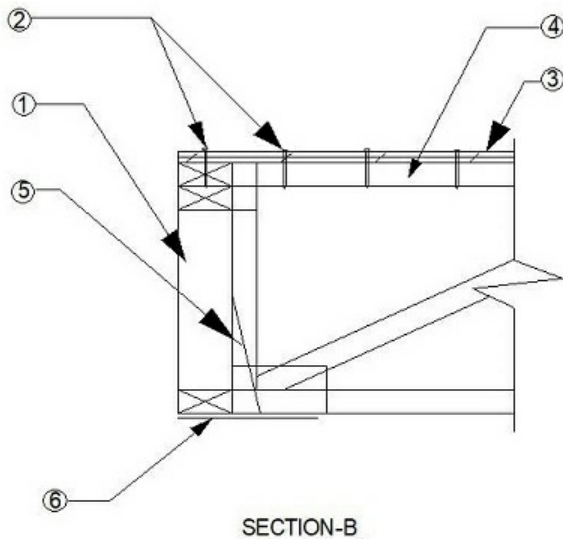
3 SHEATHING JOINT

4 COMMON TRUSS

5 8d COMMON NAILS 3 INCH O.C. FOR THE FIRST 24 INCHES THEN 6 INCHES

O.C.

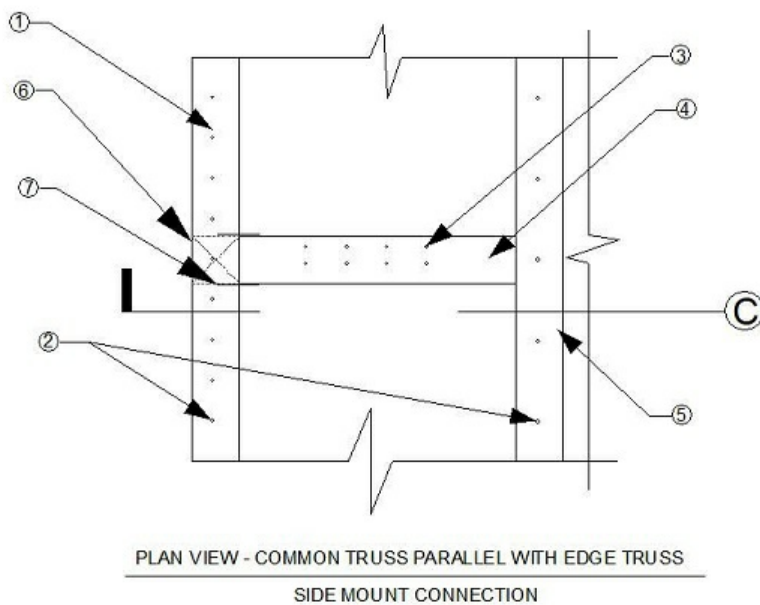
Figure R502.11.6(3)



NOTES:

- 1 EDGE TRUSS
  - 2 8d COMMON NAILS 3 INCH o.c. IN TO TRUSSES
  - 3 FLOOR SHEATHING
  - 4 COMMON TRUSS
  - 5 TOP MOUNTED TRUSS HANGER
  - 6 3-1/8 INCHx 9 INCHx 20 ga STEEL STRAP WITH (6) (1.5 INCHx 0.131 INCH) NAILS
- PER MEMBER

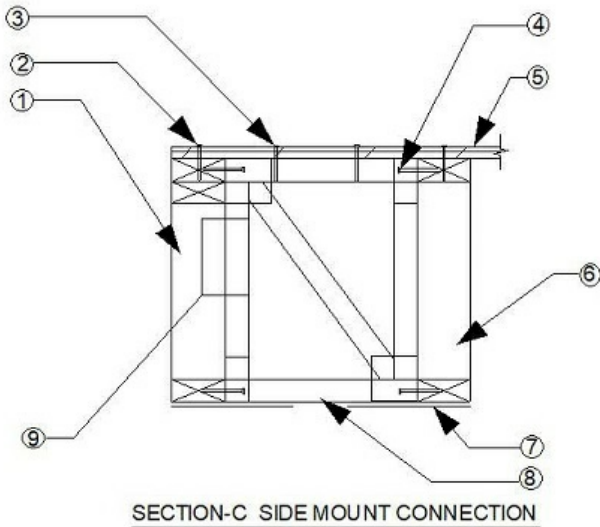
Figure R502.11.6(4)



NOTES:

- 1 EDGE TRUSS
- 2 8d COMMON NAILS 3 INCH o.c. IN TO THE EDGE TRUSS
- 3 (2) ROWS OF 8d COMMON NAILS AT 3 INCH o.c. IN ROLL BRACE
- 4 ROLL BRACE
- 5 COMMON TRUSS
- 6 EDGE OF ROLL BRACE SHALL ALIGN WITH EDGE OF 4x4 VERTICAL
- 7 3-1/8 INCHx 5 INCHx 20 STRAP WITH (5) 8d COMMON NAILS PER MEMBER PER FACE

Figure R502.11.6(5)



**NOTES:**

- 1 EDGE TRUSS
- 2 8d COMMON NAILS 3 INCH o.c. IN TO EDGE TRUSS
- 3 (2) ROWS OF 8d COMMON NAILS AT 3 INCH o.c. IN ROLL BRACE
- 4 (1) 16d COMMON TOE-NAIL IN EACH CORNER OF ROLL BRACE TO EACH FACE
- 5 FLOOR SHEATHING
- 6 COMMON TRUSS
- 7 3-1/8 INCHx 7 INCHx 20 ga STEEL STRAP WITH (6) (1.5 INCHx 0.131 INCH) NAILS PER I
- 8 ROLL BRACE
- 9 3-1/8 INCHx 5 INCHx 20 ga STEEL STRAP WITH (5) 8d COMMON NAILS PER MEMBER

Figure R502.11.6(6)

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction

It is our estimate that the increased cost should be very similar to that shown in the original proposal of \$400-\$800. This includes the increase in cost of the edge truss versus the common truss that is being replaced in addition to the roll braces. The upper bound cost would be lower if guard post locations were on the construction documents.

Public Comment# 3434

## Proposed Change as Submitted

**Proponents:** Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

### 2021 International Residential Code

Revise as follows:

**R317.1 Location required.** Protection of wood and wood-based products from decay shall be provided in the following locations by the use of decay-resistant *naturally durable wood* or wood that is preservative-treated in accordance with AWP A 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 ~~would prevent~~ moisture or water accumulation on the surface or at joints between members.

**Exception:** Sawn lumber used in ~~structures~~ buildings 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.

**R507.2.1 Wood materials.** Wood structural members for joists, beams, and posts ~~materials~~ shall be No. 2 grade or better lumber, protected from decay where required by Section R317.1 and R317.1.2, and protected from termites where required by Section R318.1. ~~preservative-treated in accordance with Section R317, or approved, naturally durable lumber, and termite protected where required in accordance with Section R318.~~ Where design in accordance with Section R301 is provided, wood structural members shall be designed using the wet service factor defined in AWC NDS. Cuts, notches and drilled holes of preservative-treated wood members shall be treated in accordance with Section R317.1.1. ~~All preservative-treated wood products in contact with the ground shall be labeled for such usage.~~

**R507.9.1.1 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 approved, decay-resistant naturally durable wood.~~ ~~No. 2 grade or better lumber.~~ Deck ledgers shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

**Reason:** The intent of Section R507.2.1 when first added to the IRC was to require wood materials of deck construction to be decay resistant, whether treated or natural species. However, rather than repeat the AWP A referenced standard for treatment, the section pointed back to R317 in general. In 2021 the IRC was modified by other proponents in Section R317.1 item #8 where “balconies and porches” is discussed in regard to decay resistance. This section is not definitive that all materials must be decay resistant in the way R507.2.1 is for decks. This has led to confusion regarding the required decay resistance of deck wood materials. Is it required or not?

Item 8 provides more flexibility to jurisdictions to evaluate the exact minimum threshold of each project design to determine if the characteristics contributing to decay are present. For this reason, it is most reasonable to change R507.2.1 to reference R317.1 for determining when decay resistance is required. However, note that R507.9.1.1 specifically requires deck ledgers to be decay resistant. This section is more specific and would thus always be required, universally, on deck ledgers. Deck ledger decay is not always visible, as it may be occurring on the backside due to a failure in the flashing detail. There is no redundant connection to the ledger. Therefore the hazard associated with decay is a greater risk and



decay resistance is specifically required.

Terms were changed to "wood structural member" to match the language in the remaining text. "Buildings" was changed to "structures" in the exception since decks and porches are not buildings and the last sentence of the exception speaks to "structures". Clarification that Section R507.2.1 and the reference to R317.1 only applies to joists, beams, and posts, allows for decking not to be included for required decay resistance or grading. Many tropical hardwoods and other alternative wood decking materials are not graded lumber or naturally durable yet have had no history of insufficient performance as decking in the American market for at least two decades. Decay in decking is more easily visible to the occupant than the other structural members. The requirement for decay resistance is not to provide a greater useful service life, it is to reduce safety hazards due to unseen decay.

The modifications proposed to R507.9.1.1 are simply clean up associated with the subject of this proposal. The AWP U1 standard provides methods of treatment that do not require "pressure" and the required field treatment in Section R317.1.1 is not a "pressure" treatment. Using this term is unnecessary. All lumber for ledgers using these prescriptive methods of attachment must be "No. 2 grade or better". Where currently located in the provision, it appears the grade requirement is only related to naturally durable wood. The definition is "naturally durable wood" so the term in the body of the code should be as defined and not "lumber". It also doesn't need to be "approved" because it is a defined term.

**Cost Impact:** The code change proposal will decrease the cost of construction

This code change will decrease the cost of deck construction in regions and designs where the wood materials are not subject to decay and in accordance with Section R317.1 do not require decay resistant materials.

RB176-22

## **Public Hearing Results**

### **Committee Action:**

**As Modified**

### **Committee Modification:**

**R507.9.1.1 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.

**Committee Reason:** The committee decided that the modification reasonably added back "pressure" to maintain the requirements. The committee concluded that the proposal, as modified, clarifies the existing language to clarify confusing text regarding the required decay resistance of deck wood materials. Two committee members encouraged the proponent to address AWC concerns mentioned during the proposal hearing. For example, in Section 507.2.1, "materials" have been deleted, and an incomplete list has been added as "structural members for joists, beams, and posts". Decking and stairs are missing from the added list to Section 507.2.1. There was also a concern regarding deleting "All preservative-treated wood products in contact with the ground shall be labeled for such usage." in Section R507.2.1, Wood materials. For Section R507.9.1.1, Ledger details, the proponent did not justify why "No. 2 grade or better" has been added. Also, "preservative-treated" and "naturally durable" have been replaced with undefined terms (Vote: 9-1).

RB176-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R507.2.1

**Proponents:** Edward Lisinski, representing American Wood Council (elisinski@awc.org) requests As Modified by Public Comment

**Further modify as follows:**

## **2021 International Residential Code**

**R507.2.1 Wood materials.** Wood structural members ~~for joists, beams, and posts~~ shall be ~~No. 2 grade or better lumber~~, protected from decay

where required by Section R317.1 and R317.1.2, and protected from termites where required by Section R318.1. Where design in accordance with Section R301 is provided, wood structural members shall be designed using the wet service factor defined in AWC NDS. Sawn lumber for joists, beams and posts shall be No. 2 or better. Cuts, notches and drilled holes of preservative-treated wood members shall be treated in accordance with Section R317.1.1.

**Commenter's Reason:** This Public Comment further modifies the "Approved as Modified" version from the Committee Action Hearings. The version recommended for approval at the Committee Action Hearings limits the required use of preservative treated or naturally durable wood to "joists, beams and posts" and omits other structural members such as wood decking, wood stair treads and stringers, wood guards, and other wood structural members. This means that if the code change stands as currently proposed, the only elements on a wood deck that would require preservative treated or naturally durable wood are joists, beams and posts, and nothing else. The proposed change to this public comment restores the requirement for preservative treated or naturally durable wood to be more broadly applicable to all wood structural members in deck construction. However, it should be noted that such members are not required to be preservative treated or naturally durable wood where the geographic exception of R317.1 applies (i.e., where experience has demonstrated that climatic conditions preclude the need for such protection). A second component of this Public Comment proposal relocates requirements for "joists, beams, and posts" to be No. 2 grade or better to the third sentence of R507.2.1 and decouples it from "wood structural members." The abbreviated list of elements (i.e., "joists, beams and posts") might suggest by omission that other deck wood members such as deck boards and stair treads are not wood structural members. This language would also clarify that the requirement to have a No. 2 or better grade relates only to sawn lumber joists, beams and posts, which does not include decking or structural composite lumber wood products.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The final effect of the code change with the public comment should just be editorial and clarification of existing code requirements. If anything, there may be a slight decrease in cost of construction because currently in the code, "wood materials" are required to be preservative treated or naturally durable wood; whereas with this change, only "wood structural members" would be required to be preservative treated or naturally durable.

Public Comment# 3246

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## ***Public Comment 2:***

**Proponents:** Edward Lisinski, representing American Wood Council (elisinski@awc.org) requests Disapprove

**Commenter's Reason:** This code change proposal had several issues, so we are asking for Disapproval. The version recommended for approval at the Committee Action Hearings limits the required use of preservative treated or naturally durable wood to "joists, beams and posts" and omits other structural members such as wood decking, wood stair treads and stringers, wood guards, and other wood structural members. This means that if the code change stands as currently proposed, the only elements on a wood deck that would require preservative treated or naturally durable wood are joists, beams and posts, and nothing else. There are many regions of the country where deck structural elements would be subject to decay, and preservative treated or naturally durable wood is necessary as a baseline to provide acceptable performance. There is a reference that all joists, beams and posts need to be No. 2 or better, however this requirement would limit decks to only sawn lumber as written. This change does not take into account structural composite lumber products which are not graded the same as sawn lumber. The word "deck" is not necessary in R307.1 because decks have always been considered a similar appurtenance to a porch or balcony.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. No change to code.

Public Comment# 3252

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**RB178-22**

***Proposed Change as Submitted***

**Proponents:** Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

**2021 International Residential Code**

**Revise as follows:**

**TABLE R507.2.3 FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKS<sup>a, b</sup>**

| ITEM   | MATERIAL  | MINIMUM FINISH/COATING  | ALTERNATE FINISH/COATING <sup>e</sup>     |
|--|---|---|---|
| Nails and glulam rivets                              | In accordance with ASTM F1667   | Hot-dipped galvanized per ASTM A153, Class D for 3/8-inch diameter and less   | Stainless steel, silicon bronze or copper |
| Bolts <sup>c</sup>                                   | 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 |
| Lag screws <sup>d</sup> (including nuts and washers) |   |   |   |
| 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 <sup>2</sup> (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. Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.
- c. ~~Holes for bolts shall be drilled a minimum 1/32-inch and a maximum 1/16-inch larger than the bolt.~~
- d. ~~Lag screws 1/2-inch and larger shall be predrilled to avoid wood splitting per the National Design Specification (NDS) for Wood Construction.~~
- e. Stainless-steel-driven fasteners shall be in accordance with ASTM F1667.

**R507.9.1.3 Ledger to band joist details.** ~~Fasteners used in deck ledger connections~~ Where ledgers are fastened in accordance with Table R507.9.1.3(1), ~~fasteners shall comply with Section R507.2.3 be hot-dipped galvanized or stainless steel~~ and shall be installed in accordance with Table R507.9.1.3(2) and Figures R507.9.1.3(1) and R507.9.1.3(2). Holes 1/2-inch (12.7 mm) in diameter shall be drilled through the ledger and holes 5/16-inch (7.9 mm) in diameter shall be drilled through the band joist prior to lag screw installation. Holes 1/2-inch (12.7 mm) in diameter shall be drilled through the ledger and band joist prior to bolt installation.

**Reason:** 1) R507.9.3.1 is redundant and does not need to specify the properties of lag screws and bolts as this is the purpose of Table R507.2.3. 2) Table R507.2.3 is titled "Fastener and connector specifications for decks". This table provides material specifications for metal fasteners and connectors. It is not the appropriate place to present installation requirements in the footnotes (drilling of holes).

3) The NDS is a design document for engineers. It is not appropriate to reference such a document from the IRC for "installation" requirements of a prescriptive design.

4) The 2018 NDS provisions for lag screw installation are provided below. It is unrealistic to expect an IRC user to reference these engineering provisions and determine the specific gravity of the species of band joist the lag screw is fastening to.

**NDS provisions**

"12.1.4.2 Lead holes for lag screws loaded laterally and in withdrawal shall be bored as follows to avoid splitting of the wood member during connection fabrication.

A) The clearance hole for the shank shall have the same diameter as the shank, and the same depth of penetration as the length of the unthreaded shank.

B) The lead hole for the threaded portion shall have a diameter equal to 65% to 85% of the shank diameter in wood with  $G > 0.6$ , 60% to 75% in wood with  $0.5 < G \leq 0.6$ , and 40% to 70% in wood with  $G \leq 0.5$  (see Table 12.3.3A) and a length equal to at least the length of the threaded portion. The larger percentile in each range shall apply to lag screws of greater diameters."

5) 65% of a 1/2-inch diameter lag screw falls within the range for all three specific gravity and is thus an acceptable value for basic prescriptive code. This results in a 5/16-inch hole in the band joist as proposed in the relocated footnotes.

6) The allowable tolerance for holes for bolts being measured to a 32 of an inch is not practical for rough framing construction. A slight side-to-side movement of a hand tool while drilling is greater than a 32 of an inch. It is not necessary or realistic to require such precise values in prescriptive wood framing.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
There is no cost impact to this proposal, as it simply clarifies the intent of the IRC as currently written.

RB178-22

## **Public Hearing Results**

### **Committee Action:**

**Disapproved**

**Committee Reason:** The committee's disapproval is due to some technical issues with the proposal that need to be addressed. During testimony, it was stated the ledger table was determined from testing that was done many years ago, but the committee did not have supporting evidence of how those ledgers were attached when those tests were done to verify the requirements. The committee suggested that the proponent work with AWC and look into predrilling requirements during the public comment phase. The committee agreed that the Wood Construction reference's National Design Specification (NDS) needs to be deleted (Vote: 6-5).

RB178-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R507.9.1.3**

**Proponents:** Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R507.9.1.3 Ledger to band joist details.** Where ledgers are fastened in accordance with Table R507.9.1.3(1), fasteners shall comply with Section R507.2.3 and shall be installed in accordance with Table R507.9.1.3(2) and Figures R507.9.1.3(1) and R507.9.1.3(2). Holes ½-inch (12.7 mm) in diameter shall be drilled through the ledger and holes 5/16-inch (7.9 mm) in diameter shall be drilled through the band joist prior to lag screw installation. ~~Holes ½-inch (12.7 mm) in diameter shall be drilled through the ledger and band joist prior to bolt installation.~~

**Commenter's Reason:** The committee and seemingly all opposition agreed that referencing the NDS (an engineering document) as part of a prescriptive design for residential decks was not appropriate. Further, this reference is in the fine print footnote of a table regarding corrosion resistance of fasteners. The opposition appears they are concerned about prescribing a 1/2 inch hole a 1/2 inch bolt, so we researched this further. We found numerous other IRC prescriptive designs utilizing bolts, and none of them specified the size hole to drill. Notably, Section R403.1.6 (Foundation anchorage) and R603.3.1 (Wall to foundation of floor connection) have clear and specific provisions for securing a house to the foundation using 1/2 inch bolts and yet there is no mention of hole size. Perhaps specifying a hole size for a bolt on a deck is a bit too specific and we should not get hung up on specifying it's size down to 1/32 of an inch. I believe the IRC still expects a minimum level of comprehension of construction, and that drilling a hole for a bolt is within it. The committee disapproved this proposal 6 to 5, so our we are suggesting this small change. We believe eliminating the unnecessary guidance for drilling holes for bolts is the appropriate direction for this proposal. We left the simple guidance for lag screws holes as originally proposed. There is about a 10 minute window in the deck installers life between drilling these holes and installing the lags. Keep it simple and to the point.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
This PC does not change the scope of the original proposal. As in the original proposal, there is no impact on the cost of construction as the objective is to clarify the existing code requirements.

Public Comment# 3520

### **Public Comment 2:**

**IRC: R507.2.3, TABLE R507.2.3, R507.9.1.3, TABLE R507.9.1.3(1)**

**Proponents:** Randy Shackelford, representing Simpson Strong-Tie Co. (rshackelford@strongtie.com); David Tyree, representing American Wood Council requests As Modified by Public Comment

**Modify as follows:**

## **2021 International Residential Code**

**R507.2.3 Fasteners and connectors.** Metal fasteners and connectors used for all decks shall be in accordance with Section R317.3 and Table R507.2.3. Holes for through bolts shall be drilled to a diameter of 1/32" to 1/16" larger than the bolt diameter. Connectors shall be installed in accordance with the manufacturer's approved instructions.

**TABLE R507.2.3 FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKS<sup>a, b</sup>**

| ITEM                                    | MATERIAL  | MINIMUM FINISH/COATING  | ALTERNATE FINISH/COATING <sup>e</sup>     |
|---|---|---|---|
| Nails and glulam rivets                 | In accordance with ASTM F1667   | Hot-dipped galvanized per ASTM A153, Class D for 3/8-inch diameter and less   | Stainless steel, silicon bronze or copper |
| Bolts                                   | 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 |
| Lag screws (including nuts and washers) |   |   |   |
| 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 <sup>2</sup> (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. Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.
- e.c. Stainless-steel-driven fasteners shall be in accordance with ASTM F1667.

**R507.9.1.3 Ledger to band joist details.** Where ledgers are fastened in accordance with Table R507.9.1.3(1), fasteners shall comply with Section R507.2.3 and shall be installed in accordance with Table R507.9.1.3(2) and Figures R507.9.1.3(1) and 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 shall be is drilled through the ledger and sheathing, if present, and a holes 5/16-inch (7.9 mm) to 3/8 inch (9.5mm) in diameter shall be is drilled through the band joist prior to lag screw installation. Holes 1/2-inch (12.7 mm) in diameter shall be drilled through the ledger and band joist prior to bolt installation.

**TABLE R507.9.1.3(1) DECK LEDGER CONNECTION TO BAND JOIST**

| LOAD <sup>c</sup><br>(psf) | JOIST<br>SPAN <sup>a</sup><br>(feet) | ON-CENTER SPACING OF FASTENERS <sup>b</sup><br>(inches)                        |  |  |
|----------------------------|--------------------------------------|--|--|--|
|                            |                                      | 1/2-inch diameter lag screw with 1/2-inch<br>maximum sheathing <sup>d, e</sup> | 1/2-inch diameter bolt with 1/2-inch<br>maximum sheathing <sup>e</sup> | 1/2-inch diameter bolt with 1-inch<br>maximum sheathing <sup>f</sup> |
| 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<br>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<br>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<br>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.

- Interpolation permitted. Extrapolation is not permitted.
- Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.
- Dead Load = 10 psf. Snow load shall not be assumed to act concurrently with live load.
- 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.
- Sheathing shall be wood structural panel or solid sawn lumber.
- 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.

**Commenter's Reason:** The proponents of this Public Comment agree with most of the changes in the original proposal. However, there was one requirement, to drill a hole for a 1/2" bolt to a diameter of 1/2", that conflicted with the installation requirements for bolts in the AWC National Design Specification for Wood Construction (NDS).



1) Table R507.2.3 is titled "Fastener and connector specifications for decks". This table provides material specifications for metal fasteners and connectors. It is not the appropriate place to present installation requirements in the footnotes (drilling of holes).

2) The current IRC lag screw installation requires that the hole be predrilled per the NDS. The NDS is a design document that deck builders probably won't have and may not be familiar with. IRC requirements should give an actual prescriptive requirement that can be followed in the field.

3) Having fastener corrosion resistance requirements in R507.9.3.1 is redundant because this is already specified in Table R507.2.3. It makes sense to remove them and just refer to Section R507.2.3.

The proponents of this Public Comment reviewed a report of the original testing that was performed at Washington State University to verify the fasteners that were used and how they were installed. The article "Residential Deck Ledger Connection Testing and Design" states that "As specified in the NDS (AF&PA, 2005), 3/8-inch diameter lead holes were drilled in the band joists and 1/2-inch diameter clearance holes were drilled through the deck ledgers and OSB sheathing prior to assembling the lag screwed specimens. For the bolted specimens, 9/16-inch diameter clearance holes were drilled through the band joists, OSB, and deck ledgers."

Specifications for installation of bolts is proposed to be added to Section R507.2.3, since through bolts are used in Section R507.5.2 in addition to R507.9.1.3. Lag screws are only used for ledger attachment so instructions for those is added to R507.9.1.3.

The new wording proposed in this Public Comment is meant to match that used for the testing that established the fastener spacing. In addition, since the article states that 1/2-inch diameter holes were drilled for the shank of the lag screws, that indicates that full-diameter body lag screws were used. So text was added in this Public Comment to require full-body diameter lag screws. Without that statement, reduced-body diameter lag screws could be used, and the load provided would be less than that achieved during the testing.

**Bibliography:** ""Residential Deck Ledger Connection Testing and Design", by David Carradine, Ph.D., Don Bender, P.E., Ph.D., Loe Loferski, Ph.D., and Frank Woeste, P.E., Ph.D. Structure Magazine, May 2008.  
<https://www.structuremag.org/?p=5620>

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This PC does not change the intent of the original proposal. Instead, this PC further clarifies and relocates existing requirements of the code without causing any change in construction cost.

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Public Comment# 3210

## **Proposed Change as Submitted**

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

### **2021 International Residential Code**

Delete without substitution:

~~**R311.5 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.~~

Revise as follows:

~~**R507.8 Vertical and lateral supports Deck ledgers.** 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. Deck ledgers shall not be supported on stone or masonry veneer.~~

Delete without substitution:

~~**R507.9 Vertical and lateral supports at band joist.** Vertical and lateral supports for decks shall comply with this section.~~

Revise as follows:

~~**R507.9.1 R507.8.1 Vertical supports Ledger attachment.** Where Vertical loads are shall be transferred to band joists with ledgers in accordance with this section, ledgers shall be installed in accordance with Sections R507.8.1.1 through R507.8.3.~~

~~**R507.9.1.1 R507.8.1.1 Ledger details.** Deck ledgers shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, pressure-preservative-treated Southern pine, incised pressure-preservative-treated hem-fir, or *approved*, naturally durable, No. 2 grade or better lumber. 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 R507.8.1.2 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 R507.8.1.3 Ledger to band joist Fastener details.** Fasteners used in deck ledger connections in accordance with Table R507.9.1.3(1) shall be hot-dipped galvanized or stainless steel and shall be installed in accordance with Table R507.9.1.3(2) R507.8.1.3(2) and Figures R507.9.1.3(1) and R507.9.1.3(2). R507.8.1.3(1) and R507.8.1.3(2)~~

~~**R507.9.1.4 R507.8.2 Alternate ledger details.** Alternate framing configurations, fasteners, or hardware supporting a ledger constructed to meet the load requirements of Section R301.5 shall be permitted, where approved.~~

~~**R507.9.2 R507.9 Lateral connection.** Decks shall be designed to transfer Lateral loads ~~shall be transferred~~ to the ground or to a structure capable of transmitting them to the ground. Bracing shall be required in all lateral directions in accordance with accepted engineering practice, utilizing approved braced wall panels, knee braces, cross braces, K braces, moment frame post connections, embedded support posts, horizontal diaphragms, lateral connections in accordance with Section R507.9.1, or through other approved methods. ~~Where the lateral 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).~~~~

Add new text as follows:

**R507.9.1 Lateral connection.** Lateral bracing perpendicular to a ledger shall be permitted in accordance with the following connection methods:

1. Tension devices with a minimum allowable stress design capacity of not less than 1,500 pounds (6672 N) shall be installed in not less than two locations per deck, in accordance with Figure R507.9.1 (1), and within 24 inches (610 mm) of each end of the deck
2. Tension devices with a minimum allowable stress design capacity of not less than 750 pounds (3336 N) shall be installed in not less than four locations per deck, in accordance with Figure R507.9.1 (2), and with one within 24 inches (610 mm) of each end of the deck.

**Reason:** The lateral load connection methods included in the 2009 IRC and 2015 IRC have stopped the important discussion and realization that

connections on one side of a deck to another structure is not a complete lateral load design. This is like a braced wall panel with only hold-down anchors yet no bracing in the panel. Incomplete. Though lateral loads and design methods are not yet standardized, the IRC has a responsibility to not elude to providing a complete structural system when it does not. This proposal reorganizes the ledger and lateral connection provisions so they can be more transparent and ready for further development. It makes it clear that some type of bracing of the deck in all directions is necessary.

Section R311.5 is out of place in chapter three now that Section 507 address decks more comprehensively.

Section R507.9.1 is modified into a "general" ledger attachment section with requirements for all ledger attachments.

Section R507.8.1 provides a prescriptive method of ledger attachment and references the critical subsections.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

This proposal will not change the cost of construction, because it does not create any additional requirements that a sound structure would already require.

RB188-22

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## **Public Hearing Results**

### **Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposal based on the fact that the proposed language is not enforceable and does not comply with the code language. The committee also mentioned an issue of this proposal requiring engineering design without guidance. Requiring an engineering design increases the cost of construction. The committee encouraged the proponent to look into a prescriptive pathway during the public comment phase. The prescriptive provisions need to address different soil bearing, loads, and performance issues (Vote: 10-0).

RB188-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R311.5, R507.1, R507.8.1, R507.8.2, R507.9, R507.9.1, FIGURE R507.9.2(1), FIGURE R507.9.2(2)

**Proponents:** Glenn Mathewson, representing Self (glenn@glennmathewson.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R311.5 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.

**R507.1 Decks General.** 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. Decks shall be designed to transfer lateral loads to the ground or to a structure capable of transmitting them to the ground. For decks using materials and conditions not prescribed in this section, refer to Section R301.

**R507.8.1 Ledger attachment.** ~~Where vertical loads are transferred to band joists in accordance with this section,~~ ledgers shall be installed in accordance with Sections R507.8.1.1 through R507.8.3.

**Exception:** Alternate framing configurations, fasteners, or hardware supporting a ledger constructed to meet the load requirements of Section R301.5 shall be permitted.

**R507.8.2 Alternate ledger details.** ~~Alternate framing configurations, fasteners, or hardware supporting a ledger constructed to meet the load requirements of Section R301.5 shall be permitted, where approved.~~

**R507.9 Lateral connection bracing.** Decks shall be braced against lateral movement in all directions. Lateral bracing perpendicular to a building shall be permitted in accordance with Section R507.9.1. ~~designed to transfer lateral loads to the ground or to a structure capable of transmitting~~

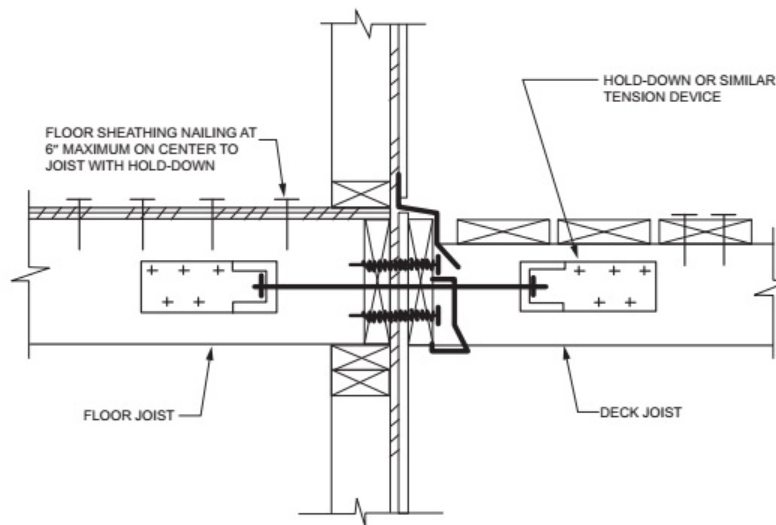
them to the ground. Bracing shall be required in all lateral directions in accordance with accepted engineering practice, utilizing ~~approved~~ braced wall panels, knee braces, cross braces, K braces, moment frame post connections, embedded support posts, horizontal diaphragms, lateral connections in accordance with Section R507.9.1, or through other approved methods.

**R507.9.1 Lateral connection.**

Where lateral load connections are provided in accordance with Figure R507.9.1(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 lateral load connections are provided in accordance with Figure R507.9.1(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).

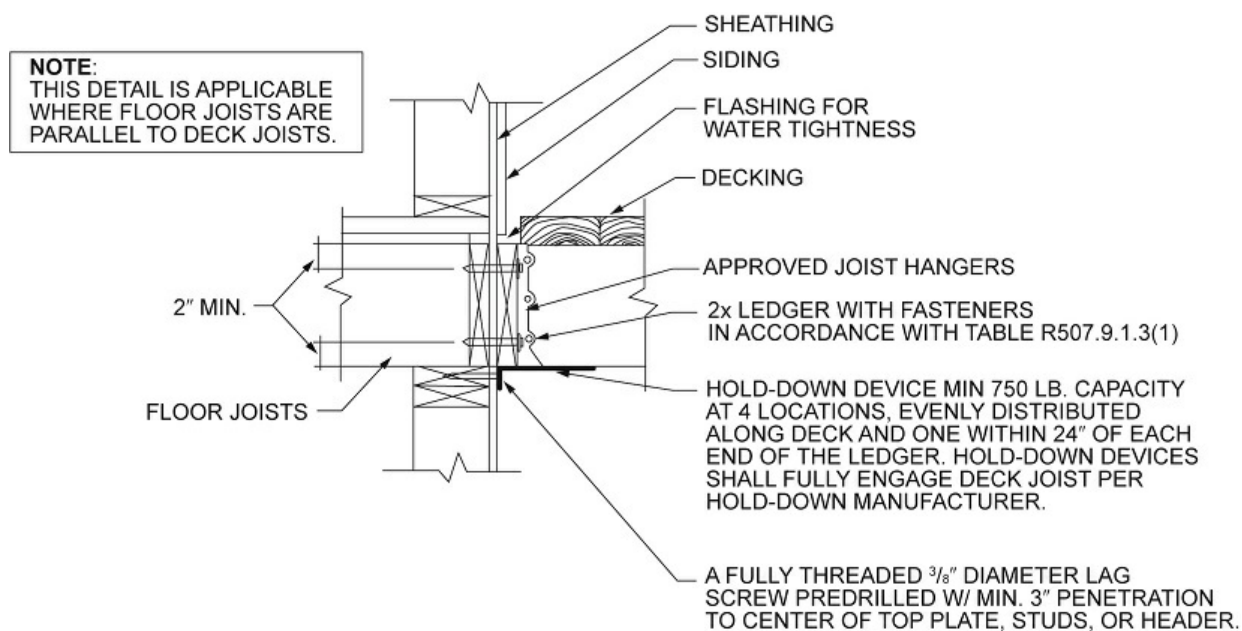
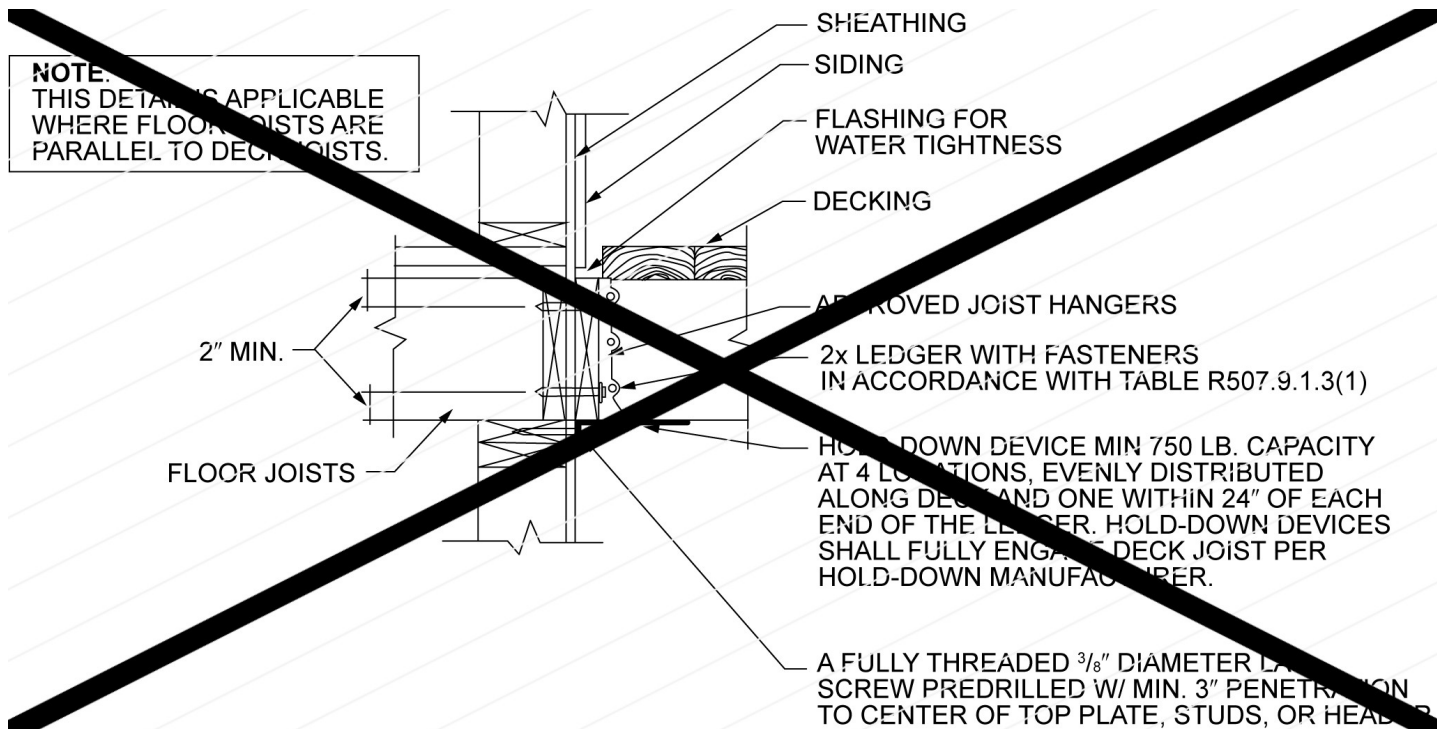
~~Lateral bracing perpendicular to a ledger shall be permitted in accordance with the following connection methods:~~

- ~~1. Tension devices with a minimum allowable stress design capacity of not less than 1,500 pounds (6672 N) shall be installed in not less than two locations per deck, in accordance with Figure R507.9.1 (1), and within 24 inches (610 mm) of each end of the deck~~
- ~~2. Tension devices with a minimum allowable stress design capacity of not less than 750 pounds (3336 N) shall be installed in not less than four locations per deck, in accordance with Figure R507.9.1 (2), and with one within 24 inches (610 mm) of each end of the deck.~~



For SI: 1 inch = 25.4 mm.

**FIGURE R507.9.2(1) R507.9.1(1) DECK ATTACHMENT FOR LATERAL LOADS**



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

**FIGURE R507.9.2(2) R507.9.1(2) DECK ATTACHMENT FOR LATERAL LOADS**

**Commenter's Reason:** The goal of this proposal was to recognize and address the need for lateral bracing of decks in all directions. The lateral connections permitted in the IRC since the 2009 edition do not provide a complete lateral bracing design, but send the illusion that they do. Opposition and committee testimony agreed that this need is valid, but were not comfortable with providing a list of bracing methods and a comment about engineering practice. I was asked to bring back a prescriptive lateral bracing method in a public comment. Unfortunately, I brought this proposal forward as a single individual, and I was asking for others in the code development industry to offer assistance to me to address this known issue. I cannot do it alone, so I don't have a prescriptive method to offer at this time.

In this public comment I have removed all of the suggestions for bracing that drove the opposition testimony concerns. I have also brought back the entirety of Section 311.5, who's proposed deletion was opposed. What remains in the proposal is an important reorganization of the sections.

1) The original provision for decks to be design for lateral loads is moved to the general section, R507.1 This section already describes the general requirement for live and snow loads, so it seems appropriate to recognize lateral in the same section.

2) The original proposal provides Section R507.8 Deck Ledgers, as general provisions that apply to all ledger connections and then subsections for

the specific prescriptive method already in the IRC. This idea was not opposed at the first hearing. This concept is further refined in this PC mod by moving the existing section R507.8.2 Alternate Ledger Details into a new exception to the prescriptive ledger connection method.

3) The original proposal created a separate section R507.9 for Lateral Bracing. This allows this critical design aspect to be more easily understood and addressed separately from vertical live and snow loads at ledgers. Currently they are combined in one section. This PC mod removes all mention of engineering and the list of bracing methods from the proposal. What is left is the critically needed statement that decks must be braced against lateral movement. Then a reference is provided to the current lateral "connections" provided in the code that can brace decks in the direction away from the building.

4) The language for the existing lateral connections has been re-established exactly as in the 2021 IRC. The figures are provided in this PC mod simply to address the Figure numbers. There are no proposed changes to them.

It is my hope that the modifications in this PC address the concerns of the opposition, while supporting our mutual agreement that lateral bracing of decks in the IRC needs better recognition.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This PC, similar to the original proposal, will not change the cost of construction, because it does not create any additional requirements that a sound structure would already require.

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Public Comment# 3271

## **Proposed Change as Submitted**

**Proponents:** Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com)

### **2021 International Residential Code**

**Revise as follows:**

**R507.2.4 Flashing.** Flashing shall be corrosion-resistant metal of nominal thickness not less than 0.019 inch (0.48 mm) or *approved* nonmetallic material that is compatible with the substrate of the structure and the decking materials. Self-adhered membranes used as flashing and counterflashing shall comply with AAMA 711.

**Add new text as follows:**

**507.9.1.5 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 a minimum of 2 inches (51 mm) above the ledger. Flashing shall extend horizontally a minimum of 4 inches (102 mm) beyond the ledger face or shall extend to the ledger face and a minimum of ¼ inch down the ledger face.

**R507.9.1.6 Water-resistive barrier.** The water-resistive barrier required by Section R703.2 shall be lapped not less than 2 inches (51 mm) over a vertical leg of the ledger flashing or counterflashing extending up the wall. 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 a minimum of 2 inches (51 mm) over the vertical leg of the flashing and a minimum of 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 cladding where ledgers are spaced horizontally from the exterior wall a minimum of 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, 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 a minimum of ½ inch (12.7 mm) beyond the sides and bottom of the ledger. A self-adhering membrane counterflashing shall be installed a minimum of 2 inches (51 mm) over the vertical leg of the ledger flashing and a minimum of 2 inches (51 mm) onto the existing sheathing.

**R507.9.1.8 Exterior cladding.** Exterior cladding shall be terminated above the finished deck surface in accordance with the cladding manufacturer's requirements and Chapter 7, as applicable to the type of cladding.

**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. 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. ASTM E331 in accordance with Section R703.1.1.
4. 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).

**R703.4 Flashing.** *Approved* corrosion-resistant flashing shall be applied *shingle-fashion* in a manner to prevent entry of water into the wall cavity or penetration of water to the building structural framing components. Self-adhered membranes used as flashing shall comply with AAMA 711. Fluid-applied membranes used as flashing in exterior walls shall comply with AAMA 714. The flashing shall extend to the surface of the exterior wall finish. Flashing shall be installed above deck ledgers in accordance with Section R507.9.1.5. *Approved* corrosion-resistant flashings shall be installed at the following locations:

1. Exterior window and door openings. Flashing at exterior window and door openings shall be installed in accordance with Section R703.4.1.



2. At the intersection of chimneys or other masonry construction with frame or stucco walls, with projecting lips on both sides under stucco copings.
3. Under and at the ends of masonry, wood or metal copings and sills.
4. Continuously above all projecting wood *trim*.
5. Where exterior porches, decks or stairs attach to a wall or floor assembly of wood-frame construction.
6. At wall and roof intersections.
7. At built-in gutters.

**Reason:** The sound connection of a deck ledger to a house band joist depends on materials that are free from decay. Ledger flashing is critical to ensuring the band joist of the house floor system does not decay, resulting in a failure of the deck fasteners. The IRC has long required deck ledgers to be flashed when attached to wood construction, but other than requiring they prevent the entry of water, there is no guidance. Deck builders from around the country have learned methods of flashing that are effective in their region and methods that aren't. This proposal attempts to provide more details about the interface between the deck ledger, ledger flashing, water resistive barrier and cladding type, while providing the most flexibility in assembly choice.

The primary goals of this proposal are:

- 1) Support the variety of flashing methods currently in use.
- 2) Recognize the different ledger fastening methods in Section 507: Fastened in contact with the sheathing/water-resistive barrier and fastened with 1/2-inch of stacked washer spacing the ledger off the sheathing/water-resistive barrier.
- 3) Recognize the different cladding materials and types of installations (drainage plane, back-vented)
- 4) Recognize the higher risk of cutting into an existing water resistive barrier for a deck attachment.
- 5) Recognize that many houses do not have a water resistive barrier.
- 6) Protect the house framing when cladding is replaced with a deck ledger.

NOTE: There is a companion, but stand alone, proposal that helps to further clarify the intent of this proposal. Figures R507.9.1.3(2), R507.9.2(2), and R507.9.2(1) depict the structural connection of a ledger but also show an illustrative example of ledger flashing... very poor ones currently. Rather than propose specific, new ledger flashing figures, the flashing in those figures were altered to support the language in this proposal.

#### COMMENTARY FOR EACH SECTION MODIFICATION:

R703.2 Water-resistive barrier: In this section it is made clear that the water resistive barrier is to continue behind deck ledgers and not terminated on top of them as a "building appendage" as seen in the next sentence in this section.

R703.4 Flashing: A reference to the new sections specifically for deck ledgers is added. Item 5 in the list could not be removed at this time because it includes the terms porches and stairs. There is no harm in item 5 remaining, though future modifications could address this. The IRC does not do well at distinguishing between a "deck" and "porch" or if there even is a distinction.

R507.2.4 Flashing: A reference to AAMA 711 is included for flashing and counterflashing. This standard is already included in Section R703.4

507.9.1.5 Ledger flashing. This section requires flashing to extend at least 2 inches above the ledger which coincides with standard "shingle fashion" laps required in the water resistive barrier (R703.2). Two common flashing practices are recognized regarding the lower termination of the ledger flashing. An "L" flashing can extend out 4 inches beyond the face of the ledger, which provides added protection to the hardware from moisture. This distance has been found sufficient through practice to sufficiently break the surface tension of water rolling under the flashing such that it drips in front of the ledger. 4 inches was selected to accommodate a 1.5 inch thick ledger spaced 1/2" from the sheathing as provided for in the ledger fastening methods of the IRC. A common "4x6 L flashing" works for this method. Another option provided is for "Z" flashing that turns down the face of the ledger. 1/4 inch was selected as it is the minimum required downward distance of drip edge flashing at the edges of roofs (R905.2.8.5). This vertical leg must be installed between the joist and ledger so it is not bent out horizontally on top of the joist.

R507.9.1.6 Water resistive barrier. The "general" provision is for the barrier to lap a minimum of two inches over the top of the flashing or counterflashing on the wall, regardless of the height of this flashing above the ledger (min 2 inches). In this option, the vertical leg of the ledger flashing must be aligned in a lap in the WRB so that the upper sheet of barrier laps both the flashing and the next sheet by a minimum of 2 inches. The WRB shall be continuous behind the ledger.

R507.9.1.6 Exception 1. Even in new construction of a dwelling, it may be impractical for the WRB lap to be at the ledger flashing location and a deck builder in new or existing construction is understandably reluctant to cut into the barrier. This exception allows for a self-adhering counterflashing to be installed over the flashing and sealed onto the barrier. The counterflashing must be compliant to AAMA 711, per the new reference in R507.2.4 This flashing follows the same minimum 2 inch lap requirements. 4-inch wide rolls of this flashing are a common product on the market. R507.9.1.6 Exception 2. This option allows for when ledgers are spaced off the wall and a drainage plane is behind the ledger. The ledger fastening table allows for up to 1/2 inch of spacers behind the ledger. though, the established minimum space for drainage behind certain cladding in the IRC is only 3/16 inch (R703.7.3.3), due to the critical connection of a ledger and the standardized 1/2 inch standoff, 1/2 inch was chosen as the minimum drainage space. This method is meant to work with vented claddings or back drained claddings held off the wall. In these conditions, the ledger flashing does not need to seal to the water resistive barrier, but rather is placed behind the cladding. Bulk water traveling down the cladding surface is directed by the flashing onto the ledger surface, while bulk water traveling on the surface of the WRB and behind a ledger can freely drain and vent.

R507.9.1.7 Existing walls. Many existing homes do not have a water resistive barrier behind the cladding. These sheathings may be more prone to decay, but they are only supporting cladding. When cladding is removed for a deck ledger attachment, the integrity of the wall framing must now support human occupancy. For this reason, the area behind the ledger and flashing must be covered in a water resistive barrier, just as if there was one above and below. Since there is no existing WRB to connect to, the barrier installed behind the ledger must extend at least 1/2 inch beyond the sides and bottom of the deck. This allows a deck addition to be installed with a cut to the existing cladding at the ends of the ledger that does not require the cladding be cut back further than 1/2 inch. This is a balance between assuring the barrier extends completely behind the ledger, but with minimal repair required to existing cladding. Above the ledger, a self adhering counterflashing is used to seal over the ledger flashing and the barrier behind the flashing to the existing exposed sheathing.

R507.9.1.8 Cladding. This is a reminder that different cladding types require different clearances to the finished deck surface. This is something very overlooked in the deck and code administration industry.

**Cost Impact:** The code change proposal will increase the cost of construction

This code change will have a different cost increase depending on many variables, including the size of the deck and the existing conditions. This proposal allows various options to meet minimum code and they have different costs associated. A few examples are provided in this cost impact statement. All product cost estimates were found through online retailers.

1) For new construction, these practices may already be taking place. New material costs from this proposal could be from lacing the flashing into the water-resistive barrier or sealing it to the surface. The self adhered flashing tape was found for approximately \$20 for a 50 ft. roll and a 140 ft roll of #30 asphalt paper for \$100. Another search for a larger bulk purchase resulted in a 216 ft. roll of #30 paper for \$23. The material costs for this method are less than \$0.50 per linear foot.

2) For deck additions, the addition of a water resistive barrier behind the ledger and the self adhering tape over the ledger flashing would include both products in the first example. This is approximately \$1.0 per linear foot of ledger in additional material costs. This is a conservatively high estimate.

The labor costs associated with this modification to current ledger flashing installation practices is minimal. Paper is cut and installed before installing the ledger and self adhering tape is installed over the flashing. This is the added labor.

RB190-22

## **Public Hearing Results**

**Committee Action:**

**As Submitted**

**Committee Reason:** The committee determined that the proposal provides good guidance and further improves deck safety requirements (Vote: 7-3).

RB190-22

## **Individual Consideration Agenda**

**Public Comment 1:**

IRC: 507.9.1.5, R507.9.1.6, R507.9.1.7, R507.9.1.8

**Proponents:** Glenn Mathewson, representing North American Deck and Railing Association (glenn@glennmathewson.com) requests As Modified

**Modify as follows:**

## 2021 International Residential Code

**507.9.1.5 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 a minimum of 2 inches (51 mm) above the ledger. Flashing shall extend horizontally a minimum of 4 inches (102 mm) beyond the ledger face or shall extend to the ledger face and a minimum of ¼ inch down the ledger face.

**Exceptions:**

1. Where a window or door opening is located less than 2 inches 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 a minimum of 1/4 inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

**R507.9.1.6 Water-resistive barrier.** The *water-resistive* barrier required by Section R703.2 shall be lapped ~~not less than 2 inches (51 mm)~~ 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 a minimum of 2 inches (51 mm) over the vertical leg of the flashing and a minimum of 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 ~~cladding~~ exterior wall covering where ledgers are spaced horizontally from the exterior wall a minimum of 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*, 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 a minimum of ½ inch (12.7 mm) beyond the sides and bottom of the ledger. A self-adhering membrane counterflashing shall be installed a minimum of 2 inches (51 mm) over the vertical leg of the ledger flashing and a minimum of 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 a minimum of 1/4 inch (6.4 mm) to allow for drainage and ventilation behind the ledger.

**R507.9.1.8 Exterior ~~cladding~~ wall covering.** ~~Exterior cladding~~ Exterior wall coverings shall be terminated above the finished deck surface in accordance with the ~~cladding covering~~ covering manufacturer's requirements and Chapter 7, as applicable to the type of covering ~~cladding~~.

**Exception:** Exterior wall coverings shall be permitted behind ledgers in accordance with Section R507.9.1.5 where capable of resisting compression forces from the ledger attachment

**Commenter's Reason:** We have continued to work on this proposals with others to fine tune it. We received concerns from the NAHB about the vertical height of flashing when a window or door opening is located above. We have addressed this with new exceptions.

To address this in Section R507.9.1.6 Water-resistive barrier, we made a small change. It's important to recognize that self-adhering membranes can still be water-resistive barriers by IRC definition, so when the flashing is cut to fit below an opening in the wall, the requirement for the water-resistive barrier can be satisfied by a self-adhering membrane and integrated into the sill flashing methods at the bottom of the opening. We also added exceptions to address conditions where a ledger can be spaced from the face of the final exterior wall covering and no flashing is required at all.

We also recognized that the term "exterior wall covering" is not only defined in chapter 2, but it is the most generic term used in chapter 7. We felt it was a more appropriate term than "cladding".

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction

This public comment modification will not increase or decrease the cost of construction. This PC does not change the intent of the original proposal. Instead, it provides some additional details for certain flashing applications that were not prescriptively captured in the original proposal.



## **RB193-22**

### ***Proposed Change as Submitted***

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

### **2021 International Residential Code**

**Revise as follows:**

**TABLE R602.3(1) FASTENING SCHEDULE**

Portions of table not shown remain unchanged.

| ITEM  | DESCRIPTION OF BUILDING ELEMENTS | NUMBER AND TYPE OF FASTENER <sup>a, b, c</sup>  | SPACING OF FASTENERS           |  |
|---|----------------------------------|---|--------------------------------|--|
|   |                                  |   | Edges <sup>h</sup><br>(inches) | Intermediate supports <sup>c, e</sup> (inches) |
| Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing [see Table R602.3(3) for wood structural panel exterior wall sheathing to wall framing] |                                  |   |                                |  |
| 31  | 3/8" – 1/2"                      | 6d common or deformed (2" × 0.113" × 0.266" head);23/8" × 0.113" × 0.266" head nail (subfloor, wall) <sup>i</sup>                         | 6                              | 6 <sup>f</sup>                                 |
|   |                                  | 8d common (21/2" × 0.131" × <u>0.281" head</u> ) nail (roof); or RSRS-01 (23/8" × 0.113" × <u>0.281" head</u> ) nail (roof) <sup>b</sup>  | 6                              | 6 <sup>f</sup>                                 |
| 32  | 19/32" – 3/4"                    | 8d common (2-21/2" × 0.131") nail (subfloor, wall)  | 6                              | 12   |
|   |                                  | 8d common (21/2" × 0.131" × <u>0.281" head</u> ) nail (roof); or RSRS-01; (23/8" × 0.113" × <u>0.281" head</u> ) nail (roof) <sup>b</sup> | 6                              | 6 <sup>f</sup>                                 |
|   |                                  | Deformed 23/8" × 0.113" × 0.266" head (wall or subfloor)  | 6                              | 12   |

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 R104.11.
- 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. Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed in accordance with AWC NDS. Where the specific gravity of the wood species used for roof framing 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 ( $2-1\frac{1}{2}$ "  $\times$   $0.131$ "  $\times$   $0.281$ " head) nails unless alternative fastening is designed in accordance with AWC NDS. Where the specific gravity of the wood species used for roof framing is less than 0.35, fastening of the roof sheathing shall be designed in accordance with AWC NDS.
- 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.

**Reason:** Fastening of roof sheathing to resist wind uplift forces is based on wood framing of species with specific gravity equal to 0.42 (per proposal RB196-19). To address possible applications using lower specific gravity wood species for roof framing (i.e., specific gravity less than 0.42 but equal to or greater than 0.35), the footnote is expanded to require use of the RSRS-03 nail unless alternative fastening is designed. The use of RSRS-03 nail (a standard ring shank nail) will maintain the same fastener spacing recommendations within the scope of applicability which is up to 140 mph wind speed. Engineered design of the fastening is required when specific gravity of the species used for roof framing is less than 0.35.

**Cost Impact:** The code change proposal will increase the cost of construction

Increased cost of construction will occur where low specific gravity wood species are used. For wood species with specific gravity of 0.35, the added ring shank nail option for resisting ASCE 7 wind uplift forces will provide equivalent withdrawal performance to the 0.42 specific gravity and smooth nail basis of the existing fastening schedule without requiring engineered design. The added language for permissible use of engineered design for fastener spacing greater than 6 inches on center at intermediate supports may reduce amount of required nailing such as in lower wind

## **Public Hearing Results**

### **Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposal based on the fact that the proposal requires engineering design while the IRC includes prescriptive provisions. In addition, the committee was concerned that the new text for specific gravity of the wood species used for roof framing is greater than or equal to 0.35 but less than 0.42 to be verified on site, which is not practical. This issue of specific gravity can be addressed by grade stamp. The committee also recommended adding a chart and taking out the engineering design requirements during the public comment phase (Vote: 7-3).

## **Individual Consideration Agenda**

### ***Public Comment 1:***

**IRC:** TABLE R602.3(1)

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**TABLE R602.3(1) FASTENING SCHEDULE**

Portions of table not shown remain unchanged.

| ITEM  | DESCRIPTION OF BUILDING ELEMENTS | NUMBER AND TYPE OF FASTENER <sup>a, b, c</sup>  | SPACING OF FASTENERS           |  |
|---|----------------------------------|---|--------------------------------|--|
|   |                                  |   | Edges <sup>h</sup><br>(inches) | Intermediate supports <sup>c, e</sup> (inches) |
| Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing [see Table R602.3(3) for wood structural panel exterior wall sheathing to wall framing] |                                  |   |                                |  |
| 31  | 3/8" – 1/2"                      | 6d common or deformed (2" × 0.113" × 0.266" head);23/8" × 0.113" × 0.266" head nail (subfloor, wall) <sup>i</sup>       | 6                              | 6 <sup>f</sup>                                 |
|   |                                  | 8d common (21/2" × 0.131"× 0.281" head) nail (roof); or RSRS-01 (23/8" × 0.113"× 0.281" head) nail (roof) <sup>b</sup>  | 6                              | 6 <sup>f</sup>                                 |
| 32  | 19/32" – 3/4"                    | 8d common (2-21/2" × 0.131") nail (subfloor, wall)  | 6                              | 12   |
|   |                                  | 8d common (21/2" × 0.131"× 0.281" head) nail (roof); or RSRS-01; (23/8" × 0.113"× 0.281" head) nail (roof) <sup>b</sup> | 6                              | 6 <sup>f</sup>                                 |
|   |                                  | Deformed 23/8" × 0.113" × 0.266" head (wall or subfloor)  | 6                              | 12   |

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.

- 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. ~~Spacing exceeding 6 inches on center at intermediate supports shall be permitted where the fastening is designed in accordance with AWC NDS. Fastener spacing applies where roof framing specific gravity is 0.42 or larger. Where the specific gravity of the wood species used for~~ 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 ( $2-1\frac{1}{2}" \times 0.131" \times 0.281"$  head) nails ~~unless alternative fastening is designed in accordance with AWC NDS. Where the specific gravity of the wood species used for roof framing is less than 0.35, fastening of the roof sheathing shall be designed in accordance with AWC NDS.~~

**Commenter's Reason:** The change proposal as well as the public comment addresses the use of roof framing having lower specific gravity than 0.42 associated with prescribed spacing of nails. The modifications to the original proposal address committee comments to focus on a simple prescriptive option because alternative fastening per an engineered design is already addressed through existing provisions of the IRC (i.e., R301.1.3). Accordingly, footnote f has been revised to identify the 0.42 specific gravity basis of the existing spacing requirements (based on lesser withdrawal strength performance of smooth shank common nails) and to prescribe the RSRS-03 ring shank nail option at the same spacing where roof framing specific gravity is less than 0.42 but greater than or equal to 0.35.

While specific gravity is the primary wood property for nail withdrawal strength per an engineered design, existing specific gravity triggers in the IRC are limited to less common applications than wood structural panel roof sheathing attachment to roof framing. To support the added fastening option for low specific gravity roof framing, AWC is developing FAQ's and web-based materials to assist with identification of lumber specific gravity from the grade mark. For reference, the four major lumber species/species combinations for which prescriptive span tables are provided in the IRC and their assigned specific gravity per NDS are tabulated below (all have specific gravity of at least 0.42). A full listing of specific gravity for lumber species/species combinations is available in the National Design Specification (NDS) for Wood Construction and its Supplement.

**Lumber species/species combination and specific gravity (G)**

Southern pine (G=0.55)  
Douglas fir-larch (G=0.50)  
Hem-fir (G=0.43)  
Spruce-pine-fir (G=0.42)

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction. Increased cost for fastening roof sheathing will occur where low specific gravity wood species are used (i.e., specific gravity less than 0.42). For wood species with specific gravity less than 0.42 but greater than or equal to 0.35, the ring shank nail option provides equivalent withdrawal performance to the 0.42 specific gravity and smooth nail basis of the existing fastening schedule without requiring engineered design. In areas where typical practice is to specify and use material with specific gravity of 0.42 or greater for roof framing, there is no increased cost of construction associated with this change proposal. Where engineered design for fastener spacing per R301.1.3 is employed as a typical practice, an increase in field nail spacing and reduction in fastening costs is viable for closer than 24" o.c. rafter spacing and in lower wind speed zones.

Public Comment# 3072



## **RB195-22**

### ***Proposed Change as Submitted***

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

### **2021 International Residential Code**

**Revise as follows:**

**TABLE R602.3(3) REQUIREMENTS FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES<sup>a, b, c</sup>**

| MINIMUM NAIL                    |                         | MINIMUM WOOD<br>STRUCTURAL PANEL<br>SPAN RATING | MINIMUM NOMINAL<br>PANEL THICKNESS<br>(inches) | MAXIMUM WALL<br>STUD SPACING<br>(inches) | PANEL NAIL<br>SPACING     |                           | ULTIMATE DESIGN<br>WIND SPEED V <sub>ult</sub><br>(mph) |     |     |
|---------------------------------|-------------------------|---|--|--|---------------------------|---------------------------|---|-----|-----|
| Size                            | Penetration<br>(inches) |   |  |  | Edges<br>(inches<br>o.c.) | Field<br>(inches<br>o.c.) | Wind exposure<br>category                               |     |     |
|                                 |                         |   |  |  |                           |                           | B   | C   | D   |
| 6d Common<br>(2.0" x<br>0.113") | 1.5                     | 24/0  | 3/8  | 16                                       | 6                         | 12 <sup>d</sup>           | 140   | 115 | 110 |
| 8d Common<br>(2.5" x<br>0.131") | 1.75                    | 24/16   | 7/16   | 16                                       | 6                         | 12 <sup>d</sup>           | 170   | 140 | 135 |
|                                 |                         |   |  | 24                                       | 6                         | 12 <sup>d</sup>           | 140   | 115 | 110 |

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

- Panel strength axis parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.
- Table is based on wind pressures acting toward and away from building surfaces in accordance with Section R301.2. Lateral bracing requirements shall be in accordance with Section R602.10.
- Wood structural panels with span ratings of Wall-16 or Wall-24 shall be permitted as an alternate to panels with a 24/0 span rating. Plywood siding rated 16 o.c. or 24 o.c. shall be permitted as an alternate to panels with a 24/16 span rating. Wall-16 and Plywood siding 16 o.c. shall be used with studs spaced not more than 16 inches on center.
- Where the specific gravity of the wood species used for wall framing 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. Where the specific gravity of the wood species used for wall framing is less than 0.35, fastening of the wall sheathing shall be designed in accordance with AWC NDS.

**Reason:** The change addresses the use of wall framing of wood species having lower specific gravity wall framing than the value of 0.42 associated with prescribed spacing of nails in the field of the panel. Footnote 2 is added to reduce maximum spacing permissible when species with low specific gravity are used. The resulting maximum nail spacing of 8 inch results from 2/3 of the prescribed 12 inch spacing to account for reduced withdrawal capacity of wall framing of species with low specific gravity. Engineered design of the fastening is required when specific gravity of the species used for wall framing is less than 0.35.

**Cost Impact:** The code change proposal will increase the cost of construction. Increased cost of construction will occur where low specific gravity wood species are used. For wood species with specific gravity of 0.35, closer fastener spacing is required to provide equivalent withdrawal performance to the 0.42 specific gravity basis of the existing fastening schedule without requiring engineered design.

RB195-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposal due to the fact that the requirements in the current code are not based on the specific gravity of 0.42. The committee has an issue with the proposal requiring engineering design while the IRC is a prescriptive code (Vote: 7-3).

RB195-22

## **Individual Consideration Agenda**

**Public Comment 1:**

**IRC: TABLE R602.3(3)**

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org) requests As Modified by Public Comment

**Modify as follows:**

**2021 International Residential Code**

**TABLE R602.3(3) REQUIREMENTS FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES<sup>a, b, c</sup>**

Portions of table not shown remain unchanged.

| MINIMUM NAIL                    |                         | MINIMUM WOOD<br>STRUCTURAL PANEL<br>SPAN RATING | MINIMUM NOMINAL<br>PANEL THICKNESS<br>(inches) | MAXIMUM WALL<br>STUD SPACING<br>(inches) | PANEL NAIL<br>SPACING     |                           | ULTIMATE DESIGN<br>WIND SPEED V <sub>ult</sub><br>(mph) |     |     |
|---------------------------------|-------------------------|---|--|--|---------------------------|---------------------------|---|-----|-----|
| Size                            | Penetration<br>(inches) |   |  |  | Edges<br>(inches<br>o.c.) | Field<br>(inches<br>o.c.) | Wind exposure<br>category                               |     |     |
|                                 |                         |   |  |  |                           |                           | B   | C   | D   |
| 6d Common<br>(2.0" x<br>0.113") | 1.5                     | 24/0  | 3/8  | 16                                       | 6                         | 12 <sup>d</sup>           | 140   | 115 | 110 |
| 8d Common<br>(2.5" x<br>0.131") | 1.75                    | 24/16   | 7/16   | 16                                       | 6                         | 12 <sup>d</sup>           | 170   | 140 | 135 |
|                                 |                         |   |  | 24                                       | 6                         | 12 <sup>d</sup>           | 140   | 115 | 110 |

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

- d. ~~Fastener spacing applies where wall framing specific gravity is 0.42 or larger. Where the specific gravity of the wood species used for 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. Where the specific gravity of the wood species used for wall framing is less than 0.35, fastening of the wall sheathing shall be designed in accordance with AWC NDS.~~

**Commenter's Reason:** The change proposal as well as the public comment addresses the use of wall framing having lower specific gravity than the value of 0.42 associated with prescribed spacing of nails. The modifications to the original proposal address committee comments to focus on a simple prescriptive option because alternative fastening per an engineered design can be addressed through existing provisions of the IRC (i.e., R301.1.3). Accordingly, Footnote d has been revised to identify the 0.42 specific gravity basis of the existing spacing requirements and further prescribe that 8 inch on center field nail spacing is required instead of 12 inch on center where wall framing specific gravity is less than 0.42 but greater than or equal to 0.35. Reduced wind suction pressures on walls when compared to roofs, enables an option for reduced spacing of the prescribed smooth shank nail to compensate for reduced withdrawal capacity of low specific gravity framing.

While specific gravity is the primary wood property for nail withdrawal strength per an engineered design, existing specific gravity triggers in the IRC are limited to less common applications than wood structural panel wall sheathing attachment to wall framing. To support the added fastening option for low specific gravity wall framing, AWC is developing FAQ's and web-based materials to assist with identification of lumber specific gravity from the grade mark. For reference, the four major lumber species/species combinations for which span tables are provided in the IRC and their assigned specific gravity per NDS are tabulated below (all have specific gravity of at least 0.42). A full listing of specific gravity for lumber species/species combinations is available in the National Design Specification (NDS) for Wood Construction and its Supplement.

**Lumber species/species combination and specific gravity (G)**

Southern pine (G=0.55)

Douglas fir-larch (G=0.50)

Hem-fir (G=0.43)

Spruce-pine-fir (G=0.42)

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction

Increased cost of construction will occur where low specific gravity wood species are used. For wood species with specific gravity of 0.35, closer fastener spacing provides equivalent withdrawal performance to the 0.42 specific gravity basis of the existing fastening schedule without requiring engineered design. In areas where typical practice is to specify and use material with specific gravity of 0.42 or greater for wall framing, there is no increased cost of construction associated with this change proposal. Where engineered design for fastener spacing per R301.1.3 is employed as a typical practice, use of field nail spacing of 12" on center and no increase in fastening costs is viable for closer than prescribed stud spacings and for lower wind speeds than tabulated.

Public Comment# 3071

## **Proposed Change as Submitted**

**Proponents:** Phillip Samblanet, representing The Masonry Society (psamblanet@masonrysociety.org); Jason Thompson, representing Masonry Alliance for Codes and Standards (jthompson@ncma.org)

### **2021 International Residential Code**

**Revise as follows:**

**R606.1.1 Professional registration not required.** Where the empirical design provisions of Appendix A of TMS 402, the provisions of TMS 403, or the provisions of this section are used to design masonry, 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.

**R606.2.10 Mortar for AAC masonry.** Thin-bed mortar for AAC masonry shall comply with Article 2.2 D.12.1 G.1 of TMS 602. Mortar used for the leveling courses of AAC masonry shall comply with Article 2.2 D.2 2.1 G.2 of TMS 602.

**R606.12.2.3.1 Connections to masonry shear walls.** Connectors shall be provided to transfer forces between masonry walls and horizontal elements in accordance with the requirements of Chapter 4 Section 4.1.4 of TMS 402. Connectors shall be designed to transfer horizontal design forces acting either perpendicular or parallel to the wall, but not less than 200 pounds per linear foot (2919 N/m) of wall. The maximum spacing between connectors shall be 4 feet (1219 mm). Such anchorage mechanisms shall not induce tension stresses perpendicular to grain in ledgers or nailers.

**R606.12.2.3.2 Connections to masonry columns.** Connectors shall be provided to transfer forces between masonry columns and horizontal elements in accordance with the requirements of Chapter 4 Section 4.1.4 of TMS 402. Where anchor bolts are used to connect horizontal elements to the tops of columns, the bolts shall be placed within lateral ties. Lateral ties shall enclose both the vertical bars in the column and the anchor bolts. There shall be not less than two No. 4 lateral ties provided in the top 5 inches (127 mm) of the column.

**R703.12 Adhered masonry veneer installation.** Adhered masonry veneer shall comply with the requirements of Section R703.7.3 and the requirements in Sections 13.14.2.1 and 13.3 4.2.3 of TMS 402. Adhered masonry veneer shall be installed in accordance with Section R703.7.1, Article 3.3D3.3E of TMS 602 or the manufacturer's instructions.

## **TMS**

The Masonry Society  
105 South Sunset Street, Suite Q  
Longmont, CO 80501

402—2016-2022 Building Code Requirements for Masonry Structures

602—2016-2022 Specification for Masonry Structures

**Reason:** This change updates the IRC references and requirements to TMS 402-22 and TMS 602-22. In most cases, the changes are entirely related to moving provisions and updating the references. The deletion of the permission to use empirical design is needed because that appendix has been removed from TMS 402-22 as the Committee no longer supports the provisions for new construction.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This change simply updates references. As such, there is no impact on construction costs.

**Staff Analysis:** The proposal is referencing an updated version of an existing referenced standard. Therefore the updated version is considered an new standard. A review of the standard proposed for inclusion in the code, TMS 402-2022 Building Code Requirements for Masonry Structures and TMS 602-2022 Specification for Masonry Structures, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

RB205-22

## **Public Hearing Results**

**Committee Action:**

**As Submitted**

**Committee Reason:** The committee agreed with updating the existing standards TMS 402 & TMS 602 for building code requirements for masonry structures and specifications for masonry structures to the 2022 provisions. The proposal deletes the use of empirical design in Appendix A of TMS 402 since the appendix has been removed from TMS 402-22 (Vote: 10-0).

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** CP28 administration

**Commenter's Reason:** The administration of ICC Council Policy 28 (CP28) is not taking a position on this code change. This public comment is being submitted to bring a procedural requirement to the attention of the ICC voting membership. In accordance with Section 3.6.3.1.1 of ICC Council Policy 28 (partially reproduced below), the new referenced standard TMS 402-22 must be completed and readily available prior to the Public Comment Hearing in order for this public comment to be considered.

**(CP28) 3.6.3.1.1 Proposed New Standards.** In order for a new standard to be considered for reference by the Code, such standard shall be submitted in at least a consensus draft form in accordance with Section 3.4. If the proposed new standard is not submitted in at least consensus draft form, the code change proposal shall be considered incomplete and shall not be processed. The code change proposal shall be considered at the Committee Action Hearing by the applicable code development committee responsible for the corresponding proposed changes to the code text. If the committee action at the Committee Action Hearing is either As Submitted or As Modified and the standard is not completed, the code change proposal shall automatically be placed on the Public Comment Agenda with the recommendation stating that in order for the public comment to be considered, the new standard shall be completed and readily available prior to the Public Comment Hearing

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
N/A

Public Comment# 3535

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### **Proposed Change as Submitted**

**Proponents:** Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

## **2021 International Residential Code**

**Add new text as follows:**

**R606.12.4.3 Unreinforced Masonry Parapets.** Unreinforced masonry parapets located in Seismic Design Category D<sub>2</sub>, shall have wall anchors installed at the roofline and bracing 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 roof line 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.

**R908.1.1 Structure.** Whenever a *reroofing permit* is issued for work done in Seismic Design Category D<sub>2</sub>, parapets constructed of unreinforced masonry shall comply with R606.12.4.3.

## **APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES**

### **SECTION AJ108 RENOVATIONS**

**Revise as follows:**

**~~AJ108.4 Structural.~~** ~~Unreinforced masonry buildings located in Seismic Design Category D<sub>2</sub> or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.~~

**Reason:** Appendix AJ has not been updated to correlate with changes in the IRC and IEBC provisions that have occurred during recent code cycles. This proposal aligns the unbraced masonry provisions of Appendix AJ with similar IEBC Section 503.6 provisions and relocates these provisions within the main body of the IRC. This provision applies only to the highest seismic design category, D<sub>2</sub>, and targets unreinforced masonry elements which have proven to be exceptionally vulnerable to ground shaking from earthquakes.



Photo of damage to masonry building in Christchurch.

COURTESY OF FRED TURNER, AVAILABLE AT [WWW.EERI.ORG](http://WWW.EERI.ORG),  
LAST ACCESSED 8/3/19

Unreinforced parapets (Figure 1) have proven to be vulnerable to ground motion. Aside from the damage to the building, falling masonry poses a hazard to occupants sheltering in the building and pedestrians immediately outside of the building. This vulnerability can be significantly reduced by installing braces to reduce the unsupported length of masonry that projects above the roof decking (Figure 2).

## ROOF PARAPET WALL BRACING RETROFIT

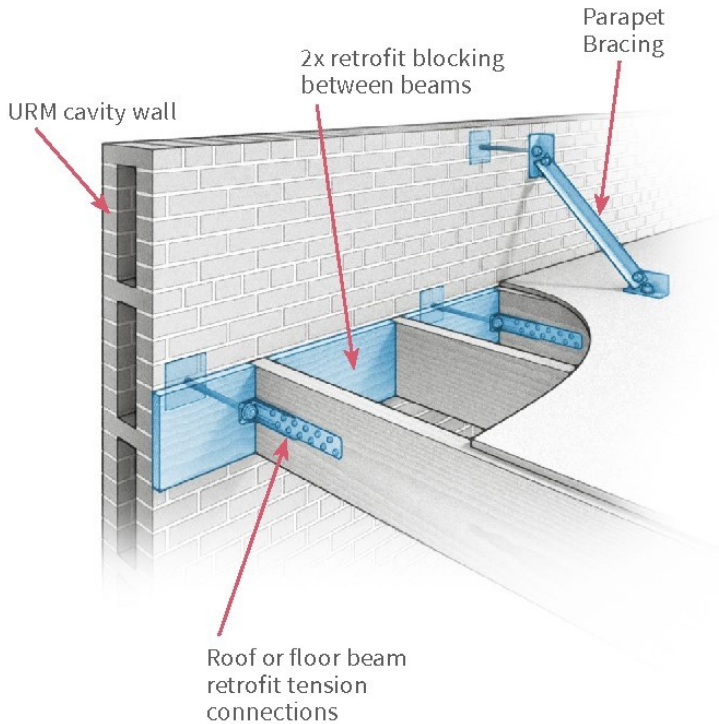


Figure 2 Caption: Parapet bracing and added tension ties to the roof/floor framing. FEMA P-530

**Cost Impact:** The code change proposal will increase the cost of construction

This proposal will increase the cost of construction by moving this provision within the main body of the IRC. However, this provision has been revised from the current Appendix AJ provision and is limited to SDC D2 only, applies only if roof work involves more than 25% of the roof area, and provides an exception for shorter more squat URM parapets.

RB206-22

## Public Hearing Results

### Committee Action:

**As Modified**

### Committee Modification:

**~~R606.12.4.3~~ AJ108.4 Unreinforced Masonry Parapets.** Unreinforced masonry parapets located in Seismic Design Category D, shall have wall anchors installed at the roofline and bracing 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 roof line 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.

**Exception:** Bracing above the roof line 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.

**~~R908.1.1 Structure.~~** Whenever a reroofing permit is issued for work done in Seismic Design Category D, parapets constructed of unreinforced masonry shall comply with ~~R606.12.4.3~~.

**Committee Reason:** The committee determined that the modification correctly deletes the unnecessary Section R908.1.1 regarding reroofing permit is issued for work in Seismic Design Category D2 and relocated the new section to AJ108.4, which is appropriate. The committee decided that the proposal as modified aligns the unbraced masonry provisions of Appendix AJ with similar IEBC Section 503.6 (Vote: 10-0).



## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: AJ108.4**

**Proponents:** Julie Furr, representing FEMA ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

**AJ108.4 Unreinforced Masonry Parapets.** Unreinforced masonry parapets located in Seismic Design Category D<sub>2</sub>, 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.

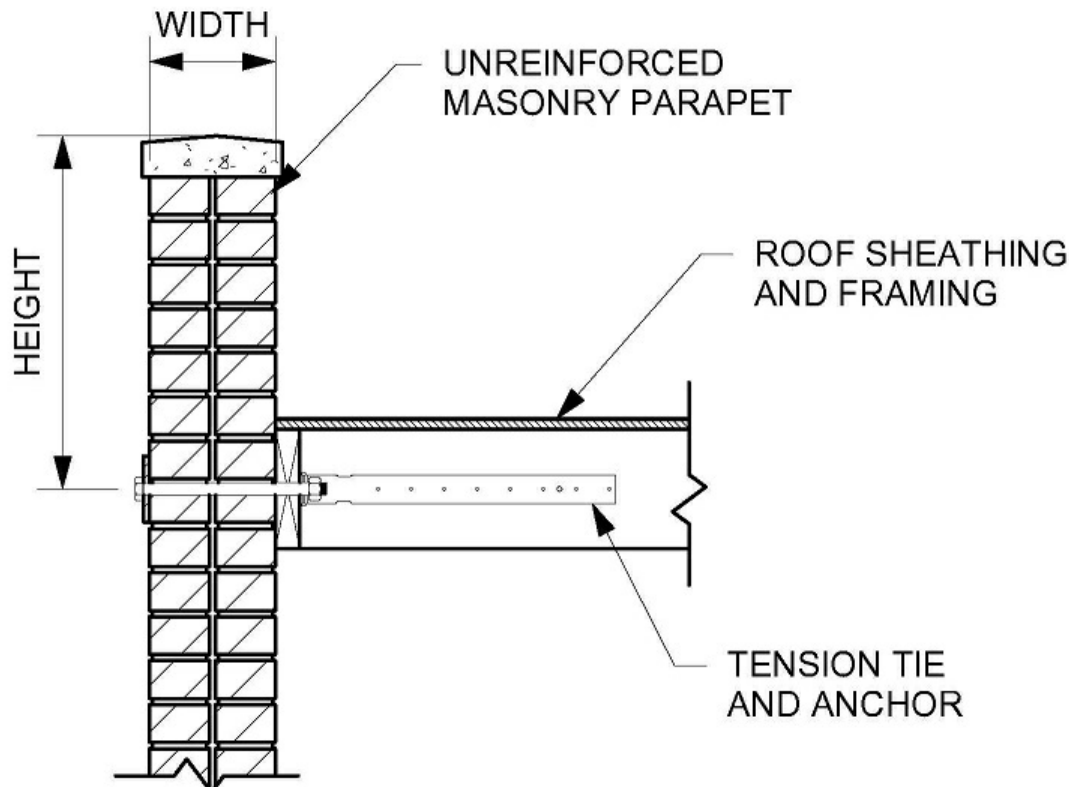
**Exception:** Bracing above the roof line shall not be required where the maximum height of unbraced unreinforced masonry does not exceed a height-to-width ratio of 2.5. Height shall be measured from the top of the parapet down to the highest existing brace or anchor point attached to the structure.

**Commenter's Reason:** This public comment addresses points of concern that were raised in testimony during the public action hearings. A new figure has been added to clarify how the height-to-width ratio should be determined.

In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.

[https://www.cdpaccess.com/public-comment/3133/27718/files/download/3683/FEMA\\_IRC%20APP%20J%20compiled%2007-21-22.docx](https://www.cdpaccess.com/public-comment/3133/27718/files/download/3683/FEMA_IRC%20APP%20J%20compiled%2007-21-22.docx)

This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB7, RB162, RB163, RB206, and RB297



**Cost Impact:** The net effect of the public comment and code change proposal will decrease the cost of construction

This PC does not increase or decrease the cost from the approved as-modified proposal. This is a clarification only of the relative brace location descriptions. The current AJ108.4 requires bracing and anchorage for unreinforced masonry parapet walls ANYTIME a reroofing permit is required. The proposed language requires bracing and anchorage for unreinforced masonry parapets ONLY WHEN the reroofing area exceeds 25% and the height-to-width ratio is greater than 2.5. This is a common sense approach that allows small repairs and maintenance projects to be performed to the roof without triggering the provision.

**Staff Analysis:** Public comments to RB7, RB162, RB163, RB206 and RB297 addresses requirements for Appendix J in a different or contradicting manner. Approved proposal to Appendix J but without a public comment are RB99, RB296, RB298 and RB299. The membership is urged to make their intention clear with their actions on these public comments.

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Public Comment# 3133

### **Proposed Change as Submitted**

**Proponents:** Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

#### **2021 International Residential Code**

**Add new text as follows:**

**R703.3.1 Siding clearance at wall and adjacent surfaces.** Unless otherwise specified by the cladding manufacturer or this code, cladding shall have clearance of at least 6 inches (152 mm) from grade and at least 1/2 inch (13 mm) from other adjacent surfaces (decks, roofs, slabs).

**Reason:** This code contains various clearance between grade, slabs, and other horizontal surfaces. With siding there are several reasons to require this spacing including heat building up on horizontal surfaces, expansion and contraction issues that come along with certain sidings like polymeric siding, and moisture management issues. A 1/2" clearance will provide a good distance between materials and intersection surfaces/planes and 6" is consistent with specific codes requirements in R317.1, protection of wood products including wood siding.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This is a common practice but worth noting in the code to ensure proper siding performance and moisture / heat issues.

RB216-22

### **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

**R703.3.1 Siding clearance at wall and adjacent surfaces.** Unless otherwise specified by the cladding manufacturer or this code, polypropylene, insulated vinyl, and vinyl claddings shall have clearance of at least 6 inches (152 mm) from grade and at least 1/2 inch (13 mm) from other adjacent surfaces (decks, roofs, slabs).

**Committee Reason:** The committee decided that the modification clarifies the materials for which the new Section R703.3.1 is applicable by adding polypropylene, insulated vinyl, and vinyl claddings. The committee approved the proposal as modified due to the fact that the proposal clarifies siding clearance at a wall and adjacent surfaces. In addition, the proposal clarifies the clearance from grade and from other adjacent surfaces (decks, roofs, slabs).

For the public comment phase, the committee encouraged the proponent to look into changing "grade" to "ground" and look into a better location for the section since Section R703.3 is for wall covering nominal thickness and attachments, which is not relevant to the new section (Vote: 10-0).

RB216-22

### **Individual Consideration Agenda**

#### **Public Comment 1:**

**IRC:** R703.3.1

**Proponents:** Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org) requests As Modified by Public Comment

**Further modify as follows:**

#### **2021 International Residential Code**

**R703.3.1 Siding clearance at wall and adjacent surfaces.** Unless otherwise specified by the cladding manufacturer or this code, polypropylene, insulated vinyl, and vinyl claddings shall have clearance of at least 6 inches (152 mm) from grade the ground and at least 1/2 inch (13 mm) from other adjacent surfaces (decks, roofs, slabs).

**Commenter's Reason:** The committee suggested changing the term grade to ground, which is more appropriate here. Siding clearance from the ground should be 6", the term grade would more broadly apply inappropriately.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This PC does not change the intent of the original proposal. The PC corrects clarification of terms.

Public Comment# 3055

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## *Proposed Change as Submitted*

**Proponents:** Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

### 2021 International Residential Code

**Revise as follows:**

**R703.14 Polypropylene siding.** *Polypropylene siding* shall be certified and *labeled* as conforming to the requirements of ASTM D7254, ~~and those of Section R703.14.2 or Section R703.14.3~~, by an *approved* quality control agency.

**Delete without substitution:**

**~~R703.14.2 Fire separation.~~** ~~*Polypropylene siding* shall not be installed on walls with a *fire separation distance* of less than 5 feet (1524 mm) and walls closer than 10 feet (3048 mm) to a building on another lot.~~

~~**Exception:** Walls perpendicular to the line used to determine the *fire separation distance*.~~

**~~R703.14.3 Flame spread index.~~** ~~The certification of the flame spread index shall be accompanied by a test report stating that all portions of the test specimen ahead of the flame front remained in position during the test in accordance with ASTM E84 or UL 723.~~

**Reason:** Currently polypropylene siding is the only cladding in both the IBC and IRC that requires an ASTM E84 test respective to specific Fire Separation Distance areas; 10 feet or closer to another building.

Sections proposed for deletion do not provide any additional protection as the code already requires that if the product is used in these settings, it will need to be a part of an ASTM E119 fire rated assembly, typically a 1-hour rated assembly. In addition, as part of the ASTM product standard, D7254, the product is required to meet an E84 tested fire performance property (max flame spread of 200) that is consistent with other exterior, combustible building materials.

The current code language proposed for deletion is superfluous. The code has adequate provisions for regulating building materials used with Fire Separation Distance areas, for example as specified in Tables 601 and 705.5.

To help the committee understand the fire properties of polypropylene siding better, which has been questioned, VSI conducted a series of tests, at the Western Fire Center, that provide good fire safe characteristic insights by using ASTM E2707 Standard Test Method for Determining Fire Penetration of Exterior Wall Assemblies Using a Direct Flame Impingement Exposure and an exposed wall to this test. Attached is a VSI Technical Report from these tests to help the committee better understand the fire characteristics of this product category. Also, here is a link to the report.

<https://www.vinylsiding.org/wp-content/uploads/2022/01/PolypropyleneFireTest.2020reportssubmitted-004.pdf>

The following is an overview of these tests:

- The product was tested in a setting and application that represents tight lot line settings (close Fire Separation Distance) by having a burner wall and exposed (receiver wall) facing each other – tests were spaced at 4' and 6' with gypsum backing to represent a rated assembly

- The product was also tested at a typical unprotected separation distance 10+' apart

- The product was tested with gypsum sheathing as on a protected wall assembly, and as part of an unprotected, combustible material wall assembly.

Based on the results of the test, it is worth noting the following:

- Polypropylene typically melts, spits, and falls off the wall and, in some cases, will collect and continue to burn on the ground within 18 inches of the burner wall

- At no point did any portion of the receiver wall with polypropylene siding combust, even at the 4' wall spacing

- The heat release rate of the polypropylene siding / gypsum sheathing (protected) base wall was about 65% less than the heat release rate of the polypropylene siding / fully combustible wood wall-Heat release peaks occurred faster into the tests and at higher magnitudes for the polypropylene siding /wood combustible wall vs. the wall with polypropylene siding / gypsum assembly-Observation of the reaction of all the wall assemblies to the fire exposures during the tests clearly show and confirm that the respective fire resistive and fire separation distance sections within the building code provide the intended protection of exterior walls with polypropylene siding.

There are no examples of the hazard this specific product presents. All data provides has not been in the application of siding.

In fact the below is an example of a house fire that occurred in close proximity to another house (approximately 15 feet) during Hurricane Isaias. The resulting fire cause no hazard to the house next to it with polypropylene siding on it other than melting the cladding. This is exactly what the provision is supposedly highlighting as a problem. It clearly is not.



**Cost Impact:** The code change proposal will decrease the cost of construction  
This change will remove unwarranted additional testing procedures which could reduce the overall cost of material testing requirements.

RB231-22

## **Public Hearing Results**

**Committee Reason:** The committee determined that the deletion of sections R703.14.2 and R703.14.3 is appropriate. Those sections do not provide any additional protection, and the current code text already addresses this issue. The committee decision was also based on a series of tests data provided. Some of the committee do not believe enough information was provided. (Vote: 5-4).

RB231-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org) requests As Submitted

**Commenter's Reason:** The committee vote to accept this change clearly indicates this change removes confusion, unjustified fire separation distance requirements, and does not diminish the fire safety of the code. The committee recognized the substantial data provided for the change. According to the committee statement, those that voted against it would like more information, so with this comment additional testing and supporting evidence has been provided.

To further exhibit how polypropylene performs, VSI conducted testing in **June of 2022** at the Western Fire Center Inc. This testing further exhibits how polypropylene siding reacts under extreme fire exposure conditions, evidence that it poses no additional risks beyond what the current code text addresses for other combustible exterior wall coverings, and negates the errant perception of the need for added protection that sections R703.14.2 and R703.14.3 incorrectly relate to fire separation distance.

Comprehensive information including the **June 2022** testing can be found here.

<https://www.vinylsiding.org/wp-content/uploads/2022/06/VSI-ICC-Proposal-Fire-Compilation.zip>

The recent testing shows:

- 1) When polypropylene siding is under fire conditions, the exposed wall (of polypropylene siding) melts falls and sticks, but never creates any risk nor combusts, even at a high density 4' separation.
- 2) The heat release rate is in an acceptable range and tolerable level when applied to current requirement of the IBC section 1405. Keep in mind these requirements do not apply to the IRC as those requirements are for non-combustible construction.
- 3) The temperature of the exposed wall's polypropylene reached 350 degrees C which is 100 degrees below the ignition temperature, and never combusted event at 4' separation distance.

The results of this clearly exhibit the fire safe nature of the product. In addition we have created a library/background which contains further examples of how polypropylene siding meets all testing requirements for combustible cladding that the code requires under certain circumstances including NFPA 268, ASTM E119, ASTM E84, and other tests including urban wildland tests in California. Click here for this additional information. Those tests results are also in the link above.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This change simply removes erroneous language.

Public Comment# 3217

### **Public Comment 2:**

**Proponents:** Marcelo Hirschler, representing GBH International (mmh@gbhint.com); Kevin Reinertson, representing California Fire Chiefs Association FPO (kevin.reinertson@fire.ca.gov) requests Disapprove

**Commenter's Reason:** The existing code language provides a certain level of fire protection when a material that burns very vigorously is used as a siding material.

The protection gives two options for the use of polypropylene siding: an added fire separation distance between buildings (10 feet instead of 5 feet) or the treatment of the polypropylene such that it does not melt and fall off the ceiling of the ASTM E84 test when the flame is applied. The proposal

eliminates the safeguards for polypropylene siding and that is unsafe.

The option of added distance is a result of the fire properties of polypropylene. It has been shown that polypropylene releases abundant heat when it burns (much more than other combustible siding materials, such as vinyl or wood, for example cedar) and that it melts and burns with a pool beneath the building, thus allowing flame spread along the floor as well as radiant heat from the burning siding.

The option of ensuring that the material stays in place during the test is to ensure that the material is actually exposed to the test flame. Otherwise, untreated polypropylene will melt and fall away as soon as the flame impinges on the test specimen and the fire test just burns an empty space, without indicating anything about the actual fire properties of the material.

Much, if not most, of the information presented in support of the proposal dealt with fire resistance rating testing (to ASTM E119). This section (in the IRC, of course) does not require fire resistance rating. The code does not require 1 hour rated assemblies for residential construction, so the information is irrelevant. More importantly, the information is misleading. What happens when an assembly with a polypropylene siding facing and a gypsum board (or other acceptable 1 hours rated assembly) behind it, is exposed to the radiant furnace of an ASTM E119 test is that the polypropylene quickly burns and falls off and leaves the rest of the assembly in place. The 1 hour rated assembly continues resisting and preventing the penetration through the assembly. That means that the polypropylene siding had no effect because the fire resistance is being provided by the rest of the assembly. It is simply there to burn off.

The information presented that the melted polypropylene does not flow away is a function of the geometry of the test lab. As pointed out by one of the committee members, in real life there is likely a grade and the burning material will flow away from the wall.

During the committee hearing there was no serious discussion of the option presented in the code of treating the polypropylene material so it does not melt and drip during the test. Evidence shows that such treatment is technically feasible, and that would provide a material that is adequately tested to ASTM E84.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.

Public Comment# 3048

### **Public Comment 3:**

**Proponents:** Jonathan Roberts, representing UL (jonathan.roberts@ul.com) requests Disapprove

**Commenter's Reason:** The requirements regulating polypropylene siding were initially introduced into the 2015 IRC (RB387-13) to give provisions for this material as an alternative to other types of siding addressed by the code.

This proposal would remove significant and relevant performance requirements, and it is important that the following points be understood:

1. Testing to ASTM E119 or UL 263 addresses fire resistance of the wall assembly with polypropylene siding, but does not address characteristics such as ignitability and flame propagation, which are also mitigated by the separation distance requirement. Fire-resistance ratings may or may not be required for the wall construction depending on its location on the property.
2. Testing to ASTM E2707, as referenced in the proponent's reason statement that was performed by Western Fire Center, provides only information about flame "penetration", **NOT** flame propagation.
3. It had already been determined by RB387-16 in the 2018 IRC that the statement requiring that "*all portions of the test specimen ahead of the flame front remain in position during the ASTM E84 or UL 723 tests*" was meaningful information in addition to what is described in ASTM D7254. The reason the code has the additional requirement is due to the tendency of polypropylene to melt and flow away from the flame, while many other siding products do not. These current IRC requirements are also consistent with the requirements in IBC Chapter 14 for polypropylene siding, and IBC Chapter 8 for polypropylene used as an interior finish.

Based on these considerations, the current code requirements for testing for flame spread index (Section R703.14.3), and the fire separation distances should remain in the code.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.





## **RB233-22**

### **Proposed Change as Submitted**

**Proponents:** Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz); Philip Line, representing American Wood Council (pline@awc.org)

### **2021 International Residential Code**

**Revise as follows:**

**TABLE R703.15.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT<sup>a</sup>**

| CLADDING FASTENER MINIMUM PENETRATION INTO WOOD WALL FRAMING THROUGH FOAM SHEATHING <sup>b</sup> | CLADDING FASTENER TYPE AND MINIMUM SIZE <sup>c</sup> | CLADDING FASTENER VERTICAL SPACING <sup>d</sup> (inches) | MAXIMUM THICKNESS OF FOAM SHEATHING <sup>d,e</sup> (inches) |        |        |        |        |                                      |        |        |        |        |
|--|--|--|---|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|
|  |  |  | 16" o.c. Fastener Horizontal Spacing                        |        |        |        |        | 24" o.c. Fastener Horizontal Spacing |        |        |        |        |
|  |  |  | Cladding Weight <sup>f</sup> :                              |        |        |        |        | Cladding Weight <sup>f</sup> :       |        |        |        |        |
|  |  |  | 3 psf   | 11 psf | 15 psf | 18 psf | 25 psf | 3 psf                                | 11 psf | 15 psf | 18 psf | 25 psf |
| Wood framing (minimum 1 1/4-inch penetration)  | 0.113" diameter nail                                 | 6  | 2.00  | 1.45   | 1.00   | 0.75   | DR     | 2.00                                 | 0.85   | 0.55   | DR     | DR     |
|  |  | 8  | 2.00  | 1.00   | 0.65   | DR     | DR     | 2.00                                 | 0.55   | DR     | DR     | DR     |
|  |  | 12   | 2.00  | 0.55   | DR     | DR     | DR     | 1.85                                 | DR     | DR     | DR     | DR     |
|  | 0.120" diameter nail                                 | 6  | 3.00  | 1.70   | 1.15   | 0.90   | 0.55   | 3.00                                 | 1.05   | 0.65   | 0.50   | DR     |
|  |  | 8  | 3.00  | 1.20   | 0.80   | 0.60   | DR     | 3.00                                 | 0.70   | DR     | DR     | DR     |
|  |  | 12   | 3.00  | 0.70   | DR     | DR     | DR     | 2.15                                 | DR     | DR     | DR     | DR     |
|  | 0.131" diameter nail                                 | 6  | 4.00  | 2.15   | 1.50   | 1.20   | 0.75   | 4.00                                 | 1.35   | 0.90   | 0.70   | DR     |
|  |  | 8  | 4.00  | 1.55   | 1.05   | 0.80   | DR     | 4.00                                 | 0.90   | 0.55   | DR     | DR     |
|  |  | 12   | 4.00  | 0.90   | 0.55   | DR     | DR     | 2.70                                 | 0.50   | DR     | DR     | DR     |
|  | 0.162" diameter nail                                 | 6  | 4.00  | 3.55   | 2.50   | 2.05   | 1.40   | 4.00                                 | 2.25   | 1.55   | 1.25   | 0.80   |
|  |  | 8  | 4.00  | 2.55   | 1.80   | 1.45   | 0.95   | 4.00                                 | 1.60   | 1.10   | 0.85   | 0.50   |
|  |  | 12   | 4.00  | 1.60   | 1.10   | 0.85   | 0.50   | 4.00                                 | 0.95   | 0.60   | DR     | DR     |

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 Spruce-pine-fir or any wood 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 2 nails per foot, 8 inch spacing is associated with 1.5 nails per foot, and 12 inch spacing is associated with 1 nail per foot.
- ~~d. 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 3-coat stucco of not more than 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<sup>a, b</sup>**

Portions of table not shown remain unchanged.

| FURRING MATERIAL | FRAMING MEMBER | FASTENER TYPE AND MINIMUM SIZE | MINIMUM PENETRATION INTO WALL FRAMING (inches) <sup>c</sup> | FASTENER SPACING IN FURRING (inches) | MAXIMUM THICKNESS OF FOAM SHEATHING <sup>e</sup> (inches) |        |        |        |        |                               |        |        |        |        |
|------------------|----------------|--------------------------------|---|--------------------------------------|---|--------|--------|--------|--------|-------------------------------|--------|--------|--------|--------|
|                  |                |                                |   |                                      | 16" o.c. Furring <sup>f</sup>                             |        |        |        |        | 24" o.c. Furring <sup>f</sup> |        |        |        |        |
|                  |                |                                |   |                                      | Siding Weight: <sup>g</sup>                               |        |        |        |        | Siding Weight: <sup>g</sup>   |        |        |        |        |
|                  |                |                                |   |                                      | 3 psf   | 11 psf | 15 psf | 18 psf | 25 psf | 3 psf                         | 11 psf | 15 psf | 18 psf | 25 psf |

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.

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 3-coat stucco of not more than 7/8-inch thickness; and 15 psf to 25 psf categories typically apply to adhered masonry veneers.

**Reason:** This proposal is a clarification of three items related to proper application of the Table R703.15.1 requirements. First, the column heading for minimum fastener penetration is revised to clearly indicate its focus on minimum fastener penetration into wood framing. Second, a new footnote 'd' is added to clarify application of prescribed vertical spacing requirements for cladding fasteners. Third, a new footnote 'f' is added to clarify application of the cladding weight categories used in the table. These clarifications are based on field experience, questions, and feedback in the use of the tables. For Table R703.15.2, the addition of footnote 'g' is proposed to clarify weight categories consistent with the revision proposed for Table R703.15.1.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. The proposal is a clarification and has no cost impact.

RB233-22

## **Public Hearing Results**

### **Committee Action:**

**As Submitted**

**Committee Reason:** The proposal provides clarity to the tables on technical details for cladding fastener requirements over foam plastic sheathing and support cladding weight. Addition of footnote d clarifies the application of prescribed vertical spacing requirements for cladding fasteners and footnote f for cladding weight categories. The committee suggested that the proponent looks into removing "not more than" in footnote f during the public comment phase (Vote: 9-1).

RB233-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: TABLE R703.15.1, TABLE R703.15.2

**Proponents:** Jay Crandell, representing P.E., ABTG / ARES Consulting (jcrandell@aresconsulting.biz) requests As Modified by Public Comment

**Modify as follows:**

## **2021 International Residential Code**

**TABLE R703.15.1 CLADDING MINIMUM FASTENING REQUIREMENTS FOR DIRECT ATTACHMENT OVER FOAM PLASTIC SHEATHING TO SUPPORT CLADDING WEIGHT<sup>a</sup>**

| CLADDING FASTENER MINIMUM PENETRATION INTO WOOD WALL FRAMING <sup>b</sup> | CLADDING FASTENER TYPE AND MINIMUM SIZE <sup>c</sup> | CLADDING FASTENER VERTICAL SPACING <sup>d</sup> (inches) | MAXIMUM THICKNESS OF FOAM SHEATHING <sup>e</sup> (inches) |        |        |        |        |                                      |        |        |        |        |
|---|--|--|---|--------|--------|--------|--------|--------------------------------------|--------|--------|--------|--------|
|   |  |  | 16" o.c. Fastener Horizontal Spacing                      |        |        |        |        | 24" o.c. Fastener Horizontal Spacing |        |        |        |        |
|   |  |  | Cladding Weight <sup>f</sup> :                            |        |        |        |        | Cladding Weight <sup>f</sup> :       |        |        |        |        |
|   |  |  | 3 psf   | 11 psf | 15 psf | 18 psf | 25 psf | 3 psf                                | 11 psf | 15 psf | 18 psf | 25 psf |
| 1 1/4-inch  | 0.113" diameter nail                                 | 6  | 2.00  | 1.45   | 1.00   | 0.75   | DR     | 2.00                                 | 0.85   | 0.55   | DR     | DR     |
|   |  | 8  | 2.00  | 1.00   | 0.65   | DR     | DR     | 2.00                                 | 0.55   | DR     | DR     | DR     |
|   |  | 12   | 2.00  | 0.55   | DR     | DR     | DR     | 1.85                                 | DR     | DR     | DR     | DR     |
|   | 0.120" diameter nail                                 | 6  | 3.00  | 1.70   | 1.15   | 0.90   | 0.55   | 3.00                                 | 1.05   | 0.65   | 0.50   | DR     |
|   |  | 8  | 3.00  | 1.20   | 0.80   | 0.60   | DR     | 3.00                                 | 0.70   | DR     | DR     | DR     |
|   |  | 12   | 3.00  | 0.70   | DR     | DR     | DR     | 2.15                                 | DR     | DR     | DR     | DR     |
|   | 0.131" diameter nail                                 | 6  | 4.00  | 2.15   | 1.50   | 1.20   | 0.75   | 4.00                                 | 1.35   | 0.90   | 0.70   | DR     |
|   |  | 8  | 4.00  | 1.55   | 1.05   | 0.80   | DR     | 4.00                                 | 0.90   | 0.55   | DR     | DR     |
|   |  | 12   | 4.00  | 0.90   | 0.55   | DR     | DR     | 2.70                                 | 0.50   | DR     | DR     | DR     |
|   | 0.162" diameter nail                                 | 6  | 4.00  | 3.55   | 2.50   | 2.05   | 1.40   | 4.00                                 | 2.25   | 1.55   | 1.25   | 0.80   |
|   |  | 8  | 4.00  | 2.55   | 1.80   | 1.45   | 0.95   | 4.00                                 | 1.60   | 1.10   | 0.85   | 0.50   |
|   |  | 12   | 4.00  | 1.60   | 1.10   | 0.85   | 0.50   | 4.00                                 | 0.95   | 0.60   | DR     | DR     |

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.

- Wood framing shall be Spruce-pine-fir or any wood species with a specific gravity of 0.42 or greater in accordance with AWC NDS.
- 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).
- Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths.
- Fastener vertical spacing is an average spacing associated with the following nail count per foot: 6 inch spacing is associated with 2 nails per foot, 8 inch spacing is associated with 1.5 nails per foot, and 12 inch spacing is associated with 1 nail per foot.
- Foam sheathing shall have a minimum compressive strength of 15 psi in accordance with ASTM C578 or ASTM C1289.
- 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 3-coat stucco of ~~not more than~~ 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<sup>a, b</sup>**

| FURRING<br>MATERIAL | FRAMING<br>MEMBER | FASTENER TYPE<br>AND MINIMUM<br>SIZE | MINIMUM PENETRATION<br>INTO WALL FRAMING<br>(inches) <sup>c</sup> | FASTENER SPACING<br>IN FURRING (inches) | MAXIMUM THICKNESS OF FOAM<br>SHEATHING <sup>e</sup> (inches) |           |           |           |           |                               |           |           |           |           |
|---------------------|-------------------|--------------------------------------|---|---|--|-----------|-----------|-----------|-----------|-------------------------------|-----------|-----------|-----------|-----------|
|                     |                   |                                      |   |   | 16" o.c. Furring <sup>f</sup>                                |           |           |           |           | 24" o.c. Furring <sup>f</sup> |           |           |           |           |
|                     |                   |                                      |   |   | Siding Weight: <sup>g</sup>                                  |           |           |           |           | Siding Weight: <sup>g</sup>   |           |           |           |           |
|                     |                   |                                      |   |   | 3<br>psf   | 11<br>psf | 15<br>psf | 18<br>psf | 25<br>psf | 3<br>psf                      | 11<br>psf | 15<br>psf | 18<br>psf | 25<br>psf |

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.

- 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 3-coat stucco of ~~not more than~~ 7/8-inch thickness; and 15 psf to 25 psf categories typically apply to adhered masonry veneers.

**Commenter's Reason:** While voting in support of this proposal, two committee members and the committee reason statement indicate a recommendation to delete "not more than" in reference to thickness of 3-coat stucco mentioned in footnotes f and g of the two tables. The footnote is a statement defining table assumptions or examples regarding cladding weight categories used in the table, and is not meant to be taken without reasonable tolerance.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal does not change requirements and only clarifies wording to allow for tolerance on nominal thickness categories of stucco.

Public Comment# 3225

## ***Proposed Change as Submitted***

**Proponents:** Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org)

### **2021 International Residential Code**

**Add new definition as follows:**

**EXTERIOR SOFFIT.** A material or assembly of materials applied on the underside of exterior overhangs, decks and floors, porches, and carport ceilings.

**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, architectural *trim* and embellishments such as cornices, ~~soffits, and fascias.~~

**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.

**R703.3.1 Exterior Soffit installation.** Exterior Soffits shall comply with Section R704.

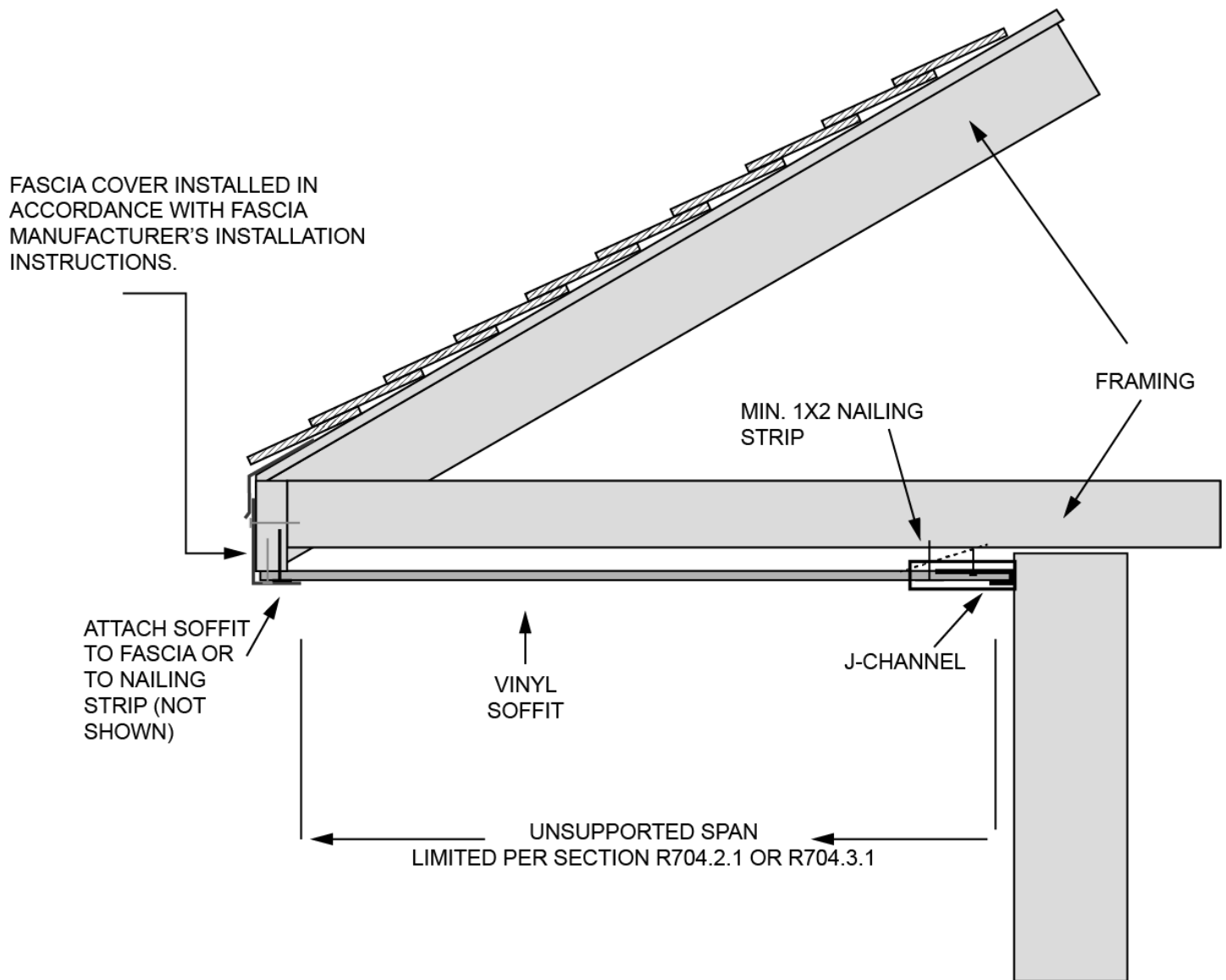
**R703.11.1 Installation.** Vinyl siding, exterior soffit and accessories shall be installed in accordance with the manufacturer's instructions.

## **SECTION R704 EXTERIOR SOFFITS**

**R704.1 General wind limitations.** Where the design wind pressure is 30 pounds per square foot (1.44 kPa) or less, exterior soffits shall comply with Section R704.2. Where the design wind pressure exceeds 30 pounds per square foot (1.44 kPa), exterior soffits shall comply with Section R704.3. The design wind pressure on exterior soffits shall be determined using the component and cladding loads specified in Table R301.2.1(1) for walls using an effective wind area of 10 square feet (0.93 m<sup>2</sup>) and adjusted for height and exposure in accordance with Table R301.2.1(2).

**R704.2 Exterior Soffit installation where the design wind pressure is 30 psf or less.** Where the design wind pressure is 30 pounds per square foot (1.44 kPa) or less, exterior soffit installation shall comply with Section R704.2.1, R704.2.2, R704.2.3 or R704.2.4. Exterior Soffit materials not addressed in Sections R704.2.1 through R704.2.4 shall be in accordance with the manufacturer's installation instructions.

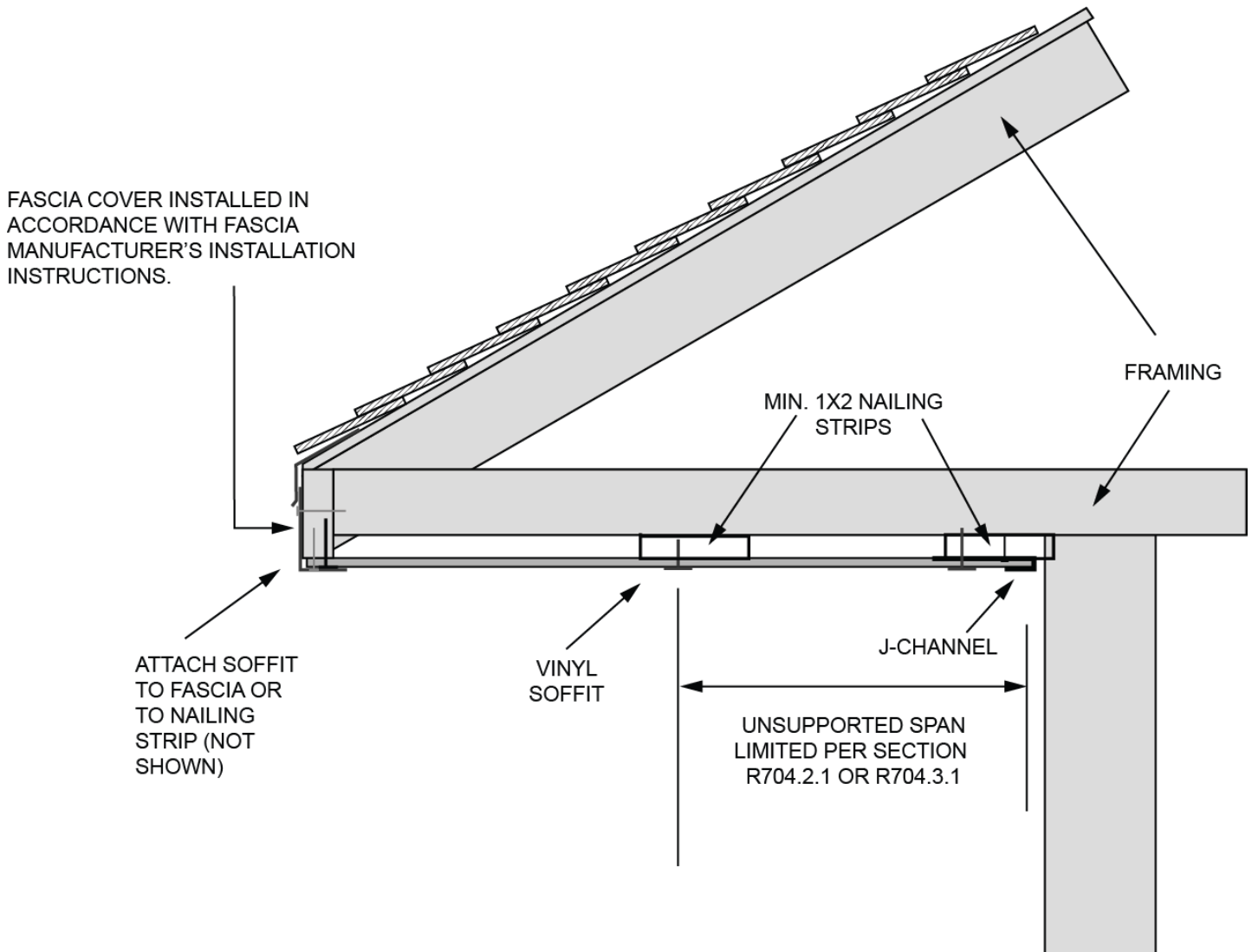
**R704.2.1 Vinyl exterior soffit panels.** Vinyl exterior soffit panels shall be installed using fasteners specified by the manufacturer and shall be fastened at both ends to a supporting component such as a nailing strip, fascia or subfascia component in accordance with Figure R704.2.1(1). Where the unsupported span of exterior soffit panels is greater than 16 inches (406 mm), intermediate nailing strips shall be provided in accordance with Figure R704.2.1(2). Vinyl exterior soffit panels shall be installed in accordance with the manufacturer's installation instructions. Fascia covers shall be installed in accordance with the manufacturer's installation instructions.



(Add 'exterior' in front of 'soffit' in three locations.)

**FIGURE R704.2.1(1) TYPICAL SINGLE-SPAN VINYL SOFFIT PANEL SUPPORT**





(Add 'exterior' in front of 'soffit' in three locations.)

**FIGURE R704.2.1(2) TYPICAL DOUBLE-SPAN VINYL SOFFIT PANEL SUPPORT**

**R704.2.2 Fiber-cement exterior soffit panels.** Fiber-cement exterior soffit panels shall be a minimum of  $\frac{1}{4}$  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 or over wood structural panel sheathing. Exterior Soffit panels shall be installed with spans and fasteners in accordance with the manufacturer's installation instructions.

**R704.2.3 Hardboard exterior soffit panels.** Hardboard exterior soffit panels shall be not less than  $\frac{7}{16}$  inch (11.11 mm) in thickness and shall be fastened to framing or nailing strips with  $2\frac{1}{2}$ -inch by 0.113-inch (64 mm by 2.9 mm) siding nails spaced not more than 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate supports.

**R704.2.4 Wood structural exterior panel soffit.** The minimum nominal thickness for wood exterior structural panel soffits shall be  $\frac{3}{8}$  inch (9.5 mm) and shall be fastened to framing or nailing strips with 2-inch by 0.099-inch (51 mm by 2.5 mm) nails. Fasteners shall be spaced not less than 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate supports.

**R704.3 Exterior Soffit installation where the design wind pressure exceeds 30 psf.** Where the design wind pressure is greater than 30 psf, exterior soffit installation shall comply with Section R704.3.1, R704.3.2, R704.3.3 or R704.3.4. Exterior Soffit materials not addressed in Sections R704.3.1 through R704.3.4 shall be in accordance with the manufacturer's installation instructions.

**R704.3.1 Vinyl exterior soffit panels.** Vinyl 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<sup>2</sup>) and adjusted for height and exposure in accordance with Table R301.2.1(2). Vinyl 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 exterior soffit panels shall be installed in accordance with the manufacturer's installation instructions. Fascia covers shall be installed in accordance with the manufacturer's installation instructions.

**R704.3.2 Fiber-cement exterior soffit panels.** Fiber-cement exterior soffit panels shall comply with Section R704.2.2 and 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<sup>2</sup>) and adjusted for height and exposure in accordance with Table R301.2.1(2).

**R704.3.3 Hardboard exterior soffit panels.** Hardboard exterior soffit panels shall comply with the manufacturer's installation instructions and 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<sup>2</sup>) and adjusted for height and exposure in accordance with Table R301.2.1(2) .

**R704.3.4 Wood structural panel exterior soffit.** Wood structural panel exterior soffits 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<sup>2</sup>) and adjusted for height and exposure in accordance with Table R301.2.1(2). Alternatively, wood structural panel exterior soffits shall be installed in accordance with Table R704.3.4.

**TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE FOR WOOD STRUCTURAL PANEL EXTERIOR SOFFIT** b, c, d, e

| MAXIMUM DESIGN PRESSURE (+ or - psf) | MINIMUM PANEL SPAN RATING | MINIMUM PANEL PERFORMANCE CATEGORY | NAIL TYPE AND SIZE                              | FASTENER <sup>a</sup> SPACING ALONG EDGES AND INTERMEDIATE SUPPORTS |                 |
|--------------------------------------|---------------------------|------------------------------------|---|---|-----------------|
|                                      |                           |                                    |   | Galvanized Steel  | Stainless Steel |
| 30                                   | 24/0                      | 3/8                                | 6d box<br>(2 × 0.099 × 0.266 head diameter)     | 6 <sup>f</sup>  | 4               |
| 40                                   | 24/0                      | 3/8                                | 6d box<br>(2 × 0.099 × 0.266 head diameter)     | 6   | 4               |
| 50                                   | 24/0                      | 3/8                                | 6d box<br>(2 × 0.099 × 0.266 head diameter)     | 4   | 4               |
|                                      |                           |                                    | 8d common<br>(2½ × 0.131 × 0.281 head diameter) | 6   | 6               |
| 60                                   | 24/0                      | 3/8                                | 6d box<br>(2 × 0.099 × 0.266 head diameter)     | 4   | 3               |
|                                      |                           |                                    | 8d common<br>(2½ × 0.131 × 0.281 head diameter) | 6   | 4               |
| 70                                   | 24/16                     | 7/16                               | 8d common<br>(2½ × 0.131 × 0.281 head diameter) | 4   | 4               |
|                                      |                           |                                    | 10d box<br>(3 × 0.128 × 0.312 head diameter)    | 6   | 4               |
| 80                                   | 24/16                     | 7/16                               | 8d common<br>(2½ × 0.131 × 0.281 head diameter) | 4   | 4               |
|                                      |                           |                                    | 10d box<br>(3 × 0.128 × 0.312 head diameter)    | 6   | 4               |
| 90                                   | 32/16                     | 15/32                              | 8d common<br>(2½ × 0.131 × 0.281 head diameter) | 4   | 3               |
|                                      |                           |                                    | 10d box<br>(3 × 0.128 × 0.312 head diameter)    | 6   | 4               |

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

- a. Fasteners shall comply with Sections R703.3.2 and R703.3.3.
- b. Maximum spacing of exterior soffit framing members shall not exceed 24 inches.
- c. Wood structural panels shall be of an exterior exposure grade.
- d. Wood structural panels shall be installed with strength axis perpendicular to supports with not fewer than two continuous spans.
- e. Wood structural panels shall be attached to exterior soffit framing members with specific gravity of at least 0.42. 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.
- f. Spacing at intermediate supports shall be not greater than 12 inches on center.

**Reason:** Over the past few cycles the treatment of exterior wall coverings and soffits has become separated and addressed in different sections of the code. R704 is now an entire section of the code dedicated to soffit and now fascia. The construction methods for these parts of the exterior of the structure are unique and prior to the last few cycles were not addressed at all. This has been a noticeable area in need of requirements based

on wind performance failures due to lack of direction. With this change in definitions and resulting other areas of the code, it will help builders, installers and building officials better understand how R704 applies and how R703 applies. These definitions create clearer understanding of application.

**Cost Impact:** The code change proposal will increase the cost of construction

This code change will bring a necessary broadening of installation requirement for non-traditionally considered soffit applications. But without the change there is limited guidance on how this should be handled and regulated.

RB236-22

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## **Public Hearing Results**

### **Committee Action:**

**As Modified**

### **Committee Modification:**

**EXTERIOR SOFFIT.** A material or assembly of materials applied on the underside of exterior overhangs, ~~decks and floors, porches, and attached~~ carport ceilings.

**[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, architectural trim and embellishments such as cornices.

**R704.2.4 Wood structural ~~panel exterior panel~~ soffit.** The minimum nominal thickness for wood ~~exterior~~ structural panel exterior soffits shall be 1/2 inch (9.5 mm) and shall be fastened to framing or nailing strips with 2-inch by 0.099-inch (51 mm by 2.5 mm) nails. Fasteners shall be spaced not less than 6 inches (152 mm) on center at panel edges and 12 inches (305 mm) on center at intermediate supports.

**Committee Reason:** The committee determined that the modifications clarify exterior soffit and corrects the wood structural panel exterior soffit. The proposal as modified addresses requirements to avoid wind performance failures due to lack of directions. The proposal clarifies how Section R704 applies and how Section R703 applies (Vote: 6-3).

RB236-22

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## **Individual Consideration Agenda**

### **Public Comment 2:**

IRC: SECTION 202

**Proponents:** Matthew Dobson, representing Vinyl Siding Institute (mdobson@vinylsiding.org) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

**EXTERIOR SOFFIT.** A material or assembly of materials applied on the underside of exterior overhangs, and attached carport and porch ceilings.

**Commenter's Reason:** The change as modified is a great step forward by splitting exterior wall covering and exterior soffit. This small modification is important as it includes ceiling soffits which should be included in this definition so it's clear they are included the provisions of the code.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

This simply adds in the provision to make sure it's clear porches ceilings are included in the code provisions without affecting the cost of construction.

Public Comment# 3122

## **RB239-22**

### **Proposed Change as Submitted**

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org)

### **2021 International Residential Code**

**Revise as follows:**

**TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE FOR WOOD STRUCTURAL PANEL SOFFIT <sup>b, c, d, e</sup>**

| MAXIMUM DESIGN PRESSURE (+ or - psf) | MINIMUM PANEL SPAN RATING | MINIMUM PANEL PERFORMANCE CATEGORY | NAIL TYPE AND SIZE   | FASTENER <sup>a</sup> SPACING <sup>e</sup> ALONG EDGES AND INTERMEDIATE SUPPORTS, <u>inches</u> |                 |
|--------------------------------------|---------------------------|------------------------------------|--|---|-----------------|
|                                      |                           |                                    |  | Galvanized Steel  | Stainless Steel |
| 30                                   | 24/0                      | 3/8                                | 6d box<br>(2 × 0.099 × 0.266 head diameter)                                | 6 <sup>f</sup>  | 4               |
| 40                                   | 24/0                      | 3/8                                | 6d box<br>(2 × 0.099 × 0.266 head diameter)                                | 6   | 4               |
| 50                                   | 24/0                      | 3/8                                | 6d box<br>(2 × 0.099 × 0.266 head diameter)                                | 4   | 4               |
|                                      |                           |                                    | 8d common<br>(2 <sup>1</sup> / <sub>2</sub> × 0.131 × 0.281 head diameter) | 6   | 6               |
| 60                                   | 24/0                      | 3/8                                | 6d box<br>(2 × 0.099 × 0.266 head diameter)                                | 4   | 3               |
|                                      |                           |                                    | 8d common<br>(2 <sup>1</sup> / <sub>2</sub> × 0.131 × 0.281 head diameter) | 6   | 4               |
| 70                                   | 24/16                     | 7/16                               | 8d common<br>(2 <sup>1</sup> / <sub>2</sub> × 0.131 × 0.281 head diameter) | 4   | 4               |
|                                      |                           |                                    | 10d box<br>(3 × 0.128 × 0.312 head diameter)                               | 6   | 4               |
| 80                                   | 24/16                     | 7/16                               | 8d common<br>(2 <sup>1</sup> / <sub>2</sub> × 0.131 × 0.281 head diameter) | 4   | 4               |
|                                      |                           |                                    | 10d box<br>(3 × 0.128 × 0.312 head diameter)                               | 6   | 4               |
| 90                                   | 32/16                     | 15/32                              | 8d common<br>(2 <sup>1</sup> / <sub>2</sub> × 0.131 × 0.281 head diameter) | 4   | 3               |
|                                      |                           |                                    | 10d box<br>(3 × 0.128 × 0.312 head diameter)                               | 6   | 4               |

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

- a. Fasteners shall comply with Sections R703.3.2 and R703.3.3.
- b. Maximum spacing of soffit framing members shall not exceed 24 inches.
- c. Wood structural panels shall be of an exterior exposure grade.
- d. Wood structural panels shall be installed with strength axis perpendicular to supports with not fewer than two continuous spans.

- e. ~~Wood structural panels shall be attached to soffit framing members with specific gravity of at least 0.42. Where the specific gravity of the wood species used for 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" x 0.099" x 0.266" head) nails replace 6d box nails and RSRS-03 (2-1/2" x 0.131" x 0.281" head) nails replace 8d common nails or 10d box nails or alternative fastening shall be designed in accordance with AWC NDS. RSRS is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667. Framing members shall be minimum 2 x 3 nominal with the larger dimension in the cross section aligning with the length of fasteners to provide sufficient embedment depths.~~
- f. Spacing at intermediate supports shall be not greater than 12 inches on center.

**Reason:** The change addresses the use of soffit framing of wood species having lower specific gravity than the value of 0.42 associated with prescribed spacing of nails. The expanded footnote e provides equivalent performing prescriptive fastening options for cases where specific gravity is as low as 0.35 in accordance with AWC NDS. Withdrawal design values are provided in the AWC NDS for the RSRS nail (a standard ring shank nail) and the RSRS nail sizes prescribed in the footnote align with proposed RSRS nail options for roof sheathing fastening. An option for design of alternative fastening is also provided.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This change provides prescriptive fastening options for soffit attachment to wood species with lower specific gravity than that existing 0.42 baseline for the tabulated requirements.

RB239-22

## **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

**TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE FOR WOOD STRUCTURAL PANEL SOFFIT** <sup>b, c, d, e</sup>

Portions of table and footnotes not shown remain unchanged.

e. ~~Wood structural panels shall be attached to soffit framing members with specific gravity of at least 0.35. Where the specific gravity of the wood species used for 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" x 0.099" x 0.266" head) nails replace 6d box nails and RSRS-03 (2-1/2" x 0.131" x 0.281" head) nails replace 8d common nails or 10d box nails or alternative fastening shall be designed in accordance with AWC NDS. RSRS is a Roof Sheathing Ring Shank nail meeting the specifications in ASTM F1667. Framing members shall be minimum 2 x 3 nominal with the larger dimension in the cross section aligning with the length of fasteners to provide sufficient embedment depths.~~

**Committee Reason:** The committee concluded that the modification provides necessary clarity and helps enforce the added provision. The committee decided that the proposal, as modified, provides requirements for soffit framing of wood species having lower specific gravity than the value of 0.42 associated with the prescribed spacing of nails (Vote: 10-0).

RB239-22

## **Individual Consideration Agenda**

**Public Comment 1:**

**IRC:** TABLE R704.3.4

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org) requests As Modified by Public Comment

**Further modify as follows:**

**2021 International Residential Code**

**TABLE R704.3.4 PRESCRIPTIVE ALTERNATIVE FOR WOOD STRUCTURAL PANEL SOFFIT <sup>b, c, d, e</sup>**

Portions of table not shown remain unchanged.

| MAXIMUM DESIGN PRESSURE (+ or - psf) | MINIMUM PANEL SPAN RATING | MINIMUM PANEL PERFORMANCE CATEGORY | NAIL TYPE AND SIZE | FASTENER <sup>a</sup> SPACING <sup>e</sup> ALONG EDGES AND INTERMEDIATE SUPPORTS, inches |                 |
|--------------------------------------|---------------------------|------------------------------------|--------------------|--|-----------------|
|                                      |                           |                                    |                    | Galvanized Steel   | Stainless Steel |

For SI: 1 inch = 25.4 mm, 1 pound per square foot = 0.0479 kPa.

- e. ~~Fastener spacing applies where wood~~ ~~Wood structural panels shall be attached to soffit framing members with specific gravity of at least 0.35 is 0.42 or larger.~~ Where the specific gravity of the wood species used for 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" x 0.099" x 0.266" head) nails replace 6d box nails and RSRS-03 (2-1/2" x 0.131" x 0.281" 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 x 3 nominal with the larger dimension in the cross section aligning with the length of fasteners to provide sufficient embedment depths.

**Commenter's Reason:** The change proposal as well as the public comment addresses the use of soffit framing having lower specific gravity than 0.42 associated with prescribed spacing of nails. The proposed public comment modifications to the Approved as Modified language from the committee action hearings aims to revise the first sentence of the footnote so that it describes the specific gravity basis of the prescribed nailing (i.e., specific gravity equal to 0.42). The remainder of the footnote describes prescriptive alternative fastening options for low specific gravity soffit framing in more simple terms without technical change.

For reference, the four major lumber species/species combinations for which prescriptive span tables are provided in the IRC and their assigned specific gravity per NDS are tabulated below (all have specific gravity of at least 0.42). A full listing of specific gravity for lumber species/species combinations is available in the National Design Specification (NDS) for Wood Construction and its Supplement.

**Lumber species/species combination and specific gravity (G)**

Southern pine (G=0.55)  
Douglas fir-larch (G=0.50)  
Hem-fir (G=0.43)  
Spruce-pine-fir (G=0.42)

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

There is no cost increase associated with the reorganization of the soffit fastening footnote in this public comment or with providing a prescriptive fastening option for low specific gravity framing in the As Modified version of this change proposal.

Public Comment# 3154



## **Proposed Change as Submitted**

**Proponents:** Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

### **2021 International Residential Code**

**Revise as follows:**

**R802.1.5 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~~ 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:**

**R802.1.5.1 Alternate fire testing.** A wood product impregnated with chemicals by a pressure process or other means during manufacture, which, when tested to ASTM E2768, has 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, shall also be considered fire-retardant-treated wood.

**Add new standard(s) as follows:**

## **ASTM**

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

E2768-11 (2018)

Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)

**Reason:** ASTM E2768 was developed specifically intended for code use. It is a standardized version of ASTM E84 with the extension from 10 minutes to 30 minutes (meaning an additional 20 minutes) and it measures exactly what the extended ASTM E84 does, namely flame spread index and flame front progression beyond the centerline of the burners. This standard is already included in the IWUIC and the language proposed is consistent with the IWUIC language.

The change to the existing section is for language consistency (the exact same language is being proposed in the IBC). The wording of "In addition" as well as "additionally" is redundant.

Note that this change adds a new section without deleting any existing section. Thus, sections 802.1.5.1 through 802.1.5.10 will have to be renumbered as 802.1.5.2 through 802.1.5.11.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This is simple clarification: ASTM E2768 is the same as the extended ASTM E84 test.

**Staff Analysis:** ASTM E2768-11(2018), Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test), is already referenced in the IWUIC. This is simply a new occurrence of the reference in the I-Codes

RB242-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposal due to the fact that the proposal creates confusion for the code users. In addition, based on the testimony, it looks like the industry is not on board with this proposed change (Vote: 9-1).

RB242-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R802.1.5, R802.1.5.1

**Proponents:** Marcelo Hirschler, representing GBH International (mmh@gbhint.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R802.1.5 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. 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.

**R802.1.5.1 Alternate fire testing.** ~~Fire retardant treated wood is also any A wood product that, when~~ impregnated with chemicals by a pressure process or other means during manufacture, ~~shall have which, when tested in accordance with~~ to ASTM E2768, ~~has~~ 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, ~~shall also be considered fire-retardant-treated wood.~~

**Commenter's Reason:** Nowadays fire test labs asked to conduct a fire test for fire-retardant-treated wood (FRTW) will generate a report to ASTM E2768 and not to ASTM E84. Why? Because ASTM E84 is a 10 minute test and ASTM E2768 is a 30 minute test, which is exactly what the charging paragraph requires (a 10 minute test **plus** an additional 20 minutes). In fact, what the code requires is a test to ASTM E2768 and not to ASTM E84. ASTM E84 has no instructions for testing longer than 10 minutes other than stating that ASTM E2768 must be used. The following are the main reasons being presented as opposition to this proposal:

1. A product that is not wood could pretend to be FRTW. That is not true, since a product that meets this requirement must be a "**wood**" product impregnated with chemicals by a pressure process or other means during manufacture". Products not made of wood and not impregnated don't qualify!

2. ASTM E2768 is a test that applies only for "alternate ignition resistant building materials" in the WUI are and not for FRTW. That is not true, since ASTM E2768 was developed specifically for code use as a standardized version of ASTM E84 with the test period extended from 10 minutes to 30 minutes. ASTM E84 does not measure anything after 10 minutes and says in the scope that for 30 minute tests you must go to ASTM E2768.

3. Introducing ASTM E2768 into the code could bring confusion. Not true since the confusion comes when a code official sees a test report to ASTM E2768 (and not to ASTM E84) and then has to figure out that the report addresses what the code requires. Adding this language eliminates that confusion.

The revised language mirrors exactly the existing language. This language was accepted by the IBC Structural committee.

Note the language in NFPA 703 (Standard for Fire-Retardant-Treated Wood and Fire-Retardant Coatings for Building Materials) that states: "ASTM E84, *Standard Test Method for Surface Burning Characteristics of Building Materials*, and UL 723, *Test for Surface Burning Characteristics of Building Materials*, are 10-minute tests, not 30-minute tests. The scope of ASTM E84 states that materials required to meet an extended 30-minute duration test are to be tested in accordance with ASTM E2768, *Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials (30 min Tunnel Test)*. There are no other instructions in ASTM E84 or UL 723 for conducting a test for longer than 10 minutes."

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This PC is consistent with the intent of the original proposal. The added language in this PC is basically editorial and consistent with typical test reports for FRTW without affecting the construction cost.

Public Comment# 3060

### **Public Comment 2:**

**Proponents:** Josh Roth, representing Arxada (joshua.roth@lonza.com) requests Disapprove

**Commenter's Reason:** Uphold the committees decision to not add more language that can cause confusion. Industry is not on board with making this adjustment. If it's not broke dont fix it.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. No effect.

**Public Comment 3:**

**Proponents:** Christopher Athari, representing Hoover Treated Wood Products (cathari@frtw.com); Mike Eckhoff, representing Hoover Treated Wood Products, Inc. (meckhoff@frtw.com) requests Disapprove

**Commenter's Reason:** The committee's decision should be upheld. Industry spoke with one voice at the hearing that the current listed standard in RB802.1.5 is the correct one. Overturning the committee will cause confusion as different standards will be referenced within the family of codes.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.

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Public Comment# 3320**Public Comment 4:**

**Proponents:** Travis Hixon, representing Koppers Performance Chemicals (hixontd@koppers.com) requests Disapprove

**Commenter's Reason:** I recommend the committee uphold the decision to disapprove the proposed changes by the proponent. ASTM E84 (extended) is the correct test method for the evaluation of Fire Retardant Treated Wood. Changing the testing requirement to ASTM 2768 will introduce unneeded confusion for users of the building code. Testing and evaluation of FRTW in accordance with ASTM E84 is available at every major test lab in the United States and is the method by which all major brands of FRTW are evaluated. The Fire Retardant Treated Wood industry is in consensus concerning this matter.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.

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Public Comment# 3469

## **Proposed Change as Submitted**

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

### **2021 International Residential Code**

**Revise as follows:**

**R902.1 Roof covering materials.** Roofs shall be covered with materials as set forth in Sections R904 and 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 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. ~~Class A, B and C roofing required by this section to be listed shall be tested in accordance with ASTM E108 or UL 790.~~

**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 decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.

**Reason:** Changing "roofing" to "roof assemblies" in Section R902.1 is important to recognize that roof assemblies are classified, not "roofing." The additional changes create a logical progression of thought that establishes when fire classification is required, what tests are to be done when fire classification is necessary, and provisions for listing when that additional step is appropriate.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

This proposal corrects language and restates and reorders existing provisions to reduce opportunities for confusion. Since there are no technical changes introduced, no change in cost of construction is anticipated if the proposal is approved.

RB251-22

## **Public Hearing Results**

**Committee Action:**

**As Submitted**

**Committee Reason:** The committee determined that the proposal corrects that the roof assembly should be listed and identified as to Class by an approved testing agency. The committee also agreed with replacing of "roofing" with "roof assemblies" in the roof covering materials section's charging statement to emphasize that roof assemblies need to be classified (Vote: 6-4).

RB251-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R902.1

**Proponents:** Marcelo Hirschler, representing GBH International (mmh@gbhint.com); Aaron Phillips, representing Asphalt Roofing Manufacturers Association (ARMA) (aphillips@asphaltroofing.org) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R902.1 Roof ~~assemblies covering materials~~.** Roofs shall be covered with materials as set forth in Sections R904 and 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 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 by a jurisdiction, 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 decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.

**Commenter's Reason: HIRSCHLER:** The revisions recommended by the public comment are basic clarifications. Section R904 addresses materials (always required to be met) and section R905 addresses roof coverings. It is important to stress that the requirement for listing must come from a jurisdiction.

**PHILLIPS:** RB251 is one of three proposals that addresses Section R902.1, the other two being RB252 and RB253. In response to input from the Committee on these three proposals, this comment makes two clarifications. First, it revises the section title to align with the remainder of the section and to correctly indicate it is roof assemblies rather than roof coverings that are classified. Second, it clarifies that listing is triggered where required by the jurisdiction. In contrast to RB252, this proposal includes a requirement that, when listed, the specific class (i.e., A, B, or C) is to be identified by an approved testing agency. RB251 offers a simpler approach to improve Section R902.1 that does not incorporate the more significant reorganization offered by RB253.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

**HIRSCHLER:** This PC does not change the scope of the original proposal. This PC provides additional clarification to the original proposal without affecting the cost of construction.

**PHILLIPS:** The original proposal is not expected to affect cost of construction and the additional changes offered in this public comment do not affect technical requirements and therefore do not increase or decrease cost of construction.

**Staff note:** RB251-22, RB252-22 and RB253-22 address Section R902.1 (RB253-22 rennumbers the section to be R903.1) in differing or conflicting ways. The voting membership is encouraged to make their intentions clear.

Public Comment# 3304

## **Public Comment 2:**

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests Disapprove

**Commenter's Reason:** While the proposal addresses the problem with the use of the term "roofing" instead of the code defined term of "roof assemblies", There are still serious issues and confusion as to:

- 1) What triggers the requirement for listing of the roof assembly? This further confuses the language and the intent. Listing provides the means for the building official to determine compliance with the requirements for achieving a fire classification rating.
- 2) This proposal does not address problem that the IRC is missing how fire-retardant-treated wood roof coverings are to be additionally in accordance with ASTM D2898.

This PC 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 2020 and 2021 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/buildingcode-action-committee-bcac/>.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.

**Staff note:** RB251-22, RB252-22 and RB253-22 address Section R902.1 (RB253-22 rennumbers the section to be R903.1) in differing or conflicting

ways. The voting membership is encouraged to make their intentions clear.

Public Comment# 3219

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### **Public Comment 3:**

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org); Jason Smart, representing American Wood Council (jsmart@awc.org) requests Disapprove

**Commenter's Reason:** The IRC defines *roof assembly* as a system designed to provide not only weather protection, but also resistance to design loads. Conversely, a *roof coving* may consist of a system of multiple components, but it does not necessarily constitute the entire "roof assembly," which always includes the structural elements of the roof that carry design loads.

ASTM E108, which is the standard used to classify *roof coverings* as either Class A, B or C, does not use the term *roof assembly*. The structural components of a roof assembly, such as framing members, are not required to be included within the system tested under ASTM E108. Roof coverings classified under ASTM E108 should not be referred to as "roof assemblies," except in cases where the tested system also includes the structural members of the roof.

Misapplication of the term *roof assembly* in the context of an ASTM E108-classified roof covering can create unnecessary confusion in demonstrating compliance with structural design provisions, as well as for roof assemblies that are required to achieve a fire-resistance rating based on an ASTM E119 exposure.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.

**Staff note:** RB251-22, RB252-22 and RB253-22 address Section R902.1 (RB253-22 rennumbers the section to be R903.1) in differing or conflicting ways. The voting membership is encouraged to make their intentions clear.

Public Comment# 3126

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## **Proposed Change as Submitted**

**Proponents:** Marcelo Hirschler, representing GBH International (mmh@gbhint.com)

### **2021 International Residential Code**

**Revise as follows:**

**R902.1 Roof ~~covering materials~~ assemblies.** Roofs shall be covered with materials as set forth in ~~Section~~ ~~Sections~~ R904 ~~and or with roof coverings as set forth in Section~~ R905. Class A, B or C ~~roofing~~ ~~roof assemblies~~ 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*. ~~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.~~ ~~Class A, B and C roofing required by this section to be listed shall be tested in accordance with ASTM E108 or UL 790.~~

**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 decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.

**Reason:** This proposal clarifies the section and makes the terminology consistent with chapter 2 definitions, with the subsections (all of which describe roof assemblies) and with sections 904 and 905.

Chapter 2 defines "roof assembly" as "A system designed to provide weather protection and resistance to design loads. The system consists of a roof covering and roof deck or a single component serving as both the roof covering and the roof deck. A roof assembly can include an underlayment, thermal barrier, ignition barrier, insulation or a vapor retarder. For the definition applicable in Chapter 11, see Section N1101.6." Chapter 2 does not define "roofing" or "roof covering material" but it defines "roof covering" as "The covering applied to the roof deck for weather resistance, fire classification or appearance."

The section contains the words "roof covering materials" and "roofing" as well as "roof assembly" (or actually its plural, roof assemblies).

The fire test in ASTM E108 or UL 790 must be conducted on the "roof assembly", meaning that it must be conducted on the entire roof covering system and not on the individual roofing material or roof covering (the chapter on definitions clarifies that "roof covering system" is the same as "roof assembly").

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. This proposal simply corrects the terminology for consistency.

RB252-22

## **Public Hearing Results**

**Committee Action:**

**As Submitted**

**Committee Reason:** The committee determined that the proposal clarifies the section and makes the terminology consistent with Chapter 2 definitions for roof assemblies. The proposal does include roof coverings in the roof assembly definitions (Vote: 8-2)..

RB252-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Marcelo Hirschler, representing GBH International (mmh@gbhint.com) requests As Modified by Public Comment

**Modify as follows:**

## 2021 International Residential Code

**R902.1 Roof assemblies.** Roofs 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 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 by a jurisdiction, 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 decks.
3. Class A *roof assemblies* include minimum 16 ounces per square foot copper sheets installed over combustible decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible decks.

**Commenter's Reason:** The public comment clarifies that any material in a roof assembly must meet the requirements of section R904, which would appear to be optional with the language in the proposal as approved. It also clarifies that the testing has to be by an approved testing agency, for consistency.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This PC does not change the scope of the original proposal. This PC provides additional clarification to the original proposal without affecting the cost of construction.

**Staff note:** RB251-22, RB252-22 and RB253-22 address Section R902.1 (RB253-22 rennumbers the section to be R903.1) in differing or conflicting ways. The voting membership is encouraged to make their intentions clear.

Public Comment# 3301

## Public Comment 2:

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests Disapprove

**Commenter's Reason:** While the proposal addresses the problem with the use of the term "roofing" instead of the code defined term of "roof assemblies", There are still serious issues and confusion as to:

- 1) What triggers the requirement for listing of the roof assembly. This further confuses the language and the intent. Listing provides the means for the building official to determine compliance with the requirements for achieving a fire classification rating.
- 2) This proposal does not address problem that the IRC is missing how fire-retardant-treated wood roof coverings are to be additionally in accordance with ASTM D2898.
- 3) The covering of roofs needs to comply with both R904 and R905. By changing the word "and" to "or" in the first sentence completely alters the intent and applicability of those requirements. R904 provides general requirements that are applicable to all roofs.

This PC 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 2020 and 2021 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/buildingcode-action-committee-bcac/>.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. No change to code.



**Staff note:** RB251-22, RB252-22 and RB253-22 address Section R902.1 (RB253-22 rennumbers the section to be R903.1) in differing or conflicting ways. The voting membership is encouraged to make their intentions clear.

Public Comment# 3221

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### **Public Comment 3:**

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org); Jason Smart, representing American Wood Council (jsmart@awc.org) requests Disapprove

**Commenter's Reason:** The IRC defines *roof assembly* as a system designed to provide not only weather protection, but also resistance to design loads. Conversely, a *roof coving* may consist of a system of multiple components, but it does not necessarily constitute the entire "roof assembly," which always includes the structural elements of the roof that carry design loads.

ASTM E108, which is the standard used to classify *roof coverings* as either Class A, B or C, does not use the term *roof assembly*. The structural components of a roof assembly, such as framing members, are not required to be included within the system tested under ASTM E108. Roof coverings classified under ASTM E108 should not be referred to as "roof assemblies," except in cases where the tested system also includes the structural members of the roof.

Misapplication of the term *roof assembly* in the context of an ASTM E108-classified roof covering can create unnecessary confusion in demonstrating compliance with structural design provisions, as well as for roof assemblies that are required to achieve a fire-resistance rating based on an ASTM E119 exposure.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
No change to code.

**Staff note:** RB251-22, RB252-22 and RB253-22 address Section R902.1 (RB253-22 rennumbers the section to be R903.1) in differing or conflicting ways. The voting membership is encouraged to make their intentions clear.

Public Comment# 3139

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## Proposed Change as Submitted

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org)

### 2021 International Residential Code

#### SECTION R901

##### GENERAL

**R901.1 Scope.** The provisions of this chapter shall govern the design, materials, construction and quality of *roof assemblies*.

**Add new text as follows:**

**R901.2 Roof covering.** Roofs shall be covered with materials as set forth in Sections R904 and R905.

**Revise as follows:**

#### ~~SECTION R903- R902~~

##### WEATHER PROTECTION

**~~R903.1~~ R902.1 General.** *Roof decks* shall be covered with *approved* roof coverings secured to the building or structure in accordance with the provisions of this chapter. *Roof assemblies* shall be designed and installed in accordance with this code and the *approved* manufacturer's instructions such that the *roof assembly* shall serve to protect the building or structure.

**~~R903.2~~ R902.2 Flashing.** Flashings shall be installed 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.

**~~R903.2.1~~ R902.2.1 Locations.** Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings. A flashing shall be installed to divert the water away from where the eave of a sloped roof intersects a vertical sidewall. Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet).

**~~R903.2.2~~ R902.2.2 Crickets and saddles.** A cricket or saddle shall be installed on the ridge side of any chimney or penetration more than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

**Exception:** *Unit skylights* installed in accordance with Section R308.6 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle.

**~~R903.3~~ R902.3 Coping.** Parapet walls shall be properly coped with noncombustible, weatherproof materials of a width not less than the thickness of the parapet wall.

**~~R903.4~~ R902.4 Roof drainage.** Unless roofs are sloped to drain over roof edges, roof drains shall be installed at each low point of the roof.

**~~R903.4.1~~ R902.4.1 Secondary (emergency overflow) drains or scuppers.** Where roof drains are required, secondary emergency overflow roof drains or *scuppers* shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason. Overflow drains having the same size as the roof drains shall be installed with the inlet flow line located 2 inches (51 mm) above the low point of the roof, or overflow *scuppers* having three times the size of the roof drains and having a minimum opening height of 4 inches (102 mm) shall be installed in the adjacent parapet walls with the inlet flow located 2 inches (51 mm) above the low point of the roof served. The installation and sizing of overflow drains, leaders and conductors shall comply with Sections 1106 and 1108 of the International Plumbing Code, as applicable.

Overflow drains shall discharge to an *approved* location and shall not be connected to roof drain lines.

#### ~~SECTION R902- R903~~

##### FIRE CLASSIFICATION

**~~R902.1~~ R903.1 Roof covering materials- General.** ~~Roofs shall be covered with materials as set forth in Sections R904 and R905. Fire classification of roof assemblies shall be in accordance with Section R903. Class A, B or C~~ *roof assemblies and roof coverings* ~~roofing~~ 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*. Class A, B and C *roof assemblies and roof coverings* ~~roofing~~ required to be listed by this section ~~to be listed~~ shall be tested in accordance with ASTM E108 or UL 790. In addition, fire-retardant-treated wood roof coverings shall be tested in accordance with ASTM D2898.

**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 decks.~~
- 3- ~~Class A roof assemblies include minimum 16 ounces per square foot copper sheets installed over combustible decks.~~
- 4- ~~Class A roof assemblies include slate installed over underlayment over combustible decks.~~

Add new text as follows:

**R903.2 Class A roof assemblies.** Class A roof assemblies are those that are effective against severe fire test exposure. Class A roof assemblies and roof coverings shall be listed and identified as Class A by an approved testing agency. Class A roof assemblies shall be permitted for use in buildings or structures of all types of construction.

**Exceptions:**

1. Class A roof assemblies include those with coverings of brick, masonry or an exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a roof deck on noncombustible framing.
3. Class A roof assemblies include minimum 16 ounce per square foot (0.0416 kg/m<sup>2</sup>) copper sheets installed over combustible decks.
4. Class A roof assemblies include slate installed over ASTM D226, Type II underlayment over combustible decks or ASTM D4869, Type IV.

**R903.3 Class B roof assemblies.** Class B roof assemblies are those that are effective against moderate fire-test exposure. Class B roof assemblies and roof coverings shall be listed and identified as Class B by an approved testing agency.

**R903.4 Class C roof assemblies.**

Class C roof assemblies are those that are effective against light fire-test exposure. Class C roof assemblies and roof coverings shall be listed and identified as Class C by an approved testing agency.

Revise as follows:

**~~R902.2- R903.5~~ Fire-retardant-treated 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 AWPAC1. 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 ~~R902.4- R903.1~~, the treating company and the quality control agency.

**~~R902.3- R903.6~~ Building-integrated photovoltaic (BIPV) product .** *Building-integrated photovoltaic (BIPV) products* 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 shall be installed where required in accordance with Section R903.1, the edge of the roof is less than 3 feet (914 mm) from a lot line.

**~~R902.4- R903.7~~ Rooftop-mounted photovoltaic (PV) panel systems.** Rooftop-mounted *photovoltaic panel systems* installed on or above the roof covering shall be tested, *listed* and identified with a fire classification in accordance with UL 2703. Systems tested, listed and identified with a fire classification shall be installed in accordance with the manufacturer's installation instructions and their listing. Class A, B or C rooftop-mounted photovoltaic panel systems and modules shall be installed where required in accordance with Section R903.1 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.

**R324.4.2 Fire classification.** Rooftop-mounted *photovoltaic panel systems* shall have the same fire classification as the *roof assembly* required in Section ~~R902- R903~~.

**R324.5.2 Fire classification.** *Building-integrated photovoltaic systems* shall have a fire classification in accordance with Section ~~R902.3- R903.3~~.

**R703.6.3 Attachment.** Wood shakes or shingles shall be installed according to this chapter and the manufacturer's instructions. Each shake or shingle shall be held in place by two stainless steel Type 304, Type 316 or hot-dipped zinc-coated galvanized corrosion-resistant box nails in accordance with Table R703.6.3(1) or R703.6.3(2). The hot-dipped zinc-coated galvanizing shall be in compliance with ASTM A153, 1.0 ounce per square foot. Alternatively, 16-gage stainless steel Type 304 or Type 316 staples with crown widths <sup>7</sup>/<sub>16</sub> inch (11 mm) minimum, <sup>3</sup>/<sub>4</sub> inch (19 mm) maximum, shall be used and the crown of the staple shall be placed parallel with the butt of the shake or the shingle. In single-course application, the fasteners shall be concealed by the course above and shall be driven approximately 1 inch (25 mm) above the butt line of the succeeding course and <sup>3</sup>/<sub>4</sub> inch (19 mm) from the edge. In double-course applications, the exposed shake or shingle shall be face-nailed with two fasteners, driven approximately 2 inches (51 mm) above the butt line and <sup>3</sup>/<sub>4</sub> inch (19 mm) from each edge. Fasteners installed within 15 miles (24 km) of saltwater coastal areas shall be stainless steel Type 316. Fasteners for fire-retardant-treated shakes or shingles in accordance with Section ~~R902 R903~~ or pressure-impregnated-preservative-treated shakes or shingles in accordance with AWPAC U1 shall be stainless steel Type 316. The fasteners shall penetrate the sheathing or furring strips by not less than <sup>1</sup>/<sub>2</sub> inch (13 mm) and shall not be overdriven. Fasteners for untreated (natural) and treated products shall comply with ASTM F1667.

**R806.4 Installation and weather protection.** Ventilators shall be installed in accordance with manufacturer's instructions. Installation of ventilators in roof systems shall be in accordance with the requirements of Section ~~R903~~ R902 . Installation of ventilators in wall systems shall be in accordance with the requirements of Section R703.1.

**R905.7.5 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 1½ 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 ¼ inch to ⅜ inch (6.4 mm to 9.5 mm). Weather exposure for wood shingles shall not exceed those set in Table R905.7.5(1). Fasteners for untreated (naturally durable) wood shingles shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304 or 316 or hot-dipped galvanized with a coating weight of ASTM A153 Class D (1.0 oz/ft²). Alternatively, two 16-gage stainless steel Type 304 or 316 staples with crown widths 7/16 inch (11.1 mm) minimum, ¾ 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~~ R903 or pressure-impregnated-preservative-treated shingles of naturally durable wood in accordance with AWP A U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of ¾ inch (19.1 mm). For sheathing less than ¾ inch (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.

**R905.8.6 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 1½ inches (38 mm) between joints in adjacent courses. Spacing between shakes in the same course shall be ⅜ inch to ⅝ inch (9.5 mm to 15.9 mm) including tapersawn shakes. Weather exposures for wood shakes shall not exceed those set in Table R905.8.6. Fasteners for untreated (naturally durable) wood shakes shall be box nails in accordance with Table R905.7.5(2). Nails shall be stainless steel Type 304, or Type 316 or hot-dipped with a coating weight of ASTM A153 Class D (1.0 oz/ft²). Alternatively, two 16-gage Type 304 or Type 316 stainless steel staples, with crown widths 7/16 inch (11.1 mm) minimum, ¾ 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~~ R903) shakes or pressure-impregnated-preservative-treated shakes of *naturally durable wood* in accordance with AWP A U1 shall be stainless steel Type 316. Fasteners shall have a minimum penetration into the sheathing of ¾ inch (19.1 mm). Where the sheathing is less than ¾ 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.

**R908.1 General.** Materials and methods of application used for recovering or replacing an existing roof covering shall comply with the requirements of Chapter 9.

**Exceptions:**

1. *Reroofing* shall not be required to meet the minimum design slope requirement of one-quarter unit vertical in 12 units horizontal (2-percent slope) in Section R905 for roofs that provide *positive roof drainage*.
2. For roofs that provide positive drainage, recovering or replacing an existing roof covering shall not require the secondary (emergency overflow) drains or *scuppers* of Section ~~R903.4.1~~ R902 .4.1 to be added to an existing roof.

**Reason:** Reason: This proposal is intended to provide consistency and clarification within Section R902 Fire Classification. Section R902.1 has been revised several times since the initial 2000 IRC, and Sections R902.3 on BIPV and R902.4 on rooftop PV added recently. This proposal includes the below elements:

1) The first sentence of R902.1 "Roofs shall be covered with materials as set forth in Sections R904 and R905" is relocated to a new subsection under R901 using the same text. This requirement applies to all roofs, not only ones where a fire classification is required. While the first sentence of R903.1 under Weather Protection similarly requires all roof decks to be provided with approved roof coverings, it was felt best to state right from the start that roof assemblies are expected to have roof coverings, and that material and installation requirements can be found in R904 and R905 respectively.

2) Since R902.1 is generic to all roof covering materials and specifies when and where Class A, B or C roofing is required, it is not necessary to restate in R902.3 and R902.4 where such classifications are required. The redundant requirements for where BIPV products or rooftop PV systems are required to be Class A, B or C are deleted and replaced with references to R902.1.

3) The proposal moves Section R902 behind Section R903 Weather Protection. In addition to the fact Section R903.1 requires roof decks be provided with a roof covering, this will provide consistency with IBC Chapter 15 where Section 1505 Fire Classification follows Section 1503 Weather Protection and Section 1504 Performance Requirements.

4) The proposed revisions in section R902.1 old (R903.1 new) within this Section are in alignment with IBC Section 1505.1, and the actions taken on S1-21 from Group A.

5) The IRC is missing how fire-retardant-treated wood roof coverings are to be tested. Therefore, a sentence have been added to section R902.1 old (R903.1 new) states "fire-retardant-treated wood roof coverings shall be tested in accordance with ASTM D2898."

6) The exception in section R902.1 old (R903.1 new) are not correct as exceptions to R902.1 old (R903.1 new). These are exceptions to the different fire classifications of A, B, and C. Furthermore, these are not aligned with the conditions for these exceptions in IBC Section 1505.2.

7) Class A, B, and C have been added as R903.2, R903.3 and R903.4. This would align more appropriately with IBC Sections 1505.2, 1505.3, and 1505.4.

8) In the new section R903.2, exception #4, "ASTM D4869, Type IV" have been added based on the approved S2-21.

9) In section (R902.4 old) (R903.7 new), "installed in accordance with the manufacturer's installation instructions and their listing." have been added. Aligns with the wording in IBC Section 1505.910) In section (R902.4 old) (R903.7 new), "modules" have been deleted. This clarifies what has the fire classification. PV modules do not have any fire classification. Only the rooftop mounted PV panel systems do. If modules were left in, it would be very confusing and inaccurate.

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 2020 and 2021 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 code change proposal will not increase or decrease the cost of construction

This proposal is intended to provide editorial clarification to the fire classification requirements for roof coverings. No technical changes are intended.

RB253-22

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## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee decided that there is some confusion regarding roof assembly vs. roof covering. Therefore, the committee advised the proponent to look into incorporating some of the modifications proposed, including Hirschler 4 and 5 (Vote: 7-3).

RB253-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R903.1

**Proponents:** Mike Nugent, representing Building Code Action Committee (bcac@iccsafe.org) requests As Modified by Public Comment

**Further modify as follows:**

### **2021 International Residential Code**

**R903.1 General.** Fire classification of roof assemblies shall be in accordance with Section R903. Class A, B or C roof assemblies ~~and roof coverings~~ 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*. Class A, B and C roof assemblies ~~and roof coverings~~ required to be listed by this section, shall be tested in accordance with ASTM E108 or UL 790. In addition, fire-retardant-treated wood roof coverings shall be tested in accordance with ASTM D2898.

**Commenter's Reason:** As noted in the original reason statement for this proposal, the intent of RB253-22 is "to provide consistency and clarification with Section R902 Fire Classification."

The clarifications needed are:

1. Relocating requirements for compliance with Sections R904 and R905 to the General requirements of the Chapter
2. Replacing “roofing” with the defined term “roof assemblies”
3. Identifying the Fire Classification is assigned to the roof assembly, as defined by code.
4. Identifying what Class A, B and C roofing is required by this section to be listed.
5. Requiring additional testing for fire-retardant-treated wood roof coverings that is missing from the IRC (but included in the IBC)
6. Clarifying the requirements for BIPV and rooftop-mounted PV panel systems to align properly with UL 7103 and UL 2703, respectively.

Although this proposal is comprehensive to clarify Section R902 Fire Classification for the code users, at the CAH, there were only two areas of discussion and confusion – what actually is assigned a fire classification (i.e. roof assemblies, roof coverings, or both) and what actually is intended to be listed. The BCAC addresses those two issues as below:

**First issue: What actually is assigned a fire classification (i.e. roof assemblies, roof coverings, or both)?**

This PC addresses this issue by removing the term “roof coverings” from the proposed Section R903.1 (Section R902.1 previously).

RB253-22 provides clarification for fire classification by utilizing the same wording used in Section 1505 of the International Building Code. What actually is assigned the fire classification of Class A, B, or C is the roof assembly, as tested in accordance with ASTM E108 or UL 790. The testing is performed on a roof assembly, as defined by the code.

**Second issue: What actually is intended to be listed?**

This issue is already addressed in the original proposal. Both the IBC and the IRC uses the same terminology (“required by this section to be listed”). In the IBC, there are three separate additional sections for Class A, B, and C, each of which clearly states that listing is required for each fire classification.

In addition, the four exceptions that appear in the existing Section R902.1 text are the same exceptions to IBC Section 1505.2 under Class A roof assemblies and are not required to be listed or tested to ASTM E108 or UL 790. Those exceptions have been correctly moved to the new Section R903.2 for Class A roof assemblies by this proposal.

The phrase “required by this section to be listed” infers that the intent of this section is to require the fire classification of roof assemblies to be listed, where fire classification is required, except for the four types of assemblies in the exceptions.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. There is no change to the original proposal intent. This PC addresses the issues brought up during CAH without affecting the construction cost.

**Staff note:** RB251-22, RB252-22 and RB253-22 address Section R902.1 (RB253-22 rennumbers the section to be R903.1) in differing or conflicting ways. The voting membership is encouraged to make their intentions clear.

Public Comment# 3222

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**Public Comment 2:**

**IRC: R901.2, R903.1, R903.2, R903.3, R903.4**

**Proponents:** Marcelo Hirschler, representing GBH International (mmh@gbhint.com) requests As Modified by Public Comment

**Modify as follows:**

**2021 International Residential Code**

**R901.2 Roof assemblies ~~covering~~.** Roofs shall be covered with materials as set forth in Sections R904 and with roof coverings as set forth in Section R905.

**R903.1 General.** Fire classification of roof assemblies shall be in accordance with Section R903. Class A, B or C roof assemblies ~~and roof coverings~~ 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*. ~~Where Class A, B and C roof assemblies and roof coverings are required, to be listed by this section they shall be tested in accordance with ASTM E108 or UL 790. Where required by a jurisdiction, the roof assembly shall be listed and identified as to Class by an approved testing agency.~~ In addition, fire-retardant-treated wood roof coverings shall be tested in accordance with ASTM D2898.

**R903.2 Class A roof assemblies.** Class A roof assemblies are those that are effective against severe fire test exposure. Class A roof assemblies and roof coverings shall be ~~listed and~~ identified as Class A by an approved testing agency. Class A roof assemblies shall be permitted for use in buildings or structures of all types of construction.

**Exceptions:**

1. Class A roof assemblies include those with coverings of brick, masonry or an exposed concrete roof deck.
2. Class A roof assemblies also include ferrous or copper shingles or sheets, metal sheets and shingles, clay or concrete roof tile or slate installed on noncombustible decks or ferrous, copper or metal sheets installed without a roof deck on noncombustible framing.
3. Class A roof assemblies include minimum 16 ounce per square foot (0.0416 kg/m<sup>2</sup>) copper sheets installed over combustible decks.
4. Class A roof assemblies include slate installed over ASTM D226, Type II underlayment over combustible decks or ASTM D4869, Type IV.

**R903.3 Class B roof assemblies.** Class B roof assemblies are those that are effective against moderate fire-test exposure. Class B roof assemblies and roof coverings shall be ~~listed and~~ identified as Class B by an approved testing agency.

**R903.4 Class C roof assemblies.** Class C roof assemblies are those that are effective against light fire-test exposure. Class C roof assemblies and roof coverings shall be ~~listed and~~ identified as Class C by an approved testing agency.

**Commenter's Reason:** This public comment modifies a good proposal principally by eliminating the requirement that roof assemblies be listed in the IRC (even though they are required to be listed in the IBC) and making the language in (new) section R903.1 consistent with the language in (old) section R902.1. Roof assemblies are not required to be listed in the 2021 IRC. It is uncommon for materials to be required to be listed in the IRC because that would typically increase cost of the materials (as admitted in testimony during the committee hearings). The two other changes included in this public comment are clarifications, as follows.

1. Fire classifications must be done on roof assemblies and not on roof coverings
2. All materials on roofs need to meet the requirements for materials in section R904 as well as the requirements for roof coverings in section R905.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The proposal itself would increase the cost of construction by adding the cost of listing roof assemblies. By eliminating that requirement, the proposal with this public comment is simply cleanup.

**Staff note:** RB251-22, RB252-22 and RB253-22 address Section R902.1 (RB253-22 rennumbers the section to be R903.1) in differing or conflicting ways. The voting membership is encouraged to make their intentions clear.

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Public Comment# 3306

## **Proposed Change as Submitted**

**Proponents:** Glenn Mathewson, representing Self (glenn@glenmathewson.com)

### **2021 International Residential Code**

**Revise as follows:**

**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 surfaces.
2. Where ~~roof decks surfaces~~ 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 surface.

**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 decking~~ 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  $\frac{5}{8}$ -inch (15.9 mm) Type X gypsum board is installed directly beneath the roof decking 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 R802.1.5 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.

**R902.1 Roof covering materials.** ~~Roofs~~ Roof decks shall be covered with materials as set forth in Sections R904 and R905. Class A, B or C roofing 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*. Class A, B and C roofing required by this section to be *listed* shall be tested in accordance with ASTM E108 or UL 790.

**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 copper sheets installed over combustible roof decks.
4. Class A *roof assemblies* include slate installed over *underlayment* over combustible roof decks.

**R905.1.1 Underlayment.** *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

**Exceptions:**

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the *underlayment* manufacturer's and roof covering manufacturer's instructions for the roof deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance with ASTM D1970, installed in accordance with the *manufacturer's installation instructions* for the roof deck material, shall be applied over all joints in the roof deck decking. An *approved underlayment* complying with Table R905.1.1(1) for the applicable roof covering



**R905.2.1 Sheathing requirements.** Asphalt shingles shall be fastened to wood structural panels or solid lumber sheathing, ~~solidly sheathed decks~~.

**R905.3.1 Deck Sheathing requirements.** Concrete and clay tile shall be installed ~~only over solid sheathing~~, wood structural panels or solid lumber sheathing.

**Exception:** Spaced lumber sheathing in accordance with Section R803.1 shall be permitted in *Seismic Design Categories* A, B and C.

**R905.3.2 Deck slope-Slope.** Clay and concrete roof tile shall be installed on roof slopes of  $2\frac{1}{2}$  units vertical in 12 units horizontal (25-percent slope) or greater. For roof slopes from  $2\frac{1}{2}$  units vertical in 12 units horizontal (25-percent slope) to 4 units vertical in 12 units horizontal (33-percent slope), double *underlayment* application is required in accordance with Section R905.3.3.

**R905.3.6 Fasteners.** Nails shall be corrosion resistant and not less than 11-gage [0.120 inch (3 mm)],  $\frac{5}{16}$ -inch (11 mm) head, and of sufficient length to penetrate the roof deck not less than  $\frac{3}{4}$  inch (19 mm) or through the thickness of the roof deck, whichever is less. Attaching wire for clay or concrete tile shall not be smaller than 0.083 inch (2 mm). Perimeter fastening areas include three tile courses but not less than 36 inches (914 mm) from either side of hips or ridges and edges of eaves and gable rakes.

**R905.4.1 Deck Sheathing requirements.** *Metal roof shingles* shall be ~~fastened to wood structural panels, solid lumber sheathing, or closely-fitted lumber sheathing applied to a solid or closely fitted deck~~, except where the roof covering is specifically designed to be applied to spaced lumber sheathing.

**R905.4.2 Deck slope-Slope.** *Metal roof shingles* shall not be installed on roof slopes below 3 units vertical in 12 units horizontal (25-percent slope).

**R905.4.4.1 Wind resistance of metal roof shingles.** *Metal roof shingles* ~~applied~~ fastened to wood structural panels, solid lumber sheathing or closely-fitted lumber sheathing a solid or closely fitted deck 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 Deck Sheathing requirements.** Mineral-surfaced roll roofing shall be fastened to wood structural panels or solid lumber sheathing, ~~solidly sheathed roofs~~.

**R905.5.2 Deck slope-Slope.** Mineral-surfaced roll roofing shall not be applied on roof slopes below 1 unit vertical in 12 units horizontal (8-percent slope).

**R905.6.1 Deck Sheathing requirements.** Slate shingles shall be fastened to wood structural panels or solid lumber sheathing, ~~solidly sheathed roofs~~.

**R905.6.2 Deck slope-Slope.** Slate shingles shall be used only on slopes of 4 units vertical in 12 units horizontal (33-percent slope) or greater.

**R905.7.1 Deck Sheathing requirements.** Wood shingles shall be ~~fastened to wood structural panels, solid lumber sheathing, or spaced lumber sheathing, installed on solid or spaced sheathing~~. Where spaced 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 to coincide with the placement of fasteners.

**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 is required on that portion of the roof deck requiring the application of an ice barrier.

**R905.7.2 Deck slope-Slope.** Wood shingles shall be installed on slopes of 3 units vertical in 12 units horizontal (25-percent slope) or greater.

**R905.8.1 Deck Sheathing requirements.** Wood shakes shall be ~~fastened to wood structural panels, solid lumber sheathing, or spaced lumber sheathing, used only on solid or spaced sheathing~~. Where spaced 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 to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced 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.

**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 is required on that portion of the roof deck requiring an ice barrier.

**R905.8.2 Deck slope-Slope.** Wood shakes shall only be used on slopes of 3 units vertical in 12 units horizontal (25-percent slope) or greater.

**R905.10.1 Deck Sheathing requirements.** *Metal roof panel* roof coverings shall be ~~fastened to wood structural panels, solid lumber sheathing, or applied to solid or spaced lumber sheathing~~, except where the roof covering is specifically designed to be applied to spaced supports.

**R905.16.1 Deck Sheathing requirements.** *Photovoltaic shingles* shall be fastened to wood structural panels, solid lumber sheathing, or closely-fitted lumber sheathing, ~~applied to a solid or closely-fitted deck~~, except where the roof covering is specifically designed to be applied over spaced lumber sheathing.

**R905.16.2 Deck slope-Slope.** *Photovoltaic shingles* shall be used only on roof slopes of 2 units vertical in 12 units horizontal (2:12) or greater.

**R905.17.1 Deck Sheathing requirements.** *BIPV roof panels* shall be fastened to wood structural panels, solid lumber sheathing, or closely-fitted lumber sheathing, ~~applied to a solid or closely-fitted deck~~, except where the *roof covering* is specifically designed to be applied over spaced lumber sheathing.

**R905.17.2 Deck slope- Slope.** *BIPV roof panels* shall be used only on roof slopes of 2 units vertical in 12 units horizontal (17-percent slope) or greater.

**Reason:** The purpose of this proposal is to use common terminology throughout section 905 in regard to roof decks and sheathing. The subsections under 905 cover different roof coverings and are organized similar to each other, but with variation in titles. The IRC is a professional standard, but developed piece by piece in cycles. Every so often non glamorous code proposals are necessary to correlate the mess. We just have to wait for someone to take the time to do the work.

1) "Roof deck" has been defined in the IRC since the first draft over two decades ago. However, over time, proposals have used the term "deck" or "roof" in references that would fall under the defined term. Where "roof deck" is appropriate, it has been corrected in this proposal.

2) Use of the term "solid sheathing" in the IRC is often misunderstood as implying "wood structural panel" and not permitting "lumber sheathing". "Spaced sheathing" in the IRC is not interpreted or understood consistently either. Many incorrectly believe this to be any "lumber sheathing" due to the inconsistencies of milled width and shrinkage that result in small gaps (1/8 to 1/4) between boards, "spaces". This incorrect interpretation has lead to many existing roof decks constructed with lumber sheathing to be unnecessarily re-sheathed with wood structural panel sheathing during roof replacement projects with asphalt shingles. This proposal clarifies three different lumber sheathing applications that affect different roof coverings.

"Spaced lumber sheathing". This term has a very specific meaning for wood shake and wood shingles. This is an installation method where the lumber boards are spaced upward of 10 inches on center and only function as nailing strips for the ends of the shingles. Spaced lumber sheathing, also referred to in the industry as "skip sheathing" is an older method of construction, but is still provided for in the IRC today. However, it is very important that the IRC be more specific in references to this sheathing method so the various provisions can be appropriately understood. It is the observation of this proponent that fewer professionals in the industry have the historical understanding of "spaced sheathing" and thus modern times require more clarification to support accurate interpretations. Please reference Sections R905.7.1 and 905.8.1 for applications of spaced sheathing.

"Solid lumber sheathing" and wood structural panel sheathing are now terms used in place of "solid sheathing" in order to clarify that this applies to both lumber sheathing and wood structural panels.

"closely-fitted lumber sheathing" is a term this proponent finds a little ambiguous and inconsistent, yet this proposal does not intend to challenge any existing intent or application. Therefore only "lumber" was added anywhere this term was used in order to stay consistent with the other installations of lumber sheathing.

3) The section titles for slope were both "Deck slope" and "Slope". This proponent simply chose one and it was "Slope". If opponents disagree, please draft a public comment to change it. Just make it consistent, please.

4) The section titles for the "deck or sheathing requirements" were not consistent. Since these sections specifically discuss the different sheathing products and installations, this proponent chose "Sheathing requirements". If opponents disagree, please draft a public comment to change it. Just make it consistent, please.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

This proposal only clarifies the current intent of the IRC roof covering applications and does not directly affect the cost of construction. However, it will reduce the cost of construction where the inconsistent terms are better understood and roof decks with lumber sheathing are no longer required to be re-sheathed due to inaccurate interpretations no longer occurring.

RB254-22

## **Public Hearing Results**

**Committee Action:**

**As Modified**

**Committee Modification:**

**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 surfaces.
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 1/2-inch (15.9 mm) Type X gypsum board is installed directly beneath the roof ~~deck decking~~ 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 R802.1.5 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.

**R905.7.1.1 Wood Structural Panels.** Wood structural panels used as sheathing for wood shingles shall be plywood that conforms to DOC PS1 and shall be identified by a grade mark or certificate of inspection issued by an approved agency.

**R905.7.1.1-2 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 is required on that portion of the roof deck requiring the application of an ice barrier

**R905.8.1.1 Wood Structural Panels.** Wood structural panels used as sheathing for wood shakes shall be plywood that conforms to DOC PS1 and shall be identified by a grade mark or certificate of inspection issued by an approved agency.

**R905.8.1.1-2 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 is required on that portion of the roof deck requiring an ice barrier.

**Committee Reason:** The committee decided that the modification corrects "decking" to "deck" and adds new sections for Wood Structural Panels. The modification also adds a reasonable reference to DOC PS1. In addition, the committee determined that the proposal as modified provides good reorganization and simplification to the sections. The proposal also brings consistency to the code requirements (Vote: 10-0).

RB254-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: R302.2.4

**Proponents:** Shane Nilles, representing Self (snilles@cityofcheney.org) requests As Modified by Public Comment

**Further modify as follows:**

## **2021 International Residential Code**

**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 surfaces.

2. Where ~~roof decks~~ surfaces adjacent to the wall or walls are at different elevations and the higher ~~roof deck~~ surface is not more than 30 inches (762 mm) above the lower ~~roof deck~~ surface, the parapet shall extend not less than 30 inches (762 mm) above the lower ~~roof surface~~ 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  $\frac{5}{8}$ -inch (15.9 mm) Type X gypsum board is installed directly beneath the roof 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 R802.1.5 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~~ surface. 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.

**Commenter's Reason:** The height of parapets is required in order to prevent the spread of fire from one townhouse unit to the other. As the fire would be on the roof surface, at the roof deck, the height needs to be measured from the roof surface.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The proposal and this public comment only clarifies the current intent of the code and does not directly affect the cost of construction.

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Public Comment# 3457

## Public Comment 2:

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org) requests As Submitted

**Commenter's Reason:** The inclusion of Sections R905.7.1.1 and R905.8.1.1 "Wood Structural Panels" was recommended by the Cedar Shake and Shingle Bureau during the Committee Action Hearings. Based on their installation guidelines "plywood" is not the only material option for these applications and OSB was incorrectly struck from the proposal. Although plywood might be recommended for roof sheathing in wood shingle and shake applications, OSB is included in the installation manual and should not be deleted as an acceptable material.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Clarification of requirements and more consistent terminology have no cost impact.

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Public Comment# 3010

## Public Comment 3:

**Proponents:** Borjen Yeh, representing APA - The Engineered Wood Association (borjen.yeh@apawood.org) requests As Submitted

**Commenter's Reason:** The change proposal that has been approved as modified includes a limitation of wood structural panel roof sheathing to plywood only for wood shingles (Section R905.7.1.1) and wood shakes (Section R905.8.1.1). This limitation is inconsistent with the definition of wood structural panels in the IRC, as specified in the approved parent Section R905.7.1, which states "Wood shingles shall be fastened to wood structural panels, solid lumber sheathing, or spaced lumber sheathing." and parent Section R905.8.1, which states "Wood shakes shall be fastened to wood structural panels, solid lumber sheathing, or spaced lumber sheathing."

The modification was introduced at the last Committee Action Hearing by the Cedar Shake & Shingle Bureau (CSSB, <https://www.cedarbureau.org/>). In the "Installation FAQ" of the CSSB website (<https://www.cedarbureau.org/literature-education/installation-faq/>) under "Oriented Strand Board," it is not the CSSB recommendation to exclude the installation of cedar shakes and shingles over oriented strand board as a wood structural panel by definition.

The original change proposal without the modification correctly made proper changes. Therefore, it is requested that RB254-22 be approved as submitted (without the modification) to correct the unnecessary confusion induced by the modification.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This public comment clarifies the intent of the code and removes the unnecessary restriction of wood structural panel sheathing types.

**Public Comment 4:**

**Proponents:** Chadwick Collins, representing Cedar Shake & Shingle Bureau (ccollins@kellencompany.com) requests As Modified by Committee

**Commenter's Reason:** The modification (Collins1) that changed the original proposal was discussed prior to the proposal being heard by the committee with multiple stakeholders, including NAHB, AWC, and the Proponent. After the Committee's decisions, a concern was raised that CSSB literature provides guidance on the use of OSB, necessitating a public comment to amend the modification of Collins1. While CSSB's website (<https://www.cedarbureau.org/>) has an FAQ on OSB (<https://www.cedarbureau.org/literature-education/installation-faq/>), it states "Certi-label shakes and shingles have only been tested on **plywood** decking. Make sure you use a very good quality hot dipped galvanized or stainless nails that are ring shanked to hold the roof to the OSB and check with your local Building Official to see if this type of application is permitted." While this statement provides an option, it is clear that the concern is holding power and that the Building Official is the determinate factor of OSB use. This proposal brought to focus that this question on decking needed clarification and since the code requires graded materials from CSSB (Table R905.7.4) and CSSB's OSB FAQ confirms that testing of such products has only taken place over plywood decking, the proposal as modified by Collins1 should move forward unchanged.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal provides clarity on current construction methods and will not impact cost.

## **Proposed Change as Submitted**

**Proponents:** Joseph Cain, representing Solar Energy Industries Association (SEIA) (JoeCainPE@gmail.com)

### **2021 International Residential Code**

**R903.1 General.** *Roof decks* shall be covered with *approved* roof coverings secured to the building or structure in accordance with the provisions of this chapter. *Roof assemblies* shall be designed and installed in accordance with this code and the *approved* manufacturer's instructions such that the *roof assembly* shall serve to protect the building or structure.

**R903.2 Flashing.** Flashings shall be installed 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.

**R903.2.1 Locations.** Flashings shall be installed at wall and roof intersections, wherever there is a change in roof slope or direction and around roof openings. A flashing shall be installed to divert the water away from where the eave of a sloped roof intersects a vertical sidewall. Where flashing is of metal, the metal shall be corrosion resistant with a thickness of not less than 0.019 inch (0.5 mm) (No. 26 galvanized sheet).

**R903.2.2 Crickets and saddles.** A cricket or saddle shall be installed on the ridge side of any chimney or penetration more than 30 inches (762 mm) wide as measured perpendicular to the slope. Cricket or saddle coverings shall be sheet metal or of the same material as the roof covering.

**Exception:** *Unit skylights* installed in accordance with Section R308.6 and flashed in accordance with the manufacturer's instructions shall be permitted to be installed without a cricket or saddle.

**Add new text as follows:**

**R903.2.3 Photovoltaic (PV) panel systems.** Flashing shall be installed in a manner that prevents moisture from entering the roof at attachment points for rooftop-mounted photovoltaic (PV) panel systems. A metallic or nonmetallic flashing material or system shall be installed in accordance with manufacturer's installation instructions.

**Reason:** While flashing and weather-sealing is required in IRC Section R903, this section is silent on specific requirements for rooftop-mounted photovoltaic (PV) panel systems. This proposal clarifies that flashing or weathersealing of rooftop attachments for PV systems can be metallic or nonmetallic, and requires them to be installed in accordance with manufacturers installation instructions.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. This proposal does not change cost of construction. It only serves to clarify requirements.

RB255-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposal considering the fact that Section R903.2, Flashing, already covers the proposed requirements. Section R903.2, Flashing, addresses these requirements by stating "other penetrations through the roof plane. " (Vote: 10-0).

RB255-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R903.2.3 (New)

**Proponents:** Joseph Cain, representing Solar Energy Industries Association (SEIA) (joecainpe@gmail.com) requests As Modified by Public Comment

**Replace as follows:**

## 2021 International Residential Code

**R903.2.3 Photovoltaic (PV) panel systems.** Flashing materials, devices or systems used for attachment of rooftop-mounted photovoltaic (PV) panel systems shall comply with one of the following:

1. Flashing materials, devices, or systems installed in accordance with the roof covering manufacturer's installation instructions.
2. Approved, tested and listed flashing materials, devices, or systems installed in accordance with the flashing manufacturer's installation instructions.

**Commenter's Reason:** Three proposals (S41-22, RB255-22, and RB278-22) were submitted for this code cycle, with the intention to provide additional guidance regarding proper flashing for rooftop-mounted photovoltaic panel systems.

The fundamental question is whether the flashing should be in accordance with the installation instructions of the roof covering manufacturer or the flashing manufacturer. There are now several manufacturers of flashing materials, devices, and systems specifically designed and intended for this application. As noted during testimony at the Committee Action Hearing, there are several different methods being used to evaluate these flashing products for preventing the entry of water and moisture. At the request of industry, UL has developed UL 2703A, "Flashing Devices and Systems for Rooftop-Mounted Photovoltaics", to consolidate and standardize all the requirements needed to evaluate flashings for this use. UL 2703A includes performance testing and durability requirements for the products.

Note the Committee Reason statement indicating Section R903.2 already covers the proposed requirements is not correct. 2021 IRC Section R903.2 does not specifically cover the flashing/weather-sealing of rooftop-mounted PV systems, as PV attachment points are not "penetrations through the roof plane." PV systems for one- and two-family dwellings are attached with fasteners to or through the roof sheathing.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Although some manufacturers may need to have their products re-evaluated to the new requirements, this provides a clear alternative method for flashing rooftop mounted photovoltaic panel systems.

Public Comment# 3477

### Public Comment 2:

#### IRC: R903.2.3

**Proponents:** Evelyn Butler, representing Solar Energy Industries Association (ebutler@seia.org) requests As Modified by Public Comment

**Modify as follows:**

## 2021 International Residential Code

**R903.2.3 Photovoltaic (PV) panel systems.** Flashing shall be installed in a manner that prevents moisture from entering the roof at attachment points for rooftop-mounted photovoltaic (PV) panel systems. A metallic or nonmetallic flashing material or system shall be installed in accordance with the roof covering manufacturer's installation instructions or the flashing manufacturer's installation instructions.

**Commenter's Reason:** Three proposals (S41-22, RB255-22, and RB278-22) were submitted for this code cycle, with the intention to provide additional guidance regarding proper flashing for rooftop-mounted photovoltaic panel systems.

The fundamental question is whether the flashing should be in accordance with the installation instructions of the roof covering manufacturer or the flashing manufacturer. There are now several manufacturers of flashing materials, devices, and systems specifically designed and intended for this application. The manufacturer of the roof covering on existing buildings is not always known, and manufacturers of roof coverings cannot possibly include installation instructions for all PV flashing materials and systems in the marketplace.

As noted during testimony at the Committee Action Hearing, there are several different methods being used to evaluate these flashing products for preventing the entry of water and moisture.

Note the Committee Reason statement indicating Section R903.2 already covers the proposed requirements is not correct. 2021 IRC Section R903.2 does not specifically cover the flashing/weather-sealing of rooftop-mounted PV systems, as PV attachment points are not "penetrations through the roof plane." PV systems for one- and two-family dwellings are attached with fasteners to or through the roof sheathing.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The original proposal and the public comment are both intended to include specific language for flashing/weather-sealing of rooftop-mounted PV systems, where the code is currently silent. The net effect is no difference in cost of construction.





## **Proposed Change as Submitted**

**Proponents:** Emily Lorenz, representing International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com)

### **2021 International Residential Code**

**Add new text as follows:**

**R903.5 Waterproofing weather-exposed areas.** Balconies, decks, landings, exterior stairways, occupied roofs, and similar surfaces exposed to the weather and sealed underneath shall be waterproofed and sloped a minimum of 1/4 unit vertical in 12 units horizontal (2% slope) for drainage.

#### **Reason:**

To ensure life-safety of users of balconies in cold climates, and to promote bulk water flow away from exterior walls or assemblies that adjoin balconies, so that ponding does not occur. Proper drainage on balconies, decks, etc., is an important performance requirement to aid in draining liquid water away from the building. In cold climates, any ponding that may occur could potentially freeze, causing a safety issue. Add the original code reference from 1997 UBC Chapter 14 under the roof drainage sections of IBC Chapter 15 (1502) and IRC Chapter 9 (R903.4). Section 1402.3 of the 1997 Uniform Building Code (UBC) stated:

#### **1402.3 Waterproofing Weather-exposed Areas.**

Balconies, landings, exterior stairways, occupied roofs, and similar surfaces exposed to the weather and sealed underneath shall be waterproofed and sloped a minimum of 1/4 unit vertical in 12 units horizontal (2% slope) for drainage.

Section 1402.3 of the 1997 Uniform Building Code (UBC) is what most waterproofing consultants considered the gold standard for ensuring that architects and builders constructed balcony and stairways with a minimum of 2% slope. The 2% slope requirement referenced in the Section 1402.3 of the 1997 UBC does not exist at any location within any version of IBC from 2000 through 2018. Decks were also listed as an area that should be waterproofed and sloped.

During the transition from the UBC to the IBC, this valuable and useful reference to require a minimum 2% surface slope for balconies, landings, and exterior stairways was omitted from the IBC and IRC. There are no referenced statements or definitions anywhere in the current codes on this issue.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This should be standard practice, thus will not impact the cost of construction

RB257-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved the proposal due to the fact that the proposed text is confusing and needs better clarification for the proposed requirement for balconies, decks, and landings exposed to the weather. The committee asked the proponent to clarify how to apply these requirements for designers, builders, and building officials. In addition, the new section better fits into Section 507 (Vote: 9-0).

RB257-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: 507.11 (New)**

**Proponents:** Emily Lorenz, representing International Institute of Building Enclosure Consultants (emilyblorenz@gmail.com) requests As Modified

by Public Comment

Replace as follows:

## 2021 International Residential Code

**507.11 Drainage of weather-exposed areas.** Where the surface of balconies, decks, landings, porches, stairways, and similar surfaces are exposed to weather, and do not have spaces nor gaps or are not perforated to drain, they shall be sloped to drain.

**Commenter's Reason:** The concept of this code change, as well as the companion code change S-3, were generally supported by the committees. However, they expressed concern related to a few items, all of which have been addressed in this public comment. The items addressed are:

1. The location of this code change was moved from the roofing chapter (9) to a new section in chapter 5.
2. Changed the title of the section to reflect the intent of the code change, which is to ensure that any surfaces that are exposed to weather are sloped to drain. However, removes specific slope requirements that may cause a conflict between existing landing and stair slope requirements.
3. Clarifies that this requirement only applies in cases where surfaces are not perforated nor slotted.
4. Removes requirement for waterproofing and the vague term "sealed underneath," which were also concerns raised by the concrete industry related to sealing slabs on both sides.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This PC does not change the intent of the original proposal. This PC and the original proposal try to include the existing standard practice for drainage of weather-exposed areas.

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Public Comment# 3145

**RB263-22**

***Proposed Change as Submitted***

**Proponents:** T. Eric Stafford, representing Insurance Institute for Business and Home Safety

**2021 International Residential Code**

**Revise as follows:**

**TABLE R905.1.1(1) UNDERLAYMENT TYPES**

| <b>ROOF COVERING</b>          | <b>SECTION</b> | <b><u>AREAS NOT WITHIN HURRICANE-PRONE REGIONS</u><br/><u>WHERE WIND DESIGN IS NOT REQUIRED IN</u><br/><u>ACCORDANCE WITH FIGURE R301.2.1.1</u></b> | <b><u>AREAS WITHIN HURRICANE-PRONE REGIONS</u><br/><u>WHERE WIND DESIGN IS REQUIRED IN</u><br/><u>ACCORDANCE WITH FIGURE R301.2.1.1</u></b> |
|-------------------------------|----------------|---|---|
| Asphalt shingles              | R905.2         | ASTM D226 Type I or II<br>ASTM D4869 Type I, II, III or IV<br>ASTM D6757  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV   |
| Clay and concrete tile        | R905.3         | ASTM D226 Type II<br>ASTM D2626 Type I<br>ASTM D6380 Class M mineral-surfaced roll roofing  | ASTM D226 Type II   |
| Metal roof shingles           | R905.4         | ASTM D226 Type I or II<br>ASTM D4869 Type I, II, III or IV  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV   |
| Mineral-surfaced roll roofing | R905.5         | ASTM D226 Type I or II<br>ASTM D4869 Type I, II, III or IV  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV   |
| Slate and slate-type shingles | R905.6         | ASTM D226 Type I<br>ASTM D4869 Type I, II, III or IV  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV   |
| Wood shingles                 | R905.7         | ASTM D226 Type I or II<br>ASTM D4869 Type I, II, III or IV  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV   |
| Wood shakes                   | R905.8         | ASTM D226 Type I or II<br>ASTM D4869 Type I, II, III or IV  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV   |
| Metal panels                  | R905.10        | Manufacturer's instructions   | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV   |
| Photovoltaic shingles         | R905.16        | ASTM D4869 Type I, II, III or IV<br>ASTM D6757  | ASTM D4869 Type III or Type IV  |

For SI: 1 mile per hour = 0.447 m/s.

**TABLE R905.1.1(2) UNDERLAYMENT APPLICATION**

| <b>ROOF COVERING</b>          | <b>SECTION</b> | <b>AREAS NOT WITHIN HURRICANE-PRONE REGIONS WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1</b>   | <b>AREAS WITHIN HURRICANE-PRONE REGIONS WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1</b>  |
|-------------------------------|----------------|--|---|
| Asphalt shingles              | R905.2         | 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 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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 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. | Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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         | For roof slopes from 2½ units vertical in 12 units horizontal (2½:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: starting at the eave, apply a 19-inch strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide strips of underlayment felt, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be not fewer than one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.  | Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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. |
| Metal roof shingles           | R905.4         | Apply in accordance with the manufacturer's installation instructions.   | Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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        |  |   |
| Photovoltaic shingles         | R905.16        | 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 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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 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. | Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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 APPLICATION

| ROOF COVERING                 | SECTION | AREAS <u>NOT</u> WITHIN HURRICANE-PRONE REGIONS <del>WHERE WIND DESIGN IS NOT REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1</del> | AREAS <u>WITHIN</u> HURRICANE-PRONE REGIONS <del>WHERE WIND DESIGN IS REQUIRED IN ACCORDANCE WITH FIGURE R301.2.1.1</del>  |
|-------------------------------|---------|---|--|
| Asphalt shingles              | R905.2  | Fastened sufficiently to hold in place  | The underlayment shall be attached 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 $\frac{3}{4}$ inch into the roof sheathing. |
| Clay and concrete tile        | R905.3  |   |  |
| Photovoltaic                  | R905.16 |   |  |
| Metal roof shingles           | R905.4  | Manufacturer's installation instructions.   | The underlayment shall be attached 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 $\frac{3}{4}$ inch into the roof sheathing. |
| 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.

**R905.1.1 Underlayment.** *Underlayment* for asphalt shingles, clay and concrete tile, *metal roof shingles*, mineral-surfaced roll roofing, slate and slate-type shingles, wood shingles, wood shakes, *metal roof panels* and *photovoltaic shingles* shall conform to the applicable standards listed in this chapter. *Underlayment* materials required to comply with ASTM D226, D1970, D4869 and D6757 shall bear a *label* indicating compliance to the standard designation and, if applicable, type classification indicated in Table R905.1.1(1). *Underlayment* shall be applied in accordance with Table R905.1.1(2). *Underlayment* shall be attached in accordance with Table R905.1.1(3).

**Exceptions:**

1. As an alternative, self-adhering polymer-modified bitumen underlayment bearing a label indicating compliance with ASTM D1970 and installed in accordance with both the underlayment manufacturer's and roof covering manufacturer's instructions for the deck material, roof ventilation configuration and climate exposure for the roof covering to be installed, shall be permitted.
2. As an alternative, a minimum 4-inch-wide (102 mm) strip of self-adhering polymer-modified bitumen membrane bearing a *label* indicating compliance 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 areas where wind design is not required in accordance with Figure R301.2.1.1~~ shall be applied over the entire roof over the 4-inch-wide (102 mm) membrane strips. Underlayment shall be applied in accordance with Table R905.1.1(2) using the application requirements for areas not within Hurricane-prone Regions ~~where wind design is not required in accordance with Figure R301.2.1.1~~. Underlayment shall be attached in accordance with Table R905.1.1(3).

**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:

[2011 Hurricane Demonstration Testing Summary \(ibhs.org\)](#)

The wind driven rain demonstration can be viewed at the following link: [Building Vulnerability to Wind-Driven Rain Entry – Insurance Institute for Business & Home Safety \(ibhs.org\)](#)

These underlayment strategies required reduce water entry into the attic space by 70% or more.

This expansion is being proposed primarily for 2 reasons. It is anticipated that ASCE 7 will be updated to the 2022 edition this cycle. ASCE 7-22 includes 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 hurricane-prone areas would no longer be required to use the improved underlayment strategies.

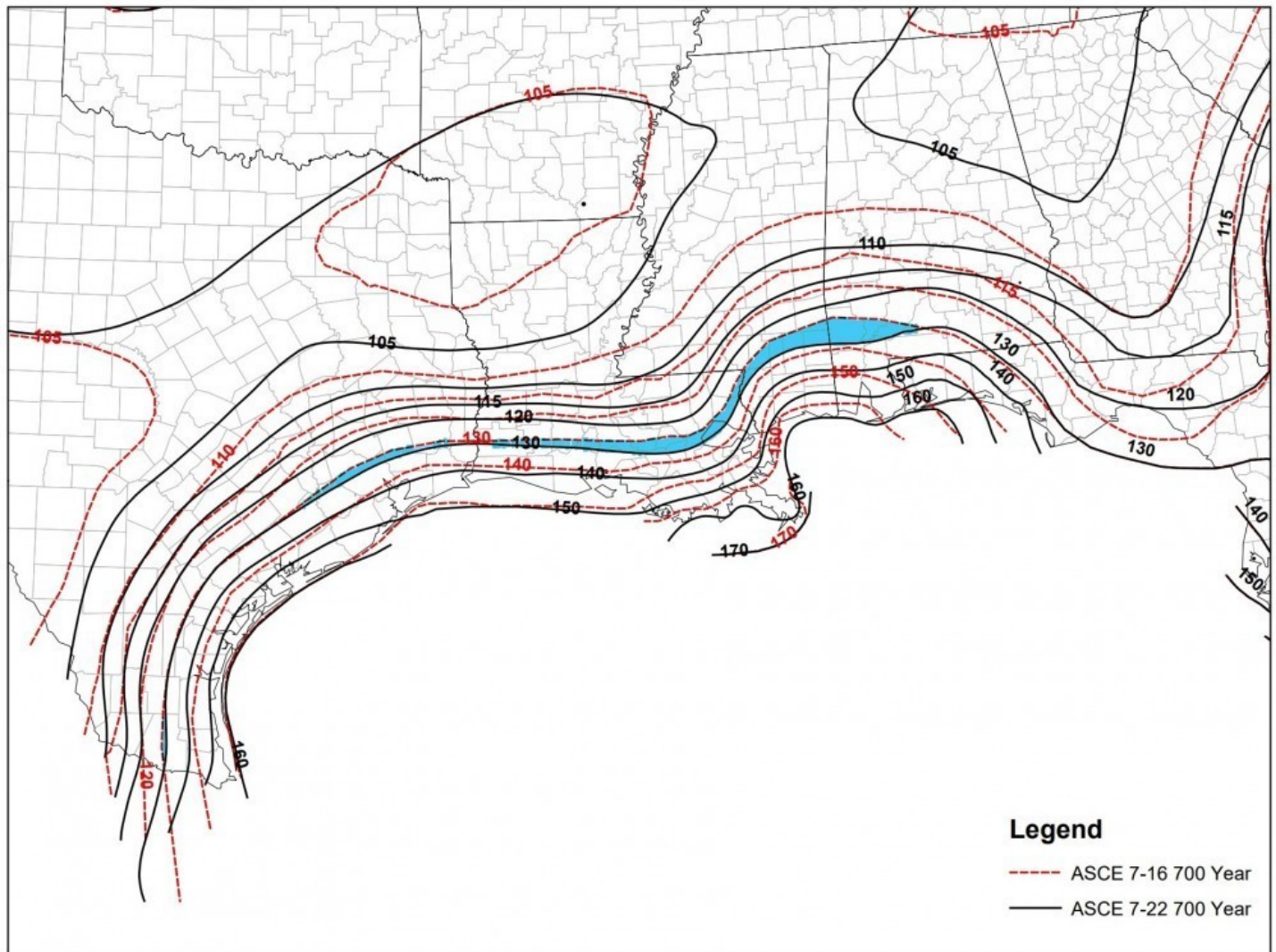
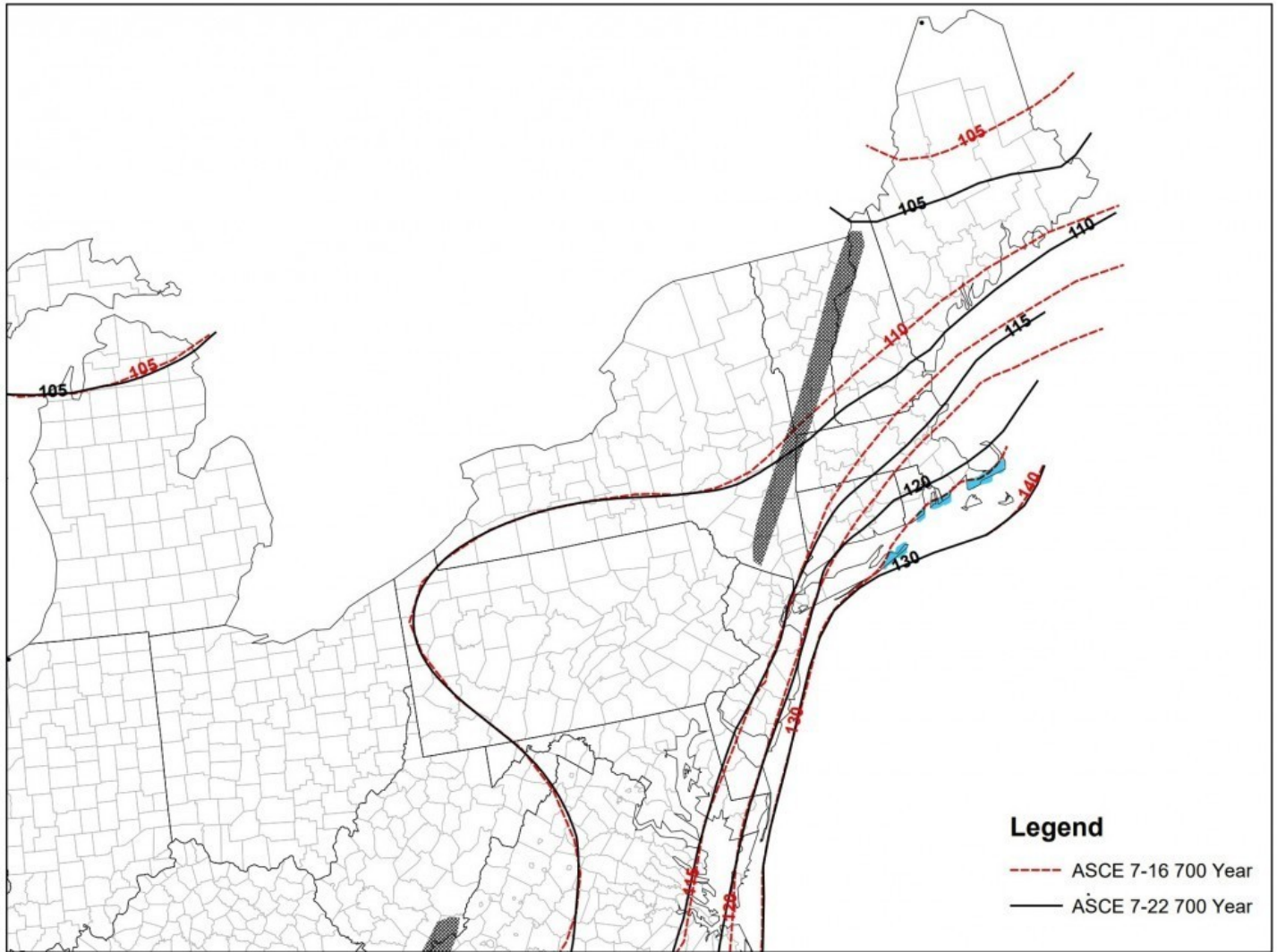


Figure 1

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 7<sup>th</sup> Edition (2020) 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.

<https://www.cdpaccess.com/proposal/7975/25356/files/download/2803/>

**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).

Roueché, D.B., Nakayama, J., Department of Civil Engineering, Auburn University Ginn College of Engineering, "Quantification of Common Wind Damage Patterns in Recent Windstorms." May 2021

**Cost Impact:** The code change proposal will increase the cost of construction. This proposal will only increase costs in the Hurricane-prone Regions for wind speeds between 115 mph and 129 mph. Exceptions 1 and 2 have existed in the IRC for several editions. If the double layer of underlayment option is used, the cost of the additional layer of underlayment will vary by region. However, for a 2000 square foot roof, the cost increase for the additional layer of underlayment will be between \$100 to \$200. Additional fasteners will be required in addition to the additional layer of underlayment.

RB263-22

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## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposal considering that designing different elements of the house for different risk levels is a concern and goes against the codes in general. The proposal causes issues for high wind regions that are not Hurricane-prone Regions (Vote: 10-0)

RB263-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**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) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**TABLE R905.1.1(1) UNDERLAYMENT TYPES**

| <b>ROOF COVERING</b>          | <b>SECTION</b> | <b><u>AREAS WHERE THE ULTIMATE DESIGN WIND SPEED, <math>V_{ult}</math>, IS LESS THAN 120 mph NOT WITHIN HURRICANE-PRONE REGIONS</u></b> | <b><u>AREAS WITHIN HURRICANE-PRONE WHERE THE ULTIMATE DESIGN WIND SPEED, <math>V_{ult}</math>, IS GREATER THAN OR EQUAL TO 120 mph REGIONS</u></b> |
|-------------------------------|----------------|---|--|
| Asphalt shingles              | R905.2         | ASTM D226 Type I or II<br>ASTM D4869 Type I, II, III or IV<br>ASTM D6757  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV  |
| Clay and concrete tile        | R905.3         | ASTM D226 Type II<br>ASTM D2626 Type I<br>ASTM D6380 Class M mineral-surfaced roll roofing  | ASTM D226 Type II  |
| Metal roof shingles           | R905.4         | ASTM D226 Type I or II<br>ASTM D4869 Type I, II, III or IV  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV  |
| Mineral-surfaced roll roofing | R905.5         | ASTM D226 Type I or II<br>ASTM D4869 Type I, II, III or IV  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV  |
| Slate and slate-type shingles | R905.6         | ASTM D226 Type I<br>ASTM D4869 Type I, II, III or IV  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV  |
| Wood shingles                 | R905.7         | ASTM D226 Type I or II<br>ASTM D4869 Type I, II, III or IV  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV  |
| Wood shakes                   | R905.8         | ASTM D226 Type I or II<br>ASTM D4869 Type I, II, III or IV  | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV  |
| Metal panels                  | R905.10        | Manufacturer's instructions   | ASTM D226 Type II<br>ASTM D4869 Type III or Type IV  |
| Photovoltaic shingles         | R905.16        | ASTM D4869 Type I, II, III or IV<br>ASTM D6757  | ASTM D4869 Type III or Type IV   |

For SI: 1 mile per hour = 0.447 m/s.

**TABLE R905.1.1(2) UNDERLAYMENT APPLICATION**

| <b>ROOF COVERING</b>          | <b>SECTION</b> | <b>AREAS WHERE THE ULTIMATE DESIGN WIND SPEED, <math>V_{ult}</math>, IS LESS THAN 120 mph NOT WITHIN HURRICANE-PRONE REGIONS</b>   | <b>AREAS WHERE THE ULTIMATE DESIGN WIND SPEED, <math>V_{ult}</math>, IS GREATER THAN OR EQUAL TO 120 mph WITHIN HURRICANE-PRONE REGIONS</b>   |
|-------------------------------|----------------|--|---|
| Asphalt shingles              | R905.2         | 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 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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 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. | Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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         | For roof slopes from 2½ units vertical in 12 units horizontal (2½:12), up to 4 units vertical in 12 units horizontal (4:12), underlayment shall be not fewer than two layers applied as follows: starting at the eave, apply a 19-inch strip of underlayment parallel with the eave. Starting at the eave, apply 36-inch-wide strips of underlayment felt, overlapping successive sheets 19 inches. End laps shall be 4 inches and shall be offset by 6 feet. For roof slopes of 4 units vertical in 12 units horizontal (4:12) or greater, underlayment shall be not fewer than one layer of underlayment felt applied shingle fashion, parallel to and starting from the eaves and lapped 2 inches. End laps shall be 4 inches and shall be offset by 6 feet.  | Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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. |
| Metal roof shingles           | R905.4         | Apply in accordance with the manufacturer's installation instructions.   | Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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        |  |   |
| Photovoltaic shingles         | R905.16        | 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 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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 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. | Underlayment shall be two layers applied in the following manner: apply a 19-inch strip of underlayment felt parallel to and starting at the eaves. Starting at the eave, apply 36-inch-wide sheets of underlayment, overlapping successive sheets 19 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 APPLICATION**

| <b>ROOF COVERING</b>          | <b>SECTION</b> | <b><u>AREAS WHERE THE ULTIMATE DESIGN WIND SPEED, <math>V_{ult}</math>, IS LESS THAN 120 mph NOT WITHIN HURRICANE-PRONE REGIONS</u></b> | <b><u>AREAS WHERE THE ULTIMATE DESIGN WIND SPEED, <math>V_{ult}</math>, IS GREATER THAN OR EQUAL TO 120 mph WITHIN HURRICANE-PRONE REGIONS</u></b>   |
|-------------------------------|----------------|---|--|
| Asphalt shingles              | R905.2         | Fastened sufficiently to hold in place  | The underlayment shall be attached 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 $\frac{3}{4}$ inch into the roof sheathing. |
| Clay and concrete tile        | R905.3         |   |  |
| Photovoltaic                  | R905.16        |   |  |
| Metal roof shingles           | R905.4         | Manufacturer's installation instructions.   | The underlayment shall be attached 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 $\frac{3}{4}$ inch into the roof sheathing. |
| 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.

**Commenter's Reason:** This public comment seeks to reduce the impact of the original proposal. We stand by our original reason statement on the need for and importance of protecting the roof from water infiltration. However, the committee and the opponent felt our original proposal went too far. This public comment would modify the original proposal by raising the wind speed trigger in Hurricane-prone Regions for enhanced underlayment methods (sealed roof deck) from 115 mph to 120 mph. While the change in wind speed is small, the geographic impact is fairly significant. We believe this public comment to be a reasonable compromise to the original proposal.

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction. This proposal will only increase costs in the Hurricane-prone Regions for wind speeds between 120 mph and 129 mph. Exceptions 1 and 2 have existed in the IRC for several editions. If the double layer of underlayment option is used, the cost of the additional layer of underlayment will vary by region. Additional fasteners will be required in addition to the additional layer of underlayment.

Public Comment# 3250

## **Proposed Change as Submitted**

**Proponents:** Chadwick Collins, representing Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

### **2021 International Residential Code**

**Revise as follows:**

**R905.7.1 Deck requirements.** Wood shingles shall be installed on solid or spaced sheathing. Where spaced 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 to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced 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. When wood shingles are installed over spaced 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 prevent the free movement of air on the interior side of the spaced sheathing.

**Reason:** When shingles are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shingles and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process. Further, installation of components such as spray foam insulation also eliminates one surface for shingles to release heat gained through exposure. This slows the release of heat energy, requiring the shingle to hold on to heat load for longer durations, which leads to shorter service life cycles

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

RB269-22

## **Public Hearing Results**

**Committee Action:**

**As Submitted**

**Committee Reason:** The committee approved this proposal considering the fact that the proposed text ensures the configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation. The committee recommended for the proponent to look into clarifying "shall not be backed with materials" during the public comment phase (Vote: 10-0).

RB269-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R905.7.1**

**Proponents:** Chadwick Collins, representing Cedar Shake & Shingle Bureau (ccollins@kellencompany.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R905.7.1 Deck requirements.** Wood shingles shall be installed on solid or spaced sheathing. Where spaced 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 to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced 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. When wood shingles are installed over spaced 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 sheathing.

**Commenter's Reason:** The original proposal was recommended for approval by the Committee as submitted (10-0), but the Committee members did advise CSSB to address the last sentence to clarify that the ventilated space, or air gap space, needs to remain. This public comment modification is the attempt to fulfill that request of the Committee to further clarify that the air gap is first, required as stated in the previous sentence, and second, to remain as an air space.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation and the public comment modification provides further clarity to installation practices.

Public Comment# 3505

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## **Proposed Change as Submitted**

**Proponents:** Chadwick Collins, representing Cedar Shake & Shingle Bureau (ccollins@kellencompany.com)

### **2021 International Residential Code**

**Revise as follows:**

**R905.8.1 Deck requirements.** Wood shakes shall be ~~used only~~ installed on solid or spaced sheathing. Where spaced 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 to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced 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. When wood shakes are installed over spaced 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 prevent the free movement of air on the interior side of the spaced sheathing.

**Reason:** When shakes are installed over spaced sheathing, the underlayment is interwoven as the installation progresses. Due to this configuration, moisture can reach the underlayment. While much of the drying of the underlayment occurs in the direction of the exterior, some of the drying process occurs toward the interior. The exposure of this surface (the backside of the shakes and underlayment) to the ventilation space is necessary to facilitate this process. This language is proposed to ensure this configuration is maintained and not compromised with the installation of other building components, such as spray foam insulation, that would otherwise occupy this air space and eliminate this process. Further, installation of components such as spray foam insulation also eliminates one surface for shakes to release heat gained through exposure. This slows the release of heat energy, requiring the shake to hold on to heat load for longer durations, which leads to shorter service life cycles.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation.

RB271-22

## **Public Hearing Results**

**Committee Action:**

**As Submitted**

**Committee Reason:** The committee's approval is consistent with the committee's previous action on RB269-22. See RB269-22 committee's reason statement (Vote: 10-0).

RB271-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: R905.8.1**

**Proponents:** Chadwick Collins, representing Cedar Shake & Shingle Bureau (ccollins@kellencompany.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R905.8.1 Deck requirements.** Wood shakes shall be installed on solid or spaced sheathing. Where spaced 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 to coincide with the placement of fasteners. Where 1-inch by 4-inch (25 mm by 102 mm) spaced 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. When wood shakes are installed over spaced 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 sheathing.

**Commenter's Reason:** The original proposal was recommended for approval by the Committee as submitted (10-0), but the Committee members did advise CSSB to address the last sentence to clarify that the ventilated space, or air gap space, needs to remain. This public comment modification is the attempt to fulfill that request of the Committee to further clarify that the air gap is first, required as stated in the previous sentence, and second, to remain as an air space.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This proposal does not add any requirements to current construction practices, but clarifies the configuration of the installation and the public comment modification provides further clarity to installation practices.

Public Comment# 3506

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## **Proposed Change as Submitted**

**Proponents:** Mark Graham, representing National Roofing Contractors Assoc. (mgraham@nrca.net)

### **2021 International Residential Code**

**Revise as follows:**

**R905.15.2 Material standards.** Liquid-applied roofing shall comply with ASTM C836, C957, ~~D1227~~, or D3468, ~~D6083, D6694 or D6947~~.

**Reason:** This code change proposal is intended to clarify the code's requirements for liquid-applied roof coverings. This proposal removes roof coating products from this section as these, in themselves, are not liquid-applied roof coverings. The following roof coatings products are being removed:

- ASTM D1227, "Standard Specification for Emulsified Asphalt Used as a Protective Roof Coating"
- ASTM D6083, "Standard Specification for Liquid Applied Acrylic Coating Used in Roofing"
- ASTM D6694, "Standard Specification for Liquid-applied Silicone Coating Use din Spray Polyurethane Foam Roofing Systems"
- ASTM D6947, "Standard Specification for Liquid Applied Moisture Cured Polyurethane Coating Used in Spray Polyurethane Foam Roofing Systems"

ASTM D6694 and ASTM D6947 already appear in Section R905.14-Sprayed Polyurethane Foam Roofing's Table R905.14.3-Protective Coating Material Material Standard's.

A separate code change proposal will move these material standards for roof coating products to a new code section specific to roof coatings.

This same removal of roof coating-specific standards from the material standards list for liquid-applied roof coverings has already been incorporated into IBC 2021.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This code change proposal is a clarification to the code's requirements and has no cost impact.

RB275-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disproved this proposal considering the fact that there is an issue with the applicability of the ASTM standards for liquid-applied roofing. The committee encouraged the proponent to look into addressing the ASTM standards applicability during the public comment phase (Vote: 9-0)

RB275-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** R905.15.2

**Proponents:** Chadwick Collins, representing Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**R905.15.2 Material standards.** Liquid-applied roofing shall comply with ASTM C836, C957, D6694, D6947, or D3468.

**Commenter's Reason:** While RCMA spoke in opposition at the CAH, RCMA committed to submitting a public comment to reflect the concerns with the original proposal. RCMA agrees that D1227 and D6083 should not be included in this section, but D6694 and D6947 should remain as these products are being installed in this configuration in the marketplace currently.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This public comment modification cleans up the standards that should be listed in this section and will not impact cost of construction.

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Public Comment# 3507

## ***Public Comment 2:***

**Proponents:** Mark Graham, representing National Roofing Contractors Association (mgraham@nrca.net) requests As Submitted

**Commenter's Reason:** This code change proposal is intended to coordinate with RB280-22, which was Approved As Submitted. RB280-22 creates a new section, Section R908-Roof Coatings, to specifically address roof coating products separately from Section R905.15-Liquid-applied Roofing. This code change proposal removes the roof coating-specific material standards from Section R905.15-Liquid-applied Roofing. With the approval of RB280-22, these roof coating-specific material standards now appear in the new Section R908-Roof Coatings. Development of a roof coating-specific section in the IRC and moving the roof coating-specific material standards from Section R905.15-Liquid-applied Roofing to the new Section R908-Roof Coatings is consistent with action taken during the 2018/19 Code Development Cycle for the IBC and what currently appears in IBC 2022.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This code change proposal and this public comment are a clarification to the code's existing requirements and have no cost impact.

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Public Comment# 3462

**Proposed Change as Submitted**

**Proponents:** Chadwick Collins, Kellen Company, representing Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com)

**2021 International Residential Code**

**Add new text as follows:**

**R905.15.4 Flashings.** Flashings shall be applied in accordance with the liquid applied roofing manufacturer's installation instructions.

**Reason:** This proposal provides clarity and direction that is missing from section R905.15 regarding flashings. The manufacturer's installation instructions have the specifics for each specific product and should be the source material to consult for proper application and flashing guidance with these materials.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This proposal updates R905.15 to ensure that the needed guidance for installation is pointed to by the code.

RB276-22

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**Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposal considering the fact that the proposed text is not clear. In addition, the requirements for roofing manufacturer's installation instructions are already addressed in the code (Vote: 10-0).

RB276-22

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**Individual Consideration Agenda**

**Public Comment 1:**

**Proponents:** Chadwick Collins, representing Roof Coating Manufacturers Association (RCMA) (ccollins@kellencompany.com) requests As Submitted

**Commenter's Reason:** While the Committee reasoned that charging language in chapter 9 already exists, RCMA is proposing overturning the Committee's decision so that Liquid Applied Roofing has the same clarity and direction about flashings for these systems that other materials have in their sections within this chapter.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction  
This proposal will not change the cost of construction, but provide clarity and guidance for correction installation of materials.

Public Comment# 3508

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## **Proposed Change as Submitted**

**Proponents:** Ali Fattah, representing City of San Diego Development Services Department (afattah@sandiego.gov)

### **2021 International Residential Code**

**Revise as follows:**

**R1003.9 Termination.** Chimneys shall extend not less than 2 feet (610 mm) higher than any portion of a building, or roof mounted Photovoltaic System, within 10 feet (3048 mm), but shall be not less than 3 feet (914 mm) above the highest point where the chimney passes through the roof.

**R1005.4 Factory-built fireplaces.** *Chimneys* for use with factory-built fireplaces shall comply with the requirements of UL 127. Chimneys shall extend not less than 2 feet (610 mm) higher than any portion of a roof mounted Photovoltaic System, within 10 feet (3048 mm).

**Reason:** The IRC is silent in regards to the impacts of chimneys when they are located in close proximity to roof mounted photovoltaic systems. The IRC and prefabricated chimney manufacturers require that chimneys be higher than the building and the peak of a sloped roof to allow for efficient venting of the products of combustion out of a fire place served by the chimney.

Solar installations can cover a large portion of the roof and are protected like a roof covering when they are building integrated photovoltaic systems BIPV so it stands to reason that roof mounted systems whether on rack or otherwise should be treated like a portion of the building. Unlike discrete roof mounted mechanical equipment, roof mounted Photovoltaic Systems can cover large areas and can impact the aerodynamics of airflow on the roof.

The IRC requires spark arrestors to prevent burning embers from falling on the roof and requires clearance between the chimney and combustibles however a new product like roof mounted solar systems are not addressed. Chimney termination rules have not changed for decades.

<https://www.cdpassess.com/proposal/8525/24964/files/download/2923/>



**Cost Impact:** The code change proposal will increase the cost of construction

The proposed code change may increase the cost of construction if the property owner chooses to extend the height of a chimney to comply with the proposed requirement especially when the chimney is existing. The proposed code change addresses the life safety hazards of an improperly drafting chimney as well as the fire hazards due to burning embers and the heat of the chimney.

## **Public Hearing Results**

### **Committee Action:**

**Disapproved**

**Committee Reason:** The committee disapproved this proposal due to the hazard it creates for firefighters. In Section R1003.9 Termination, the added text of "or roof mounted Photovoltaic System" is unnecessary. When you add roof mounted photovoltaic system to a building, it becomes a portion of the building. The proponent needs to look into UL127 and incorporate the clearance requirement into the code. The committee advised the proponent to address these issues during the public comment phase (Vote: 7-3).

RB285-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

#### **IRC: R324.4.4 (New)**

**Proponents:** Ali Fattah, representing City of San Diego Development Services Department (afattah@sanidiego.gov) requests As Modified by Public Comment

**Replace as follows:**

### **2021 International Residential Code**

**R324.4.4 Setback From Chimneys.** Rooftop mounted *photovoltaic panel systems* located adjacent to a chimney serving a masonry or factory-built fire place or fuel burning *appliance* shall be set back from any chimney so as to provide not less than a 36-inch (914 mm) clear setback from all portions of a chimney.

**Commenter's Reason:** The original code change submitted as RB285-22 is proposed to be replaced with this public comment that takes a similar approach to addressing the original code change's set back concerns. The public comment was developed with input from the fire service and also addresses a comment made by a member of the opposition to the code change that testified on behalf of Sun Run. Additionally comments made by the the IRC Building Committee indicated to proponent that some on the committee agreed that there is a safety issue but the approach taken in the original submittal needed work. Proponent gave consideration to committee advice to review UL 127 however it was determined that the code trumps the standard and the proposed code change is complimentary and not contradictory since the standard is silent on the issue. Additionally, the proposed Section in R324.4 was simpler to draft and present than having to restructure Section R324.6 since the public comment is limited to rooftop mounted photovoltaic panel systems.

This public comment was developed with further input from UL, the Brick Industry Association and Buckley Rumford. Unfortunately stakeholders in opposition and who are members of the solar industry did not join the conversation, they were invited. The group consensus was that there was not sufficient time to address the fire box drafting issues and that the code change should limit itself to a set back distance of less than 10 feet that addresses burning embers from a solid fuel burning fire place that does not include a spark arrestor. The drafting issue will be addressed comprehensively in the next code cycle and only the fire exposure problem will be addressed at this time. The collateral benefit is to provide service and fire fighting pathways around the chimney.

Testifiers in opposition made a good point that fire service pathways need to be maintained not only due to the solar system but as the fire service pointed out later for maintenance and fire fighting access to the chimney itself. Additionally the public comment more narrowly focuses the requirement to rooftop mounted photovoltaic panel systems and purposely excludes BIPV. Chimney sweeps made a point that they need access to chimneys to clean them and to service them an activity that reduces fire risk. All chimneys need to be serviced or replaced at some point during the service life of a building. Additionally proponent was made acutely aware for the need to provide fire fighting access to chimneys when a chimney fire occurred in San Diego, they do occur, see photos attached showing a fire in prefabricated fire place serving an upper unit.

This alternative option is offered to the voting membership is the desired option since it applies the set back to all fire places and appliances regulated in IRC Chapter 10. The IBC, IFC, IMC and IRC will be modified in the next code cycle since they are processed in Group A which has passed for the 2024 IBC. The IRC includes Chapter 18 that needs to be modified to provide a pointer to the proposed code Section. Interestingly IRC Ch 10 includes requirements relied upon in Ch 18 for example Flue lining (material) addressed in Section R1003.11.

We request that voting members of ICC support overturning the correct decision the IRC Building Committee made to disapprove the proposal so that the membership can hear arguments for the public comment submitted and make the final decision that we hope is approved as modified by public comment.



**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The net effect of the public comment and code change proposal will not increase or decrease the cost of construction it is assumed that the code change merely impacts the placement of solar systems adjacent to chimneys. The IRC already addresses set backs from solar system to provide pathways.

Public Comment# 3353

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**Proposed Change as Submitted**

**Proponents:** David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, American Association of Radon Scientists and Technologists, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crpcd.org)

**2021 International Residential Code****Revise as follows:**

**AF103.6.1 Subslab 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. Not less than 4 feet (102 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. All above ground material used shall comply with Section P3002.1.

**Reason:** This proposal prevents a common field problem where the plumbing "tee" fitting fills with concrete when the slab is cast and clarifies that the pipe and fitting material requirements shall be consistent with the IRC.

**Cost Impact:** The code change proposal will increase the cost of construction. Additional 10-foot pipe, costing approximately \$10-15, is required.

RB290-22

**Public Hearing Results****Committee Action:****Disapproved**

**Committee Reason:** The committee disapproved this modification to the Appendix for Radon Control Methods because the felt that passive systems did not fail in the manner described in the reason. The proposed language does not provide a beneficial system and the additional 4 feet is not necessary. (Vote: 7-3)

RB290-22

**Individual Consideration Agenda****Public Comment 1:****IRC: AF103.6.1**

**Proponents:** David Kapturowski, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crpcd.org); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com) requests As Submitted

**Commenter's Reason:** This is a very common problem in the field where concrete from the slab pour leaks past the soil retarder and fills the "Tee Fitting". Gravel can also close off the "Tee Fitting" openings. Adding the pipe extenders keeps the suction point open.

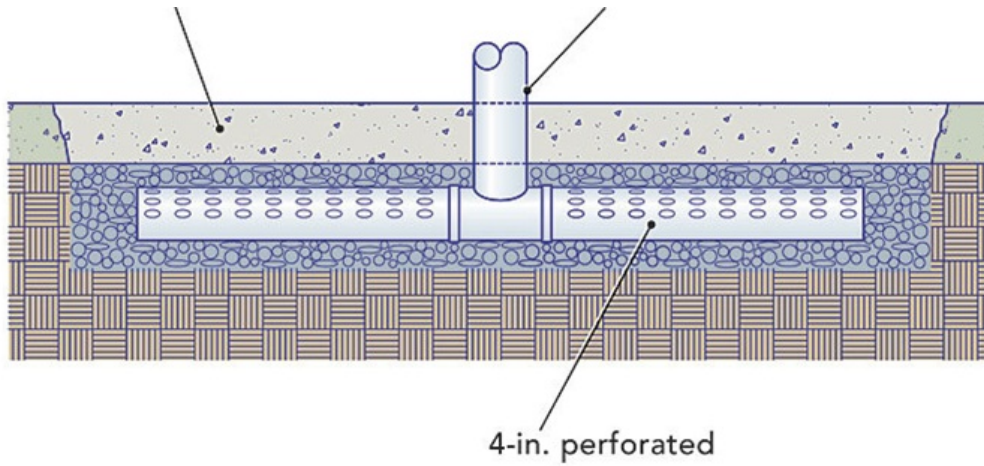
Tee Fitting Clogged with Concrete and Tee Fitting Filled with Gravel



Extending the Tee Fitting with perforated pipe prevents closure of the suction point. This is a minimal cost to the builder.

**Concrete Slab**

**Riser Pipe**



**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction

Additional 10-foot pipe, costing approximately \$10-15, is required.

Public Comment# 3371

## **Proposed Change as Submitted**

**Proponents:** David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crcpd.org)

### **2021 International Residential Code**

**Revise as follows:**

**AF103.8 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 18 inches (46 cm) in the location where the fan would be installed.

**Exception:** The radon vent pipe need not be ~~accessible~~ accessed from in 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 simply reserves adequate space in the attic for future installation of a radon fan. If there is not enough room to add a fan if needed then the entire piping system must be abandoned and redone. This is a common field failure where the pipe is run too close to the eave and is inaccessible.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

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.

RB291-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal to the appendix for Radon Control Methods was disapproved because it is not clear how this will work with a low slope roof with limited access space. What impact do additional elbow have on the system operation? Details were not provided to provide any guidance on how this is to be achieved. The 36 inch minimum clearance is excessive. (Vote: 10-0)

RB291-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** David Kapturowski, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crcpd.org); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com) requests As Submitted

**Commenter's Reason:** Appendix F allows for mounting the fan on the roof when there is insufficient room because of a low roof slope. Elbow bends have a minimal effect on passive systems because the airflow is so small (around 10 cubic feet per minute) that there is little resistance lost in a 90 degree fitting. If there is not enough room to mount a radon fan then the entire passive system may be abandoned and a new piping system installed that will allow for an active system when high radon levels are present. 36 inches is a minimum space for a workman to access the pipe and install a fan.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction

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.



### **Proposed Change as Submitted**

**Proponents:** David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crpcd.org)

### **2021 International Residential Code**

#### **Revise as follows:**

**AF103.5.3 Submembrane 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. Not less than 10 feet (254 cm) of perforated pipe or geotextile matting shall be connected to each of the horizontal openings of the tee fitting or the two horizontal openings shall be connected to the interior drain tile system. 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:** It is a common field problem where the horizontal openings of the "tee" fitting will be closed off by suction on the membrane. This makes the suction point non-functional. The proposal further clarifies the piping material consistent with the IRC plumbing section.

**Cost Impact:** The code change proposal will increase the cost of construction (2)10 foot stick of perforated pipe are additionally required for the system. This will cost \$20-\$25.

RB292-22

### **Public Hearing Results**

#### **Committee Action:**

**Disapproved**

**Committee Reason:** This proposal to the appendix for Radon Control Methods was disapproved the issue described in the reason is not a common reason for failure of the system - the typical pipe is buried in the gravel with a plastic membrane on top. What is the reason for the difference of requirements with an additional 4 feet of pipe in proposal RB290-22 and and addition 10 feet in this proposal? The cost impact statement is about half of what this would cost. There was concern that "connection to an interior drain tile" system is an EPA violation. (Vote: 7-3)

RB292-22

### **Individual Consideration Agenda**

#### **Public Comment 1:**

**Proponents:** David Kapturowski, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crpcd.org); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com) requests As Submitted

**Commenter's Reason:** There is no detail in Appendix F to bury the submembrane "Tee Fitting" in a gravel trench. That is the reason for the 10 foot extension on each side of the "Tee Fitting". Connecting the riser pipe to an interior drain tile system is part of the EPA guidance and does not violate the EPA.

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction (2)10 foot stick of perforated pipe are additionally required for the system. This will cost \$20-\$25.

Public Comment# 3374

## **Proposed Change as Submitted**

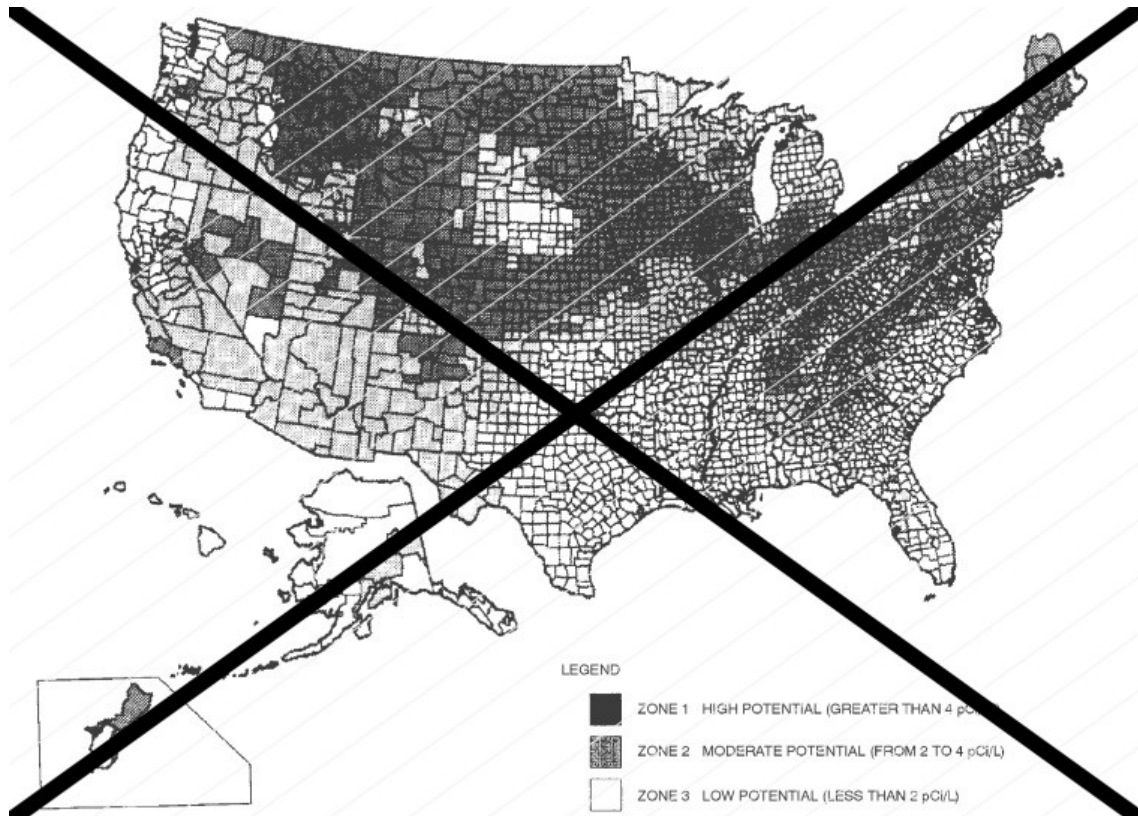
**Proponents:** Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors

### **2021 International Residential Code**

#### **Revise as follows:**

**AF101.1 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:**



1. 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 AF101.1 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 AF101.1 EPA MAP OF RADON ZONES**



## **TABLE AF101.1 HIGH RADON POTENTIAL (ZONE 1) COUNTIES\***

**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 3141 counties 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' average radon test results equal or 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 F will remain an optional appendix that is only in effect where the jurisdiction has adopted it.

In response to stakeholder feedback EPA has been deemphasizing the use of the EPA zone map as a reference for building codes and specifications. 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, it unintentionally creates a false sense of security for those in Zone 2 and Zone 3 that risk in those areas is non-existent. With this in mind, the EPA Indoor airPLUS program (a voluntary partnership and labeling program that helps new home builders improve the Indoor Air Quality) plans to include testing in ALL ZONES in its upcoming Version 2 update. The fact remains that radon is found in all zones and to truly protect against radon you need to test regardless of zone.

It is suggested that the following information be added to the Commentary for the IRC: Code officials seeking radon risk information may consult with the state radon programs listed at <https://www.crcpd.org/page/Radon> or information listed at <https://www.epa.gov/radon/epa-map-radon-zones-and-supplemental-information#datainfo>.

**Cost Impact:** The code change proposal will increase the cost of construction

Adoption of the Appendix adds to the cost of construction. According to results from the Home Innovations Research Lab's survey of homebuilders, the average installation cost for a passive system in 2019 for a single-family detached home was approximately \$463, up from the \$377 reported for 2018 and \$367 reported for 2017.

RB294-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** The proposal for the appendix for Radon Control Methods was disapproved. Some of the committee members felt that by taking the map for EPA Radon Zones out of the code, no guidance is left for the local building officials to make a determination of how close they are to higher prone areas. Removing "in jurisdictions" may not be appropriate because some things may be done at a state or jurisdictional level and a distinction is needed there. Other committee members did not have a problem with removing the map at the request of the EPA based on the age of the map. This proposal allows the policymakers at the jurisdictional level decide whether this can be required. Requiring radon detection systems should be based on a test, not based on assumed average risk levels. (Vote: 6-4)

RB294-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: AF101.1

**Proponents:** Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crcpd.org); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org) requests As Modified by Public Comment

**Further modify as follows:**

## 2021 International Residential Code

**AF101.1 General.** This appendix contains requirements for new construction in jurisdictions where radon-resistant construction is required.

**Commenter's Reason:** This public comment re-inserts the phrase "in jurisdictions" in response to an IRC committee stated concern in disapproving this code change.

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction. Adoption of the Appendix adds to the cost of construction. According to results from the Home Innovations Research Lab's survey of homebuilders, the average installation cost for a passive system in 2019 for a single-family detached home was approximately \$463, up from the \$377 reported for 2018 and \$367 reported for 2017.

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Public Comment# 3265

## **Proposed Change as Submitted**

**Proponents:** David Kapturowski, representing American Association of Radon Scientists and Technologists; Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com); Thomas Bowles, representing EPA (bowles.thomas@epa.gov); Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crcpd.org)

### **2021 International Residential Code**

**Revise as follows:**

**AF103.2 Subfloor preparation.** A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a subslab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:

1. A uniform layer of clean aggregate, not less than 4 inches (102 mm) thick. The aggregate shall consist of material that will pass through a 2-inch (51 mm) sieve and be retained by a  $\frac{1}{4}$ -inch (6.4 mm) sieve.
2. A uniform layer of sand (native or fill), not less than 4 inches (102 mm) thick, overlain by a layer or strips of geotextile drainage matting designed to allow the lateral flow of soil gases.

**Exception:** A sand base course is not required under geotextile drainage matting where the concrete slab is installed on well-drained or sand-gravel mixture soil classified as Group 1 according to the United Soil Classification in accordance with Table R405.1

3. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire subfloor area.

**Reason:** Well drained soils do not require a sand layer and the matting can be laid right on the native soils, where applicable.

**Cost Impact:** The code change proposal will decrease the cost of construction  
This will eliminate the requirement for a sand base layer where appropriate soils exist.

RB295-22

## **Public Hearing Results**

**Committee Action:**

**As Submitted**

**Committee Reason:** This proposal for the appendix on Radon Control Methods allows for additional options for subfloor preparation, however the new exception should be applied to the entire section and not just option 2. (Vote: 10-0)

RB295-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC: AF103.2**

**Proponents:** David Kapturowski, representing American Association of Radon Scientists and Technologists; Jonathan Wilson, representing National Center for Healthy Housing (jwilson@nchh.org); Kevin Stewart, representing American Lung Association (kevin.stewart@lung.org); Ruth McBurney, representing Conference of Radiation Control Program Directors (rmcburney@crcpd.org); Jane Malone, representing American Association of Radon Scientists and Technologists (janemalonedc@gmail.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**AF103.2 Subfloor preparation.** A layer of gas-permeable material shall be placed under all concrete slabs and other floor systems that directly

contact the ground and are within the walls of the living spaces of the building, to facilitate future installation of a subslab depressurization system, if needed. The gas-permeable layer shall consist of one of the following:

**Exception:** A sand base course is not required under geotextile drainage matting where the concrete slab is installed on well-drained or sand-gravel mixture soil classified as Group 1 according to the United Soil Classification in accordance with Table R405.1

1. A uniform layer of clean aggregate, not less than 4 inches (102 mm) thick. The aggregate shall consist of material that will pass through a 2-inch (51 mm) sieve and be retained by a  $\frac{1}{4}$ -inch (6.4 mm) sieve.
2. A uniform layer of sand (native or fill), not less than 4 inches (102 mm) thick, overlain by a layer or strips of geotextile drainage matting designed to allow the lateral flow of soil gases.

~~**Exception:** A sand base course is not required under geotextile drainage matting where the concrete slab is installed on well-drained or sand-gravel mixture soil classified as Group 1 according to the United Soil Classification in accordance with Table R405.1~~

3. Other materials, systems or floor designs with demonstrated capability to permit depressurization across the entire subfloor area.

**Commenter's Reason:** The Exception was relocated as the committee requested.

**Cost Impact:** The net effect of the public comment and code change proposal will decrease the cost of construction. This will eliminate the requirement for a sand base layer where appropriate soils exist.

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Public Comment# 3375

**Proposed Change as Submitted**

**Proponents:** Julie Furr, representing FEMA-ATC Seismic Code Support Committee (jfurr@rimkus.com); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov)

**2021 International Residential Code**

Revise as follows:

**APPENDIX AJ  
EXISTING BUILDINGS ~~AND STRUCTURES~~**

**SECTION AJ101  
PURPOSE AND INTENT**

Revise as follows:

**AJ101.1 General.** The purpose of these provisions is to encourage the continued use or reuse of legally existing buildings ~~and structures~~. These provisions are intended to permit work in existing buildings that is consistent with the purpose of this code. Compliance with these provisions shall be deemed to meet the requirements of this code. Structural elements and systems shall comply with Section R102.7.1 and Chapter 3 through Chapter 10 of the *International Residential Code*.

**SECTION AJ102  
COMPLIANCE**

Revise as follows:

**AJ102.1 General.** Regardless of the category of work being performed, the work shall not cause the building 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 to any previously *approved* alternative arrangements than it was before the work was undertaken.

Add new text as follows:

**AJ102.2 Structural.** Structural elements and systems that are altered, repaired, or replaced shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code*. The work performed shall not cause the structure to become less compliant with the *International Residential Code* than it was before the work was undertaken.

**SECTION AJ104  
EVALUATION OF AN EXISTING BUILDING**

Revise as follows:

**AJ104.1 General.** The *building official* shall have the authority to require an existing building to be investigated and evaluated by a *registered design professional* in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions and Section R102.7.1 and structural provisions of the *International Residential Code*, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:

1. Available documentation of the existing building.
  - 1.1. Field surveys.
  - 1.2. Tests (nondestructive and destructive).
  - 1.3. Laboratory analysis.

**Exception:** Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing an extensive reconstruction shall not be required to be evaluated.

**SECTION AJ107**

## REPAIRS

Add new text as follows:

**AJ107.4 Structural.** Repaired structural elements and systems shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code*.

## SECTION AJ108 RENOVATIONS

Revise as follows:

**AJ108.4 Structural.** Structural elements and systems modified by the renovation shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code*. Unreinforced masonry buildings located in Seismic Design Category D<sub>2</sub> or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.

## SECTION AJ109 ALTERATIONS

Revise as follows:

**AJ109.4 Structural.** Altered structural elements and systems shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code*. The minimum design loads for the structure shall be the loads applicable at the time the building was constructed, provided that a dangerous condition is not created. Structural elements that are uncovered during the course of the *alteration* and that are found to be unsound or dangerous shall be made to comply with the applicable requirements of this code.

## SECTION AJ110 RECONSTRUCTION

Add new text as follows:

**AJ110.5 Structural.** Reconstructed structural elements and systems shall comply with Section R102.7.1 and the structural provisions of Chapter 3 through Chapter 10 of the *International Residential Code* for new construction.

**Reason:** This proposal aligns the structural provisions of Appendix AJ with the main body of the IRC. Appendix AJ has not been updated to correlate with changes in the IRC and IEBC provisions that have occurred during recent code cycles. However, Section AJ101.1 states: “Compliance with these provisions shall be deemed to meet the requirements of this code.” Given both the limitations of the structural requirements outlined in Appendix AJ and the disconnect between the appendix and main body of the codes (IRC and IEBC), allowing this Appendix to be considered “deemed to comply” is dangerous with regard to the structure.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. This proposal will not increase the cost of construction within the IRC, since the main body of the IRC is the default resource used given the present limitations of Appendix AJ.

RB297-22

## Public Hearing Results

Committee Action:

As Modified

Committee Modification:

**AJ101.1 General.** The purpose of these provisions is to encourage the continued use or reuse of legally existing buildings. These provisions are intended to permit work in existing buildings that is consistent with the purpose of this code. Compliance with these provisions shall be deemed to meet the requirements of this code. Structural elements and systems shall comply with Section R102.7.1 and the provisions of this Appendix, Chapter 3 through Chapter 10 of the International Residential Code.

**AJ102.2 Structural.** Structural elements and systems that are altered, repaired, or replaced shall comply with Section R102.7.1 and the structural provisions of this Appendix, Chapter 3 through Chapter 10 of the International Residential Code. The work performed shall not cause the structure to become less compliant with the International Residential Code than it was before the work was undertaken.

**AJ102.4 Structural.** The minimum design loads for the structure shall be the loads applicable at the time the building was constructed. The minimum design loads for new structural components shall comply with the International Residential 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 R102.7.1.

**AJ104.1 General.** The *building official* shall have the authority to require an existing building to be investigated and evaluated by a *registered design professional* in the case of proposed reconstruction of any portion of a building. The evaluation shall determine the existence of any potential nonconformities to these provisions and Section R102.7.1 and structural provisions of this Appendix, ~~the International Residential Code~~, and shall provide a basis for determining the impact of the proposed changes on the performance of the building. The evaluation shall use the following sources of information, as applicable:

1. Available documentation of the existing building.
  - 1.1. Field surveys.
  - 1.2. Tests (nondestructive and destructive).
  - 1.3. Laboratory analysis.

**Exception:** Detached one- or two-family dwellings that are not irregular buildings under Section R301.2.2.6 and are not undergoing an extensive reconstruction shall not be required to be evaluated.

**AJ107.4 Structural.** Repaired structural elements and systems shall comply with Section R102.7.1 and the structural provisions of this Appendix. ~~Chapter 3 through Chapter 10 of the International Residential Code.~~

**AJ108.4 Structural.** Structural elements and systems modified by the renovation shall comply with Section R102.7.1 and the structural provisions of this Appendix. ~~Chapter 3 through Chapter 10 of the International Residential Code.~~ Unreinforced masonry buildings located in Seismic Design Category D<sub>2</sub> or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.

**AJ109.4 Structural.** Altered structural elements and systems shall comply with Section R102.7.1 and the structural provisions of this Appendix. ~~Chapter 3 through Chapter 10 of the International Residential Code.~~

**AJ110.5 Structural.** Reconstructed structural elements and systems shall comply with Section R102.7.1 and the structural provisions of this Appendix. ~~Chapter 3 through Chapter 10 of the International Residential Code for new construction.~~

**Committee Reason:** This proposal for the appendix for Existing Buildings is approved as modified. The modification provides an opportunity to use loads required at the time of construction on existing elements and new loads on new elements. The proposal is consistent with action previously taken and it fixes Section AJ108.4. There may need to be some correlation with Section AJ108.4 and previous actions. There were concern that removing the words "and structures" from the title removes some of the scoping from this provision. (Vote: 9-1)

RB297-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

IRC: APPENDIX AJ, SECTION AJ101, AJ101.1, SECTION AJ102, AJ102.1, AJ102.2, AJ102.4, AJ108.4, AJ109.4

**Proponents:** Julie Furr, representing FEMA ATC Seismic Code Support Committee (jfurr@rimkus.com); Michael Mahoney, representing FEMA (mike.mahoney@fema.dhs.gov); Kelly Cobeen, representing Federal Emergency Management Agency/Applied Technology Council - Seismic Code Support Committee (kcobeen@wje.com) requests As Modified by Public Comment

**Further modify as follows:**

## **2021 International Residential Code**

### **APPENDIX AJ EXISTING BUILDINGS AND STRUCTURES**

#### **SECTION AJ101 PURPOSE AND INTENT**

**AJ101.1 General.** The purpose of these provisions is to encourage the continued use or reuse of legally existing buildings and structures. These provisions are intended to permit work in existing buildings that is consistent with the purpose of this code. ~~Compliance with these provisions shall be deemed to meet the requirements of this code.~~ Structural elements and systems shall comply with Section R102.7.1 and the provisions of this Appendix.

## SECTION AJ102 COMPLIANCE

**AJ102.1 General.** Regardless of the category of work being performed, 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 to any previously *approved* alternative arrangements than it was before the work was undertaken.

**AJ102.2 Structural.** Structural elements and systems that are altered, repaired, or replaced shall comply with Section R102.7.1 and the structural provisions of this Appendix. The work performed shall not cause the structure to become less compliant with the International Residential Code than it was before the work was undertaken.

~~**AJ102.4**~~ **AJ102.2.1 Structural-Design loads.** The minimum design loads for the structure shall be the loads applicable at the time the building was constructed. The minimum design loads for new structural components shall comply with the International Residential 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 R102.7.1.

~~**AJ108.4 Structural.** Structural elements and systems modified by the renovation shall comply with Section R102.7.1 and the structural provisions of this Appendix.~~ Unreinforced masonry buildings located in Seismic Design Category D<sub>2</sub> or E shall have parapet bracing and wall anchors installed at the roofline whenever a *reroofing permit* is issued. Such parapet bracing and wall anchors shall be of an *approved* design.

~~**AJ109.4 Structural.** Altered structural elements and systems shall comply with Section R102.7.1 and the structural provisions of this Appendix.~~

**Commenter's Reason:** This public comment restores the references to "structure" that were removed from Appendix AJ with the original proposal and overlooked with the approved floor modifications.

AJ102.4 was added by the floor modification, however, the original intent was for this section to be a subset of AJ102.2. There should not be two sections with the same title.

AJ108.4 is deleted as a correlation with RB206-22 that was approved as modified and deals more unreinforced masonry parapets – with is currently the only structural item dealt with in this section on Renovations.

AJ109.4 is deleted as a correlation with RB162-22 that was approved as modified and deals more extensively with requirements for structural alterations to existing buildings.

In developing this public comment, we have collaborated with WABO and other interested parties. This public comment will work in conjunction with WABO's code change proposals and public comments. The link below is to a document showing how Appendix AJ is intended to look, if all of the related Appendix AJ proposals and public comments are approved. Where proposals and public comments operate on the same section, this combined document identifies which text is intended to control.

- [https://www.cdpassess.com/public-comment/3132/27763/files/download/3682/FEMA\\_IRC%20APP%20J%20compiled%2007-21-22.docx](https://www.cdpassess.com/public-comment/3132/27763/files/download/3682/FEMA_IRC%20APP%20J%20compiled%2007-21-22.docx)
  - This shows what Appendix AJ would look like if these proposals were approved with floor modifications and public comments: RB7, RB162, RB163, RB206, and RB297

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. Because the main body of the code is the default resource used given the present limitations of Appendix AJ, this proposal with floor modifications and public comments will not increase the cost of construction within the IRC. This is a long overdue cleanup that begins to align the Appendix provisions with the requirements of the main body of the code as they are frequently interpreted and used in the field.

**Staff Analysis:** Public comments to RB7, RB162, RB163, RB206 and RB297 addresses requirements for Appendix J in a different or contradicting manner. Approved proposal to Appendix J but without a public comment are RB99, RB296, RB298 and RB299. The membership is urged to make their intention clear with their actions on these public comments.



## RB310-22

### ***Proposed Change as Submitted***

**Proponents:** Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Eisenberg, representing DCAT (strawnet@gmail.com); Kevin Donahue, representing Verdant Structural Engineers (kevin@verdantstructural.com); David Rich, representing Reax Engineering Inc. (rich@reaxengineering.com)

### **2021 International Residential Code**

**Revise as follows:**

**AU108.1 Fire-resistance rating.** ~~Cob walls are not fire-resistance-rated.~~ Cob walls that comply with Table AU108.1 shall be considered to provide a two-hour fire-resistance rating.

**Add new text as follows:**

**TABLE AU108.1 TWO-HOUR FIRE-RESISTANCE RATED COB WALLS**

| <u>Allowable superimposed load (plf)</u> | <u>Density<sup>a</sup> (pcf)</u>                            | <u>Minimum compressive strength per Section AU106.6.1 (psi)</u> | <u>Wall type reinforcement per Table AU105.3</u> | <u>Minimum thickness<sup>c</sup> at top of wall (inches)</u> | <u>Minimum thickness<sup>c</sup> at bottom of wall (inches)</u> |
|--|---|---|--|--|---|
| <u>1,200</u>                             | <u>100</u>  | <u>85</u>   | <u>E</u>   | <u>9</u>   | <u>12</u>   |
| <u>475</u>                               | <u>50 pcf for the top 40 inches of wall height, maximum</u> | <u>40<sup>b</sup></u>   | <u>E or F</u>                                    | <u>8</u>   | <u>12</u>   |
|  | <u>70 pcf for the top 80 inches of wall height, maximum</u> | <u>55<sup>b</sup></u>   |  |  |   |
| <u>non load-bearing</u>                  | <u>50 to 100<sup>d</sup></u>                                | <u>&gt;60 psi</u><br><u>&lt;60 psi<sup>b</sup></u>              | <u>E or F</u>                                    | <u>9</u>   | <u>9</u>  |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 0.45 kg

- a. Density is to be measured at equilibrium moisture content. Average wall density shall be within +/- 5 pcf of the tabulated value.
- b. Requires an *approved* engineered design per Section AU106.6.
- c. Cob thickness only. The interior and exterior cob faces shall be permitted to be unfinished or receive any plaster finish allowed by this appendix.
- d. Cob walls with more than one density shall be built with heavier densities below lighter densities.

**Revise as follows:**

**TABLE AU105.3 OUT-OF-PLANE RESISTANCE METHODS AND UNRESTRAINED WALL HEIGHT LIMITS**

| WALL TYPE <sup>a, g, h</sup> AND METHOD OF OUT-OF-PLANE LOAD RESISTANCE   | FOR ULTIMATE DESIGN WIND SPEEDS (mph) | FOR SEISMIC DESIGN CATEGORIES | UNRESTRAINED COB WALL HEIGHT $H^{b, c}$ |  | TOP ANCHOR <sup>e</sup> SPACING (inches) | TENSION TIE <sup>f</sup> SPACING (inches) |
|---|---------------------------------------|-------------------------------|---|--|--|---|
|   |                                       |                               | Absolute Limit (feet)                   | Limit Based on Wall Thickness $T^d$ (feet) |  |   |
| Wall 1 <sup>i</sup> : no anchors, no steel wall reinforcing   | $\leq 110$                            | A                             | $H \leq 8$                              | $H \leq 6T$                                | None                                     | 48  |
| Wall 2: top anchors, <sup>j</sup> continuous vertical 6" x 6" x 6" 6-inch x 6-inch 6-gage steel mesh in center of wall embedded in foundation 12 inches | $\leq 140$                            | A, B, C                       | $H \leq 8$                              | $H \leq 8T$                                | 12                                       | 24  |
| Wall A <sup>i</sup> : top anchors, no vertical steel reinforcing  | $\leq 120$                            | A, B                          | $H \leq 8$                              | $H \leq 6T$                                | 12                                       | 48  |
| Wall B <sup>i</sup> : top and bottom anchors, no vertical steel reinforcing   | $\leq 130$                            | A, B                          | $H \leq 8$                              | $H \leq 6T$                                | 12                                       | 48  |
| Wall C: top and bottom anchors, continuous vertical threaded rod at 4 feet on center embedded in foundation and connected to bond beam                  | $\leq 140$                            | A, B, C                       | $H \leq 8$                              | $H \leq 8T$                                | 12                                       | 24  |
| Wall D: continuous vertical threaded rod at 1 foot on center embedded in foundation and connected to bond beam  | $\leq 140$                            | A, B, C                       | $H \leq 8$                              | $H \leq 8T$                                | N/A                                      | 24  |
| Wall E: top anchors, continuous vertical 6" x 6" x 6" 6-inch x 6-inch 6-gage steel mesh 2 inches from each face of wall embedded in foundation          | $\leq 140$                            | A, B, C                       | $H \leq 8$                              | $H \leq 8T$                                | 12                                       | 24  |
| Wall F: top anchors, continuous vertical 6-inch x 6-inch 10-gage steel mesh 2 inches from each face of wall embedded in foundation                      | $\leq 140$                            | A, B, C                       | $H \leq 8$                              | $H \leq 8T$                                | 12                                       | 24  |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s.

N/A = Not Applicable

- See Table AU106.11(1) for reinforcing and anchorage specifications for wall Types A, B, C, D and E.
- $H$  = height of the cob portion of the wall only. See Figure AU101.4. The maximum  $H$  is the absolute limit or the limit based on wall thickness, whichever is more restrictive.
- Bond beams or other horizontal restraints are capable of separating a wall into more than one unrestrained wall height with an approved engineered design.
- $T$  = Cob wall thickness (in feet) at its minimum, without plaster.
- $\frac{5}{8}$ -inch threaded rod anchors at prescribed spacing with 12-inch embedment in cob, full embedment in concrete bond beams or full penetration in wood bond beam with a nut and washer.
- Attach rafters to bond beam with 4-inch by 3-inch by 3-inch by 18 gage tension tie angles at prescribed spacing. See Figure AU106.9.5. Where rafters are attached to tension ties, roof sheathing shall be edge nailed.
- All walls shall be tested for compressive strength in accordance with Section AU106.6.
- For curved walls with an arc length to radius ratio of 1.5:1 or greater, the  $H/T$  factor shall be increased by 1, and the absolute height limit by 1 foot.
- Wall type requires a modulus of rupture test in accordance with Section AU106.7.
- See wall Type A in Table AU106.11(1) for top anchor requirements.

**Reason:** A fire-resistance-rated cob wall assembly is added based on ASTM E119 test reports and an accompanying letter from the NTA/ICC testing engineers as well as Reax Engineering, which can be found at: <https://www.cobcode.org/cobcode-documents>. All Elements of Row 1 and 2, except for column 1 row 1 are references to the exact assembly tested in the ASTM E119 test with a field-common, 5% margin allowance for density. The requirement of column 1, row 1 is based on the ASTM E119 test and accompanying Engineering Judgment letters from NTA/ICC engineers and Reax Engineering. The requirement in footnote c is based on the unplastered assembly that was tested in the ASTM E119 test with the conservative allowance of the optional addition of plaster. The final row on the chart is based on conservatively removing the allowable superimposed load for the range of densities (50-100 pcf) tested in the ASTM E119 test. The reinforcing matches the ASTM E119 tests and the minimum thickness matches the minimum thickness of the ASTM E119 test for the highest density present (100pcf). An additional wall assembly

was added to Table AU105.3 to allow for the exact gauge of reinforcing steel used in one of the ASTM E119 tests. Concerning out-of-plane loading, this system is stronger than the one tested and governing Table AU105.3, therefore this addition is conservative.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This change simply offers options for tested fire-resistance-rated cob walls, which are no more costly than other non-rated cob walls.

RB310-22

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## **Public Hearing Results**

### **Committee Action:**

**Disapproved**

**Committee Reason:** This proposal for the appendix for Cob Construction was disapproved because there was concern that only two systems were tested, and it seems like the codes require every potential variable for other wall assemblies and other materials in the codes. Some felt this proposal does clarify the direction to achieve a fire resistance rating. (Vote: 6-3)

RB310-22

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## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** AU108.1, TABLE AU108.1

**Proponents:** Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Eisenberg, representing DCAT (strawnet@gmail.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); David Rich, representing Reax Engineering Inc. (rich@reaxengineering.com) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

**AU108.1 Fire-resistance rating.** Cob walls that comply with Table AU108.1 ~~shall be considered to provide~~ have a two-hour fire-resistance rating.

**TABLE AU108.1 TWO-HOUR FIRE-RESISTANCE RATED COB WALLS**

| Allowable superimposed load (plf) | Density <sup>a,d</sup> (pcf)  | Minimum compressive strength per Section AU106.6.1 (psi) | Wall type reinforcement per Table AU105.3 | Minimum thickness <sup>c,e,f</sup> at top of wall (inches) | Minimum thickness <sup>c,e,f</sup> at bottom of wall (inches) |
|-----------------------------------|---|--|---|--|---|
| 1,200                             | 100   | 85   | E   | 9  | 12  |
| 475                               | ≥ 50 pcf: top of wall to for the top 40 inches from top of wall height, maximum.            | 40 <sup>b</sup>  | E or F                                    | 8  | 12  |
|                                   | ≥ 70 pcf: 40 inches from for the top of wall to 80 inches from top of wall height, maximum. | 55 <sup>b</sup>  |   |  |   |
|                                   | ≥ 90 pcf: 80 inches from top of wall to bottom of wall.                                     | 85   |   |  |   |
| non load-bearing                  | 50 to 100 <sup>d</sup>  | > ≥ 60 psi<br>< 60 psi <sup>b</sup>                      | E or F                                    | 9  | 9   |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound = 0.45 kg

- a. Density is to be measured at equilibrium moisture content. Average wall density shall be within +/- 5 pcf of the tabulated value.
- b. Requires an *approved* engineered design per Section AU106.6.
- c. Cob thickness only. The interior and exterior cob faces shall be permitted to be unfinished or receive any plaster finish allowed by this appendix.
- d. Cob walls with more than one density shall be built with heavier densities below lighter densities.
- e. Minimum cob wall thickness shall be whichever is greater in Table AU105.3, Table AU106.11(1) and Table AU108.1.
- f. Wall thicknesses less than 10" require an engineered design.

**Commenter's Reason:** In both opposition testimony and comments by the IRC Committee inaccurate statements were made at the CAH that created unwarranted doubt or confusion about this proposal. These include that multiple tests are required for an assembly or material to be given a fire-resistance rating in the code; that only one test had been performed; and that the proposal did not specify material makeup requirements to ensure that constructed rated walls would match what was tested. In addition to refuting those incorrect assertions, this Public Comment rewords some of RB310-22's code language to address legitimate concerns raised at the CAH and makes other improvements for greater clarity. First, the language in the IRC and IBC indicates that a fire-resistance rating can be attained for an assembly by passing the required test, in this case ASTM E119 or UL 263 for walls. There is no language in the code requiring multiple tests to receive recognition as a rated assembly. Only that the required test is performed by an approved lab, is successful, properly documented, and that the code requirements for the rated assembly or material match what was tested, all of which the proposed code change in RB310 does. The proposed Table AU108.1 provides options by carefully matching what was tested to what is required for a fire-resistance rated cob wall. Additional footnotes further clarify the limitations and requirements in this table.

This is not a case where the tested walls barely passed the fire tests, or that a change in material makeup allowable in Appendix AU could affect the fire-resistance of the wall. Two full-scale 2-hour ASTM E119 tests were conducted with virtually no heat rise on the cool side of the wall, and both then passed the hose stream test. Importantly, the same materials required or allowed for cob walls in this appendix and this code change proposal – clay soil, sand and straw - have been used for centuries to build ovens and kilns specifically because of their ability to contain fire.

Cob density is governed by the proportion of straw in the mix. Within the material requirements of Appendix AU and density range tested and allowed in this proposal, there is no material makeup that wouldn't easily achieve a 2-hour rating. Furthermore, Appendix AU requires a shrinkage test (Section AU103.4.1) for *all* cob mixes, to minimize or eliminate cracking in service. This ensures that a rated cob wall subjected to fire, regardless of its exact material makeup, will not contain cracks that could compromise its ability to perform to its rated fire-resistance.

As stated in support testimony, the original proposal for Appendix AU for the 2021 IRC included a 1-hour fire-resistance rating without an ASTM E119 or UL 263 test, which drew opposition that resulted in disapproval at the 2019 CAH. A subsequent public comment removed the fire rating, resulting in the approval of Appendix AU. RB310-22 directly follows the recommendations of the committee and those who spoke in opposition, by conducting the needed testing and providing associated code provisions for those rated walls. The testing conducted and documented is more than adequate to support the proposed fire-resistance ratings for the cob walls described in RB310.

It should be noted that the fire-safety experts who opposed Appendix AU's original proposal because of the lack of testing, were consulted about the

ASTM E119 tests conducted and the test results were shared with them in preparation for the RB310 code change proposal. They testified in support of RB310 at the CAH. Also, individuals who testified in opposition to the current proposal at the CAH were engaged before the Public Comment was submitted. Misunderstandings were clarified and we attempted to address their concerns.

Second, two cob walls were tested, each with differing densities and thickness, and both easily passed ASTM E119 2-Hour tests, including the hose stream test. Several comments in testimony claimed only one test was performed. Laboratory reports of the tests were and are available at a linked website (see below) along with other supporting information.

Third, the specifics of the two tested walls are reflected in the requirements in RB310's Table AU108.1, with corresponding densities, compressive strength, reinforcement, and thickness. One tested wall contained three densities from bottom to top, that all performed exceedingly well in the test. The other wall was of a different, single density. Thus, four different densities ranging from 50 pcf to 100 pcf, were tested and proven to easily pass the 2-hour E119 fire test.

Fourth, for important context: Australia has had standards for earthen wall systems including for fire safety for decades. The Australian Earth Building Handbook, HB195-2002, in Section 4.6 Fire Resistance Level, states, "In the absence of specific test data, the general fire resistance level (FRL) of earth walls satisfying the minimum thickness requirements outlined in Clause 4.3.4 may be taken as not greater than 120/120/120, or 90/90/90 where wall thickness is less than 200 mm." Clause 4.3.4 Structural Adequacy states: "Minimum recommended thicknesses for mud brick, stabilized pressed block and rammed earth are as follows: External walling - 200 mm, Internal walling - 125 mm. The minimum wall thickness for poured earth and cob wall construction is also recommended to be 200 mm, though in practice wall thickness will often exceed this value."

The three numbers in the FRL represent minutes before failure for structural adequacy/integrity/insulation. In other words, the time for the wall to be able to maintain a load, maintain its integrity, and before heat increase on the unheated side of the wall exceeds accepted limits. Thus, Australia gives a 2-hour fire resistance rating for a 200 mm (7.87") earth wall, including for cob walls.

Further, Australian Standard AS 3959-2009, "Construction of Buildings in Bushfire-Prone Areas," was produced in response to the many severe bushfires they have suffered. Based on the actual performance of earthen wall buildings in Australia, mud brick with a minimum thickness of 90mm (3.54") is listed as one of only three exterior wall materials allowed to be used in the highest bushfire exposure zones without need of additional testing (the other two being full masonry and concrete). The minimum thickness of cob walls in this public comment is 8 inches, more than double the minimum thickness in the Australian standard. These Australian documents are available via the supporting documents

link: <https://www.cobcode.org/cobcode-documents>

See photo below of one of two cob wall specimens tested at the independent testing laboratory.



**Bibliography:** The test reports and other supporting documents for this Public Comment as well as the code change proposal and the original proposal for Appendix AU are available for download and review here: <https://www.cobcode.org/cobcode-documents>

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This change simply offers options for tested fire-resistance-rated cob walls, which are no more costly than non-rated cob walls.



## **Proposed Change as Submitted**

**Proponents:** Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Eisenberg, representing DCAT (strawnet@gmail.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net); Kevin Donahue, representing Verdant Structural Engineers (kevin@verdantstructural.com); David Rich, representing Reax Engineering Inc. (rich@reaxengineering.com); Nicholas Bartlett, representing Self (bartster84@gmail.com)

### **2021 International Residential Code**

**Revise as follows:**

**AU108.1 Fire-resistance rating.** ~~Cob walls are not fire-resistance-rated.~~ Cob walls that comply with all of the following shall be considered to provide a two-hour fire-resistance rating:

1. The reinforcing requirements of wall type E in Table AU106.11(1).
2. A minimum bottom of wall thickness of 12 inches (305 mm) and a minimum top of wall thickness of 10 inches (254 mm).
3. An average cob density at equilibrium moisture content, between 95 and 105 pounds per cubic foot (1602 kg/m ).
4. A minimum compressive strength of 85 psi (586 kPa) per Section AU106.6.1.
5. The superimposed design load shall not exceed 1200 pounds per linear foot (2790 kg/m).
6. The interior and exterior cob faces shall be unfinished or receive a plaster finish permitted by this appendix.

**Reason:** A fire-resistance-rated cob wall assembly is added based on ASTM E119 test reports and an accompanying letter from the NTA/ICC testing engineers as well as Reax Engineering, which can be found at: <https://www.cobcode.org/cobcode-documents>. Requirements in Items 1-4 are references to the exact assembly tested in the ASTM E119 test, with a field-common 5% margin allowance for density. The requirement in Item 5 is based on the ASTM E119 test and accompanying Engineering Judgment letters from NTA/ICC engineers and Reax Engineering. The requirement in Item 6 is based on the unplastered assembly that was tested in the ASTM E119 test with the conservative allowance of the optional addition of plaster.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
This change simply offers an option for a tested fire-resistance-rated cob wall, which is no more costly than other non-rated cob walls.

RB311-22

## **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal for the appendix for Cob Construction was disapproved because this does not include specific material requirements to make an analogy. Concrete masonry has things like sand and aggregate and type of cement that are applied and these type of specific material requirements are not seen in this code change. There was also concern expressed on the language "shall be considered" and regarding some of the testing. Some of the committee felt that this proposal is based on ASTM E 119 test and reports and accompanying supporting information. This is different than having a table that had a whole bunch of information in it, this has specific criteria that have to be met. Some did not think there's much material deviation as to when they're doing the adobe portion of the of the cob construction that is subject to variables. It was believed to be necessary for them to have a fire resistant rated wall for certain applications, and this gives enough information to get the process started. (Vote: 5-4)

RB311-22

## **Individual Consideration Agenda**

**Public Comment 1:**

IRC: AU108.1



**Proponents:** Anthony Dente, representing Verdant Structural Engineers (anthony@verdantstructural.com); David Eisenberg, representing DCAT (strawnet@gmail.com); Martin Hammer, representing Martin Hammer, Architect (mfhammer@pacbell.net) requests As Modified by Public Comment

**Modify as follows:**

## 2021 International Residential Code

**AU108.1 Fire-resistance rating.** Cob walls that comply with all of the following ~~shall be considered to provide~~ have a two-hour fire-resistance rating:

1. The reinforcing requirements of wall type E in Table AU106.11(1).
2. A minimum bottom of wall thickness of 12 inches (305 mm) and a minimum top of wall thickness of 10 inches (254 mm).
3. An average cob density at equilibrium moisture content, between 95 and 105 pounds per cubic foot (1602 kg/m<sup>3</sup>).
4. A minimum compressive strength of 85 psi (586 kPa) per Section AU106.6.1.
5. The superimposed design load shall not exceed 1200 pounds per linear foot (2790 kg/m).
6. The interior and exterior cob faces shall be unfinished or receive a plaster finish permitted by this appendix.

**Commenter's Reason:** As with RB310, in both opposition testimony and comments by the IRC Committee inaccurate statements were made at the CAH that created unwarranted doubt or confusion about this proposal. These include that multiple tests are required for an assembly or material to be given a fire-resistance rating in the code; that only one test had been performed; and that the proposal did not specify material makeup requirements to ensure that constructed rated walls would match what was tested. In addition to refuting those incorrect assertions, this Public Comment rewords RB310-22's code language to address a legitimate concern raised at the CAH.

First, the language in the IRC and IBC indicates that a fire-resistance rating can be attained for an assembly by passing the required test, in this case ASTM E119 or UL 263 for walls. There is no language in the code requiring multiple tests to receive recognition as a rated assembly. Only that the required test is conducted by an approved lab, is successful, properly documented, and that the code requirements for the rated assembly or material match what was tested, all of which the proposed code change in RB311 does.

In addition, in testimony in opposition, reference was made to the requirements in Chapter 7 of the IBC and that more testing should be done. The design and intent of the IRC is to have a stand-alone comprehensive prescriptive residential building code, and the point of creating appendices such as AU, is for the IRC is to provide such prescriptive requirements for residential building materials or systems that need not rely on the IBC for approval. From the Preface to the 2021 IRC: "The *International Residential Code* (IRC) establishes minimum requirements for one- and two-family dwellings and townhouses using prescriptive provisions. It is founded on broad-based principles that make possible the use of new materials and new building designs."

This is not a case where the tested walls barely passed the fire tests, or that a change in material makeup allowable in Appendix AU could affect the fire-resistance of the wall. Two full-scale 2-hour ASTM E119 tests were conducted with virtually no heat rise on the cool side of the wall, and both then passed the hose stream test. Importantly, the same materials required or allowed to be used for cob walls in this appendix and this code change proposal – clay soil, sand and straw - have been used for centuries to build ovens and kilns specifically because of their ability to contain fire.

Second, two cob walls were tested, each with differing densities and thickness, and both easily passed ASTM E119 2-Hour tests, including the hose stream test. Several comments in testimony claimed only one test was performed. Laboratory reports of the tests were and are available at a linked website (see below) along with other supporting information. The testing conducted and documented is more than adequate to support the proposed fire-resistance rating for the cob wall described in RB311. It should be noted that the fire-safety experts who testified in opposition because of the lack of testing in Appendix AU's original proposal were consulted for guidance about the ASTM E119 tests conducted, and the results of the tests were shared with them in preparation for the RB311 code change proposal. One of them testified in support of RB311 at the CAH.

Cob density is governed by the proportion of straw in the mix, and within the material requirements and range of densities allowed in this proposal, there is no material makeup that wouldn't easily achieve a 2-hour rating. It is also notable that Appendix AU requires a shrinkage test (Section AU103.4.1) for *all* cob mixes, to minimize or eliminate cracking in service. This ensures a fire-rated cob wall subjected to fire, regardless of its exact material makeup, will not contain cracks that could compromise its ability to meet its fire-resistance rated time period.

Third, for important context: Australia has had standards for earthen wall systems including for fire safety for decades. The Australian Earth Building Handbook, HB195-2002, in Section 4.6 Fire Resistance Level, states, "In the absence of specific test data, the general fire resistance level (FRL) of earth walls satisfying the minimum thickness requirements outlined in Clause 4.3.4 may be taken as not greater than 120/120/120, or 90/90/90 where wall thickness is less than 200 mm." Clause 4.3.4 Structural Adequacy states: "Minimum recommended thicknesses for mud brick, stabilized pressed block and rammed earth are as follows: External walling - 200 mm, Internal walling - 125 mm. The minimum wall thickness for poured earth and cob wall construction is also recommended to be 200 mm, though in practice wall thickness will often exceed this value."

The three numbers in the FRL represent minutes before failure for structural adequacy/integrity/insulation. In other words, the time for the wall to be able to maintain a load, maintain its integrity, and before heat increase on the unheated side of the wall exceeds accepted limits. Thus, Australia

gives a 2-hour fire resistance rating for a 200 mm (7.87") earth wall, including for cob walls.

Further, Australian Standard AS 3959-2009, "Construction of Buildings in Bushfire-Prone Areas," was produced in response to the many severe bushfires they have suffered. Based on the actual performance of earthen wall buildings in Australia, mud brick with a minimum thickness of 90mm (3.54") is listed as one of only three exterior wall materials allowed to be used in the highest bushfire exposure zones without need of additional testing (the other two being full masonry and concrete). The minimum thickness of cob walls in this public comment is 8 inches, more than double the minimum thickness in the Australian standard.

These Australian documents are available via the supporting documents link: <https://www.cobcode.org/cobcode-documents>

**Bibliography:** The test reports and other supporting documents for this Public Comment as well as the code change proposal and the original proposal for Appendix AU are available for download and review here: <https://www.cobcode.org/cobcode-documents>

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. This change simply offers options for tested fire-resistance-rated cob walls, which are no more costly than other non-rated cob walls.

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Public Comment# 3357

## ***Proposed Change as Submitted***

**Proponents:** Stephen Szoke, representing American Concrete Institute (steve.szoke@concrete.org); Scott Campbell, representing NRMCA (scampbell@nrmca.org)

### **2021 International Residential Code**

**Revise as follows:**

**AW101.1 Scope.** Buildings, structures and building elements fabricated in whole or in part using 3D-printed construction techniques shall be designed, constructed and inspected in accordance with the provisions contained in this appendix and other applicable requirements in this code.

**Exception:** This Appendix shall not be applicable to 3D printed buildings constructed of concrete.

**Reason:** Experience in the field of construction 3D printing of concrete, an understanding of research in that field, and an understanding of the construction industry demonstrates that there is no consensus indicating that the material property tests called out in UL 3401 are representative of 3D printing technologies used for construction or that this particular standard in its current state considers all of the material properties necessary for a structural engineer to properly perform design calculations or ensure the safety of personnel during construction.

If this approach remains in the IRC, the concern is that this technology will be implemented for a short period of time, but will ultimately meet its demise due to issues in construction as there is not a consensus regarding construction and engineering design procedures that are addressed by this appendix. There is a lot to consider when a manufacturing method is adopted for use in construction, especially when expectations are often that structural systems are intended to last 100 years. There are many cases in construction where lack of oversight of construction considerations, such as connection or proper building energy performance (both of which have not been addressed for 3D printed construction), have led to failures in building systems. In an industry that can't accept failure, early adoption may lead early abandonment of the technology.

UL 3401 called out in this appendix does not incorporate the conclusions of current research in the field of 3D printed concrete construction. In terms of cementitious materials there is consensus that the act of 3D printing results in a difference in material strength from cast materials and that this strength differs based on element orientation (Ma et al 2018, Wolfs et al 2019, Panda et al 2017, Sanjayan et al 2018). The tests called out in UL3401 only account for vertical loading of elements with layers perpendicular to the load direction and does not account for other loading directions that may result in differences in material performance. This assumes that either this is the worst-case scenario or that buildings only undergo loading in the vertical direction. Not accounting for anisotropy does not provide an engineer with enough information to properly design for all loading conditions that a structure may experience.

Additionally, research has shown that material properties of printed materials are not the same as cast materials since they are extruded and not consolidated in a mold, which results in variation in materials performance. Therefore, tests like ASTM C157 Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete are not applicable, since the test requires casting and consolidation of materials so that steel studs can be embedded for placement in the measuring device. Material performance also depends on layer height and so the test specimen sizes need to be sufficient enough to account for statistical variation in material properties due to layer height or variation in specimen dimensions based on layer height. As the ASTM tests referenced in the standard are intended for cast specimens, and such variations are not addressed in the standard, this material variation cannot be addressed by this proposal in its current state.

The most critical omission is that the UL 3401 does not account for very early age properties of cementitious materials, which is a potential construction site or facility safety issue. The standard specifically calls out slump tests (ASTM C143 or ASTM C1611). This type of test, while widely used in the field, is not applicable to printable concrete/mortars. It does not provide measurements required for determine stability of prints. Reliance on this test will lead to materials that are not printable or result in on-site safety issues. Concrete 3D printing processes can be done safely but rely on stability of the print, as there is no formwork. This requires an understanding of the yield strength, flow characteristics, elastic modulus gain over time, and strength gain over time (Perrot 2015, Roussel 2018, Wolfs 2018, Suiker 2020, Jayatilakage 2020). The slump test does not provide the level of detail required for an engineer to perform construction load and stability calculations.

While it is understood that this appendix is intended to only address the determination of material properties and printer systems, it is unclear based on the tests if design considerations were included in the determination of the material tests chosen. In general, whether for cementitious or polymeric type materials, there is a lack of publicly available studies or understanding in the structural load testing of representative components or systems for engineering applications found in construction that conclude that results from these tests can be used for design purposes. This applies whether these items are being used for structural or architectural applications. With this gap in research, it is unclear whether 3D printed elements or their connections using material values from this proposal can be properly designed for structural applications. Properties being investigated by concrete industry experts include but are not limited to: analytical methods; anchorage; bond between layers; cleanouts; durability; rheology; reinforcement types, placement and positioning; shrinkage; strength; thixotropy; time to bond; time to set; use of polymers; and viscosity.

While the appendix might be appropriate for other materials, it is not appropriate for additive manufacturing using concrete. Test and evaluation techniques used for conventional cast-in-place concrete are not sufficient and may not be appropriate for additive manufacturing using concrete. 3D printing of concrete buildings should remain an alternative means and methods until such time that the concrete industry experts develop

appropriate inspection, testing, design, materials, and construction practices with an understanding of properties and performance. Designs and construction using 3D printers still can comply through Section R104.11 Alternative materials, design and methods of construction and equipment.

**Bibliography:** Ma et al 2018, Wolfs et al 2019, Panda et al 2017, Sanjayan et al 2018, Perrot 2015, Roussel 2018, Wolfs 2018, Suiker 2020, Jayathilakage 2020

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction. This proposal excludes concrete systems from compliance with Appendix AW. It does not preclude the use of 3D printed buildings, but based on current concrete technology, encourages alternative means and methods for approval of 3D printed concrete buildings.

RB312-22

## **Public Hearing Results**

### **Committee Action:**

### **As Submitted**

**Committee Reason:** This proposal for the appendix for 3D-printed Building Construction was approved because there is considerable lack of data that is required for the additive manufacturing using concrete. The ACI representative spoke against the use of concrete in this type of construction. Since both the opposition and proponents considered the materials used concrete, more work is needed on this issue in the codes. There was concern that there were no 3D-printing manufactures or installing representatives present so that there was input from what is going on in the field. (Vote: 8-1)

RB312-22

## **Individual Consideration Agenda**

### **Public Comment 1:**

**Proponents:** Jonathan Roberts, representing UL (jonathan.roberts@ul.com) requests Disapprove

**Commenter's Reason:** The majority of companies who 3D print buildings are using mortar like cementitious materials as the print material for this new construction method. These structures are being built right now, at an ever-increasing pace. Appendix AW provides a methodology that generates data that can be used to evaluate and approve this construction method under the alternate materials and methods code provisions. Among other things UL 3401 verifies that the 3D printing equipment, the fabrication process, cementitious materials, and quality control procedures used will produce building elements with properties that do not vary from build to build. Additionally, a copy of the 3D printed operation for the building can be obtained as a record for the construction for future references. Exempting 3D printed buildings constructed of concrete from this adoptable appendix leaves no guidance at all for registered design professionals, contractors, or buildings officials to use when evaluating this very common material for this new construction technique.

We agree with the proponents that the properties of 3D printed cementitious construction varies from that of cast materials. UL 3401 contains provisions for testing material properties and performances for cementitious, polymeric, and cellulosic materials. The material properties and performance testing in UL 3401 is not limited to the test standards that are listed in the materials section. If a 3D printed building manufacturer or registered design professional determine that additional or alternate test standards are applicable, and for test standards referenced in the IRC, then testing can be done to those standards. The UL 3401 report of findings will identify the material test standards and results.

We do not understand why the proponent thinks that following UL 3401 will lead to the demise of 3D printed building construction. There is no data provided about UL 3401 designs not meeting design expectations. Quite the contrary, this construction technique is growing exponentially globally, and thus far has been extremely successful and welcomed by the industry.

Also, the proponent mentioned that one problem with UL 3401 is that expectations are that the buildings structural systems are intended to last 100 years. We agree that the structural design of a building is important. The UL 3401 report of findings describes the equipment and process to be followed to 3D print buildings, and the test results that have been obtained using those parameters. Appendix AW also requires the structural design to be provided in addition to the UL 3401 report of findings. A public comment submitted for RB313-21 clarifies the structural design requirements further.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. No change to code.



## RB313-22

### **Proposed Change as Submitted**

**Proponents:** Scott Campbell, representing NRMCA (scampbell@nrmca.org)

#### **2021 International Residential Code**

**Revise as follows:**

**AW103.1 Design ~~process~~organization.** ~~3D-printed buildings, structures and building elements shall be designed by an organization certified in accordance with UL 3401 by an approved agency and approved by the building official in accordance with this section. Designs shall be completed in accordance with the professional licensing requirements of the local jurisdiction and building code and designs shall be approved pursuant to the local jurisdiction's planning and review process.~~

**Reason:** The requirement that the design of buildings, structures and building elements be performed by entities approved by a 3<sup>rd</sup> party organization is contrary to the professional licensing laws in all jurisdictions. A professional license is the legal requirement to perform design in the area of expertise of the licensee and, along with compliance with the building code, is sufficient for the design of any structure.

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction  
No change to construction practice is proposed. If anything, this proposal will decrease the cost of construction by eliminating a requirement for 3<sup>rd</sup> party certification of the design professional.

RB313-22

### **Public Hearing Results**

**Committee Action:**

**Disapproved**

**Committee Reason:** This proposal for the appendix for 3D-printed Building Construction was disapproved because of issues with the language, especially with dealing with the professional licensing requirements. Not all jurisdictions will have a planning review process dedicated to 3D-printed construction. (Vote:9-0)

RB313-22

### **Individual Consideration Agenda**

#### **Public Comment 1:**

**IRC:** AW103.1 (New), AW103.1, AW103.2

**Proponents:** Jonathan Roberts, representing UL (jonathan.roberts@ul.com); Scott Campbell, representing NRMCA (scampbell@nrmca.org)  
requests As Modified by Public Comment

**Replace as follows:**

#### **2021 International Residential Code**

**AW103.1 Fabrication process.** The process used to fabricate the 3D-printed building construction shall be evaluated by an approved agency in accordance with UL 3401.

~~**AW103.1-AW103.2 Design organization.** 3D-printed buildings, structures and building elements shall be designed by a registered design professional based on a report of findings prepared by approved agency an organization certified in accordance with UL 3401. by an approved agency and approved by the building official in accordance with this section.~~

~~**AW103.2-AW103.3 Design approval.** The structural design, construction documents and UL 3401 report of findings shall be submitted for review and approval in accordance with Section 104.11.~~

**Commenter's Reason:** This public comment addresses concerns raised at the CAH about the reference to design organization. This public comment clarifies the responsibilities of the approved agency that certifies the 3D printed construction process and materials in accordance with UL

3401, and the registered design professional that designs the specific building or structure that utilizes the 3D printing process, and submits plans to the code official. These will typically be two separate organizations.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. No change to construction practice is proposed. If anything, this proposal will decrease the cost of construction by eliminating a requirement for 3<sup>rd</sup> party certification of the design professional.

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Public Comment# 3178

## **Proposed Change as Submitted**

**Proponents:** Jay Crandell, P.E., ABTG/ARES Consulting, representing Foam Sheathing Committee of the American Chemistry Council (jcrandell@aresconsulting.biz); Rob Brooks, representing DuPont (rob@rtbrooks.com)

### **2021 International Residential Code**

Add new text as follows:

#### **APPENDIX AY** **EXTENDED PLATE WALL CONSTRUCTION**

##### **SECTION AY101** **GENERAL**

**AY101.1 General.** Detached one- and two-family or townhome buildings using extended plate wall (EPW) construction shall comply with the International Residential Code and all of the following:

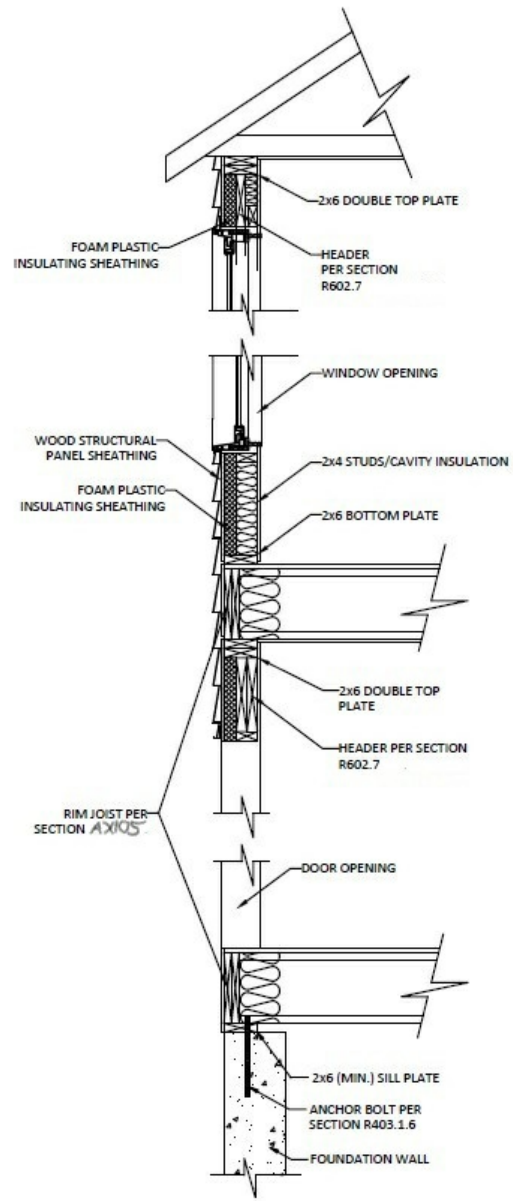
1. Not more than two stories above grade plane in height.
2. Limited to Seismic Design Categories A and B as determined from Figures R301.2.2.1(1) through (6).
3. Limited to ultimate design wind speeds no more than 115 mph as determined from Figure R301.2(2).
4. Comply with the provisions of Section R602 of the International Residential Code, except as modified by the provisions of this Appendix.

**Exception:** Buildings using EPW construction in accordance with an approved design by a registered design professional.

##### **SECTION AY102** **CONSTRUCTION REQUIREMENTS**

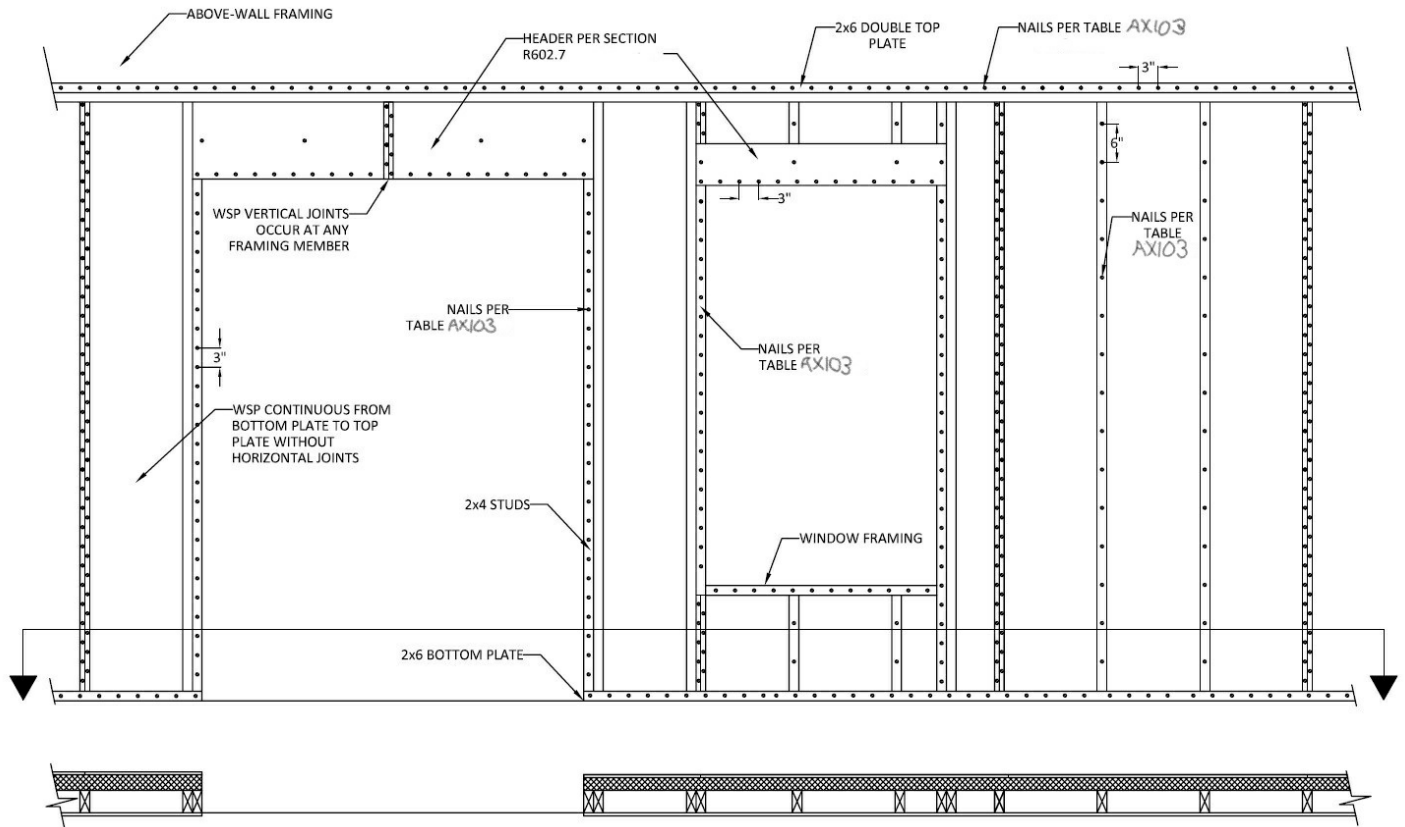
**AY102.1 Framing.** The 2x6 top and bottom plates and 2x4 studs shall be used in accordance with Figures AY102.1(1) and AY102.1(2). A single top plate shall not be permitted. Wall framing shall comply with requirements for 2x4 framing in accordance with Section R602 of the International Residential Code.





*(Reference in note on bottom left should be to AY102.4)*

**FIGURE AY102.1(1) Extended Plate Wall (EPW) Construction, Section View**



(Reference in Figure should be to AY102.2 (6 locations))

**FIGURE AY102.1(2) Extended Plate Wall, Elevation View**

**AY102.2 Wood structural panel sheathing.** Wood structural panel sheathing with a nominal thickness of 7/16-inch (11 mm) to 1/2-inch (12.7mm) shall be installed vertically and attached to wall plates and studs in accordance with Table AY102.2 and Figure AY102.1(2). The vertical joints between adjacent wood structural panels shall occur only at framing members. Where used as part of wall bracing, each wood structural panel shall be installed without horizontal joints between the extended top and bottom plates.

**TABLE AY102.2 Sheathing Fastener Requirements for EPW**

| <b><u>Minimum Nail Length and Diameter</u></b>                      | <b><u>Maximum Fastener Spacing</u></b>   |  |
|---|--|--|
|   | <b><u>At Perimeter of Wood Structural Panels</u></b><br><b><u>(inches)</u></b> | <b><u>In Field of Wood Structural Panels</u></b><br><b><u>(inches)</u></b> |
| No. 37 Power-tool Driven Common Nail (3-1/2" x 0.131") <u>a,b,c</u> | 3" O.C.  | 6" O.C.  |
| 16d Box Nail (3-1/2" x 0.135") <u>a,c,d</u>                         | 3" O.C.  | 6" O.C.  |

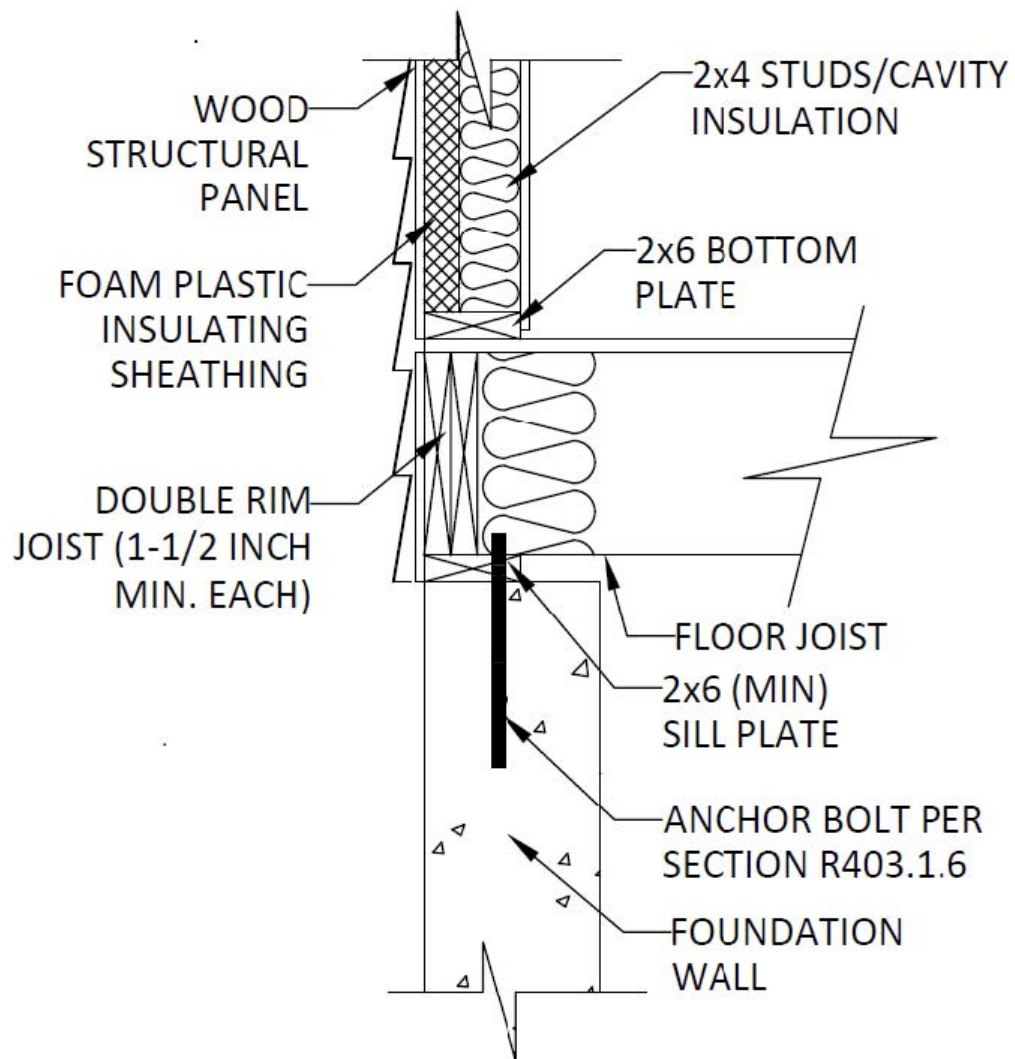
For SI: 1-inch = 25.4 mm

- a. At top and bottom plates where the wood structural panel is in direct contact with the framing, 8d common nail (2-1/2" x 0.131") shall be permitted.
- b. Full round head nail with minimum head diameter of 0.281 inches (7 mm).
- c. Nails are in accordance with ASTM F1667.

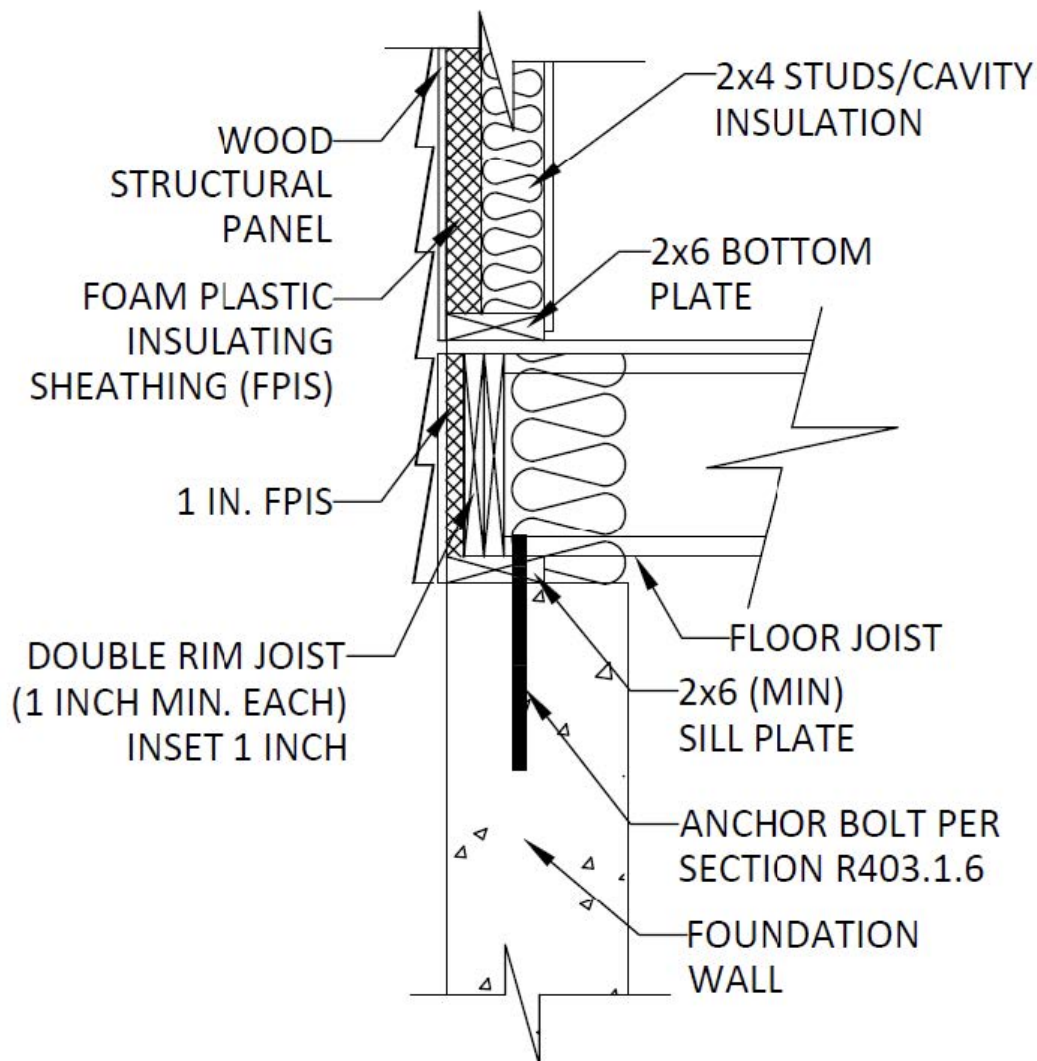
**AY102.3 Wall bracing.** Wall bracing for EPW construction shall comply with the requirements for WSP or CS-WSP or CS-G bracing methods in Section R602.10 of the *International Residential Code*, except that the sheathing fasteners shall comply with Table AY102.2.

**AY102.3.1 Simplified wall bracing.** With the exception of Section R602.12.2 Item 2, provisions of Section R602.12 of the *International Residential Code* shall be applicable to EPW construction. The fastening schedule for wood structural panels shall comply with Table AY102.2.

**AY102.4 Rim joist.** Rim joists supporting an EPW shall comply with Figure AY102.4(1) or Figure AY102.4(2). Sawn 2x lumber or engineered wood rim board shall be used to construct rim (band) joists. Engineered wood rim board shall comply with Section R602.1.7 of the *International Residential Code*. The minimum bearing length requirements for the floor joists shall be satisfied or joists shall be supported with metal hangers.



**FIGURE AY102.4(1) Rim Joist Construction for EPW - Double Member**



**FIGURE AY102.4(2) Rim Joist Construction for EPW - Inset Double Member**

**AY102.4.1 Rim joist used as rim header.** Wood rim boards, or band joists, that serve as rim board headers shall be constructed in accordance with Section R602.7.2 of the *International Residential Code*.

**AY102.5 Foam plastic insulating sheathing.** Foam plastic insulating sheathing with a total thickness of 2 inches (51 mm) shall be installed between top and bottom plates directly to the exterior surface of the 2x4 studs and flush with the 2x6 top and bottom plates as shown in Figure AY102.1(1). The foam plastic insulating sheathing shall comply with ASTM C578 or ASTM C1289 with a minimum compressive strength of 15 psi and shall be permitted to be installed in one or more layers.

**AY102.6 Cladding attachment.** Cladding shall be specified and installed in accordance with Section R703 of the *International Residential Code* and one of the following:

1. Table R703.3.3 for siding attachment to wood structural panels only.
2. Table R703.8.4(2) for brick tie-spacing and attachment to wood structural panels only.
3. Fastening schedule and fasteners as required by Table R703.3(1), except fastener length shall be selected to meet or exceed the minimum required penetration into framing.

**AY102.7 Uplift connections.** Where roof uplift tie-downs are required in accordance with Section R802.11 of the *International Residential Code*, the roof tie-downs shall be fastened to either side of the double top plate or, where required to be fastened to studs, shall be installed on the interior face of the EPW in accordance with manufacturer's installation instructions. Where uplift forces determined in accordance with Section R602.3.5 require approved uplift connectors between floors or between foundation and the floor, these uplift connectors shall not rely on wood structural panel sheathing for resisting the wind uplift forces.

**Reason:** Jay Crandell, P.E., representing FSC:

This proposal includes requirements for Extended Plate Wall (EPW) construction in a non-mandatory appendix to the IRC, alongside other innovative construction methods found in other appendices. Where this proposed appendix is adopted, EPW construction will provide a practical compliance option for meeting energy code requirements for above-grade walls using conventional wood framing materials. EPW construction uses standard framing, sheathing, fastening and insulating materials configured for optimized constructibility and performance. The EPW framing system has been extensively evaluated in the lab and in practice for its structural performance, moisture performance, energy performance and constructibility in the field by the Home Innovation Research labs (see website link in the Bibliography for various technical reports, guides, and resources). The evaluations were funded by the USDA's Forest Products Laboratory, U.S. Department of Energy, New York State Energy Research and Development Authority, and the American Chemistry Council. Four demonstration homes have been constructed and have been occupied and in successful use for many years. The wall system can be assembled in the field or fabricated in a factory for on-site installation. Based on the scope of the evaluations, the proposed system is limited to low-seismic and low-wind areas. For conditions outside of the scope limitations, the proposal requires an approved engineering design.

Rob Brooks, RBA, representing DuPont:

The 2021 IECC has expanded the optional prescriptive use of continuous insulation to include much of the US covered by Climate Zones 3-8. This has increased interest in, and the need for, cost-effective and innovative methods to construct wood frame, above-grade residential walls with continuous insulation. DuPont, together with the government agencies listed in the FSC reason statement have partnered to offer an alternative wall framing method that uses 2x4 studs and 2x6 plates, complete with installation instructions. The construction method was designed to impact the fewest possible trades.

Testing of the EPW method was completed in 2017, training guides were produced in 2018, and a 2021 IRC code change proposal was introduced in 2019 for Section R602. The proposal was disapproved citing the need for engineering oversight of a system that could go up to 3 stories in height, higher wind and seismic areas with wind uplift.

This code change proposal adds further conservatism to the 2021 IRC proposal by using the following:

- 1) Adding these provisions through an Appendix, giving jurisdictions the option to adopt this construction method.
- 2) Limited the applicable areas to Seismic A and B, and wind speeds less than 115 mph.
- 3) Limit the building height to two stories or less.
- 4) Adding language to address wind uplift.

**Bibliography:** [www.homeinnovation.com/EPW](http://www.homeinnovation.com/EPW)

**Cost Impact:** The code change proposal will not increase or decrease the cost of construction

This framing method is an alternative to existing framing methods and will not increase the cost of construction. Where continuous insulation is to be installed, this method will decrease the cost of construction.

RB315-22

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## **Public Hearing Results**

### **Committee Action:**

**As Submitted**

**Committee Reason:** The new appendix for Extended Plate Construction was approved because this is an option for conventional framing with limited application because of the height and seismic zone limitations in this appendix. This was developed collaboratively and information on construction is readily available. Previous committees asked this same group to come back with this option as an appendix. This is a good starting point and is an options worth putting in an appendix.

There were concerns about problems associated with load tracking from the roof to the foundation as well as some lateral concerns. This system would not meet the current requirements for wood construction in the IRC. (Vote: 7-2)

RB315-22

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## **Individual Consideration Agenda**

## **Public Comment 1:**

**Proponents:** Jay Crandell, representing P.E., ABTG / ARES Consulting (jcrandell@aresconsulting.biz) requests As Submitted

**Commenter's Reason:** This proposal was approved as submitted by committee based on adequacy of the proposed provisions as documented by collaborative research and testing by the Home Innovation Research Labs (HIRL) and actual homes constructed using the extended plate wall method, including three case studies sponsored by USDA Forest Products Lab (USDA-FPL), New York State Energy Research and Development Agency (NYSERDA), and the DOE Building America Program. The research, testing, and case studies are documented at [www.homeinnovation.com/EPW](http://www.homeinnovation.com/EPW).

As the committee indicated, "this is a good starting point and is an option worth putting in an appendix". Hearing testimony also highlighted that the extended plate construction method uses conventional wood framing materials and methods and is at least as valid as other appendices addressing alternative construction materials and methods such as straw-clay construction, cob construction, and strawbale construction. Further, application of the appendix is conservatively restricted to low wind and seismic regions, two story construction or less, among other limitations. For these reasons, the proponents believe a strong consensus was achieved and we ask that you sustain the committee action for approval as submitted.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. The non-mandatory appendix offers an optional construction method that does not change the cost of construction because it is an option that doesn't change any of the existing construction options in the base code. If the appendix is adopted, it can result in a decrease in cost of compliance with the building and energy codes.

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Public Comment# 3233

## **Public Comment 2:**

**Proponents:** David Tyree, representing American Wood Council (dtyree@awc.org); Philip Line, representing American Wood Council (pline@awc.org) requests Disapprove

**Commenter's Reason:** The American Wood Council (AWC) recommends disapproval unless further limitations are incorporated into the prescriptive requirements, or use of the system is coupled with engineered design. Common construction details of concern, which rely on cross-grain bending strength of wood or that will cause rotation of the wall plates include wind uplift straps attached to outside face of wall top plates, birds-mouth notched rafters bearing on the outside edge of wall top plates, framed floors which can cantilever beyond the supporting wall below, and in-plane shear loading in combination these uplift/bearing loads on extended plates. Should the extended plate system be approved as an Appendix Chapter, inclusion of information in commentary to avoid wind uplift and gravity support details through cantilevered portions of extended plates is recommended.

**Cost Impact:** The net effect of the public comment and code change proposal will not increase or decrease the cost of construction. No change to code.

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Public Comment# 3075

## **Proposed Change as Submitted**

**Proponents:** Eirene Knott, representing Metropolitan Kansas City Chapter of the ICC (eirene.knott@brrarch.com); Ron Olberding, representing Edward Wayne Inc. (ronolberding@sbcglobal.net)

### **2021 International Residential Code**

Add new text as follows:

#### **APPENDIX AY** **PHYSICAL SECURITY**

##### **SECTION AY101** **GENERAL**

**AY101.1 Purpose.** The purpose of this appendix is to establish minimum standards that incorporate physical security to make dwelling units resistant to unlawful entry.

**AY101.2 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 Section R102.7.1.

##### **SECTION AY102** **DOORS**

**AY102.1 Doors.** All exterior doors and doors leading from the garage area into the dwelling unit, shall comply with Sections AY102.1.1 through AY102.1.5 based on the type of door installed.

###### **Exceptions:**

1. Vehicle access doors
2. Storm or screen doors

**AY102.1.1 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.

**AY102.1.2 Steel doors.** Steel doors shall be a minimum skin thickness of 24 gauge and have reinforcement material at the location of the deadbolt.

**AY102.1.3 Fiberglass doors.** Fiberglass doors shall have a minimum skin thickness of 1/16 inch (1.6 mm) and have reinforcement material at the location of the deadbolt.

**AY102.1.4 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.

**AY102.1.5 Sliding doors.** Sliding doors shall be installed to prevent the removal of the panels from the exterior.

##### **SECTION AY103** **DOOR FRAMES**

**AY103.1 Door frames.** The exterior door frames shall be installed prior to the rough-in inspection. One and one-half inch (38 mm) 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 AY103.1.1 through AY103.1.3 based on the type of door installed.

**AY103.1.1 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.

**AY103.1.2 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.

**AY103.1.3 Sidelite entry doors.** 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 AY104**

### **DOOR HARDWARE**

**AY104.1 Door hardware.** Exterior door hardware shall comply with Sections AY104.1.1 through AY104.1.4.

**AY104.1.1 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.

**AY104.1.2 Escutcheon plates.** All exterior doors shall have escutcheon plates protecting the door's edge at the location of the deadbolt.

**AY104.1.3 Locks.** Exterior doors shall be provided with a deadbolt with a minimum grade B as determined by ANSI/BHMA A156.40.

**AY104.1.4 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 AY105**

### **REFERENCED STANDARDS**

**AY105.1 General.** See Table AY105.1 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 AY105.1 REFERENCED STANDARDS**

| <b><u>STANDARD ACRONYM</u></b> | <b><u>STANDARD NAME</u></b>                                    | <b><u>SECTIONS HEREIN REFERENCED</u></b> |
|--------------------------------|--|--|
| ASTM F476-14                   | Standard Test Methods for Security of Swinging Door Assemblies | AY103.1, AY104.1.1                       |
| ANSI/BHMA A156.40-2020         | Residential Deadbolts  | AY104.1.3                                |

**Reason:** This change was originally submitted as RB300-19. What is being presented for this cycle is language that addressed the concerns of the committee members at the time. The committee agreed that language such as this should be placed in the appendix so that jurisdictions can make their choice of whether or not to adopt this code language that can provide for a minimum level of protection for the public safety in their own homes. 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.

Much like a smoke detector provides the homeowner ample time to respond to a possible fire, this code change is an attempt to provide the homeowner ample time to respond to an attempted break-in. What helps to prevent crime is witness potential. By delaying the potential entry into a home, the probability of a witness increases. Whether you live in a rural or urban environment, this code change provides the homeowner ample time to respond.

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 homes 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. What about cameras, which are growing in popularity today? Those are a great help for after the fact; after the house has been broken into and the damage has already been done to not only the home but potentially the home owner.

The changes here reflect concerns and comments expressed from the committee for their decision on RB 161. The committee agreed this language belongs in the Appendix so the items presented in this public comment should address the concerns expressed by the committee members as well as others who spoke in opposition at the committee hearings.

Another concern expressed by the committee was that the building code is not a crime prevention code. We agree with the committee. However, the code does address life safety, which is what we believe this code change covers.

**Cost Impact:** The code change proposal will increase the cost of construction

The cost to secure a single door ranges from \$40-60 for a single door unit and between \$140-180 for a double sidelite unit.

**Staff Analysis:** A review of the standards proposed for inclusion in the code, ASTM F476-14, Standard Test Methods for Security of Swinging Door Assemblies and ANSI/BHMA A156.40-2020, Residential Deadbolts Standard for the Protection of Records, with regard to some of the key ICC criteria for referenced standards (Section 3.6 of CP#28) will be posted on the ICC website on or before March 16, 2022.

RB317-22

## **Public Hearing Results**

### **Committee Action:**

**Disapproved**

**Committee Reason:** This new appendix for Physical Security was disapproved because some of the committee felt that this is outside the scoping of what the intent of the IRC. The IRC is used to provide a structure that can withstand loads from the environment such as snow loads and wind loads, not the ability to resist the force of a criminal trying to gain entry into the building. Therefore it's not something that belongs in the building code, in an appendix or not. It should be something that is the homeowners individual desire to what degree physical security should be done or by a local ordinance.

While favor for the proposal was also expressed from personal experiences and noting rising crime rates, there needs to be further collaboration to make improvements for resident's safety, including collaboration from the door and window manufacturer's. There are a few vague terms that need to be cleared up like "reinforcement material". (Vote: 6-3)

## **Individual Consideration Agenda**

### **Public Comment 1:**

**IRC:** SECTION AY102, AY102.1, AY102.1.1, AY102.1.2, AY102.1.3, AY102.1.4, AY102.1.5, AY103.1.2, AY104.1, AY104.1.4

**Proponents:** Eirene Knott, representing Self (eirene.knott@brrarch.com); Ron Olberding, representing Self (ronolberding@sbcglobal.net) requests As Modified by Public Comment

**Modify as follows:**

### **2021 International Residential Code**

#### **SECTION AY102 DOORS**

**AY102.1 Doors.** All exterior doors and doors leading from the garage area into the dwelling unit, shall comply with Sections AY102.1.1 through ~~AY102.1.5~~ AY102.1.3 based on the type of door installed.

**Exceptions:**

1. Vehicle access doors
2. Storm or screen doors

**AY102.1.1 ~~Wood doors~~ Doors.** ~~Wood doors~~ ~~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.

**AY102.1.2 ~~Steel doors~~.** ~~Steel doors~~ shall be a minimum skin thickness of 24 gauge and have reinforcement material at the location of the deadbolt.

**AY102.1.3 ~~Fiberglass doors~~.** ~~Fiberglass doors~~ shall have a minimum skin thickness of 1/16 inch (1.6 mm) and have reinforcement material at the location of the deadbolt.

**AY102.1.4 ~~AY102.1.2~~ 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.

**AY102.1.5 ~~AY102.1.3~~ Sliding doors.** Sliding doors shall be installed to prevent the removal of the panels from the exterior.

**AY103.1.2 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.

**AY104.1 Door hardware.** Exterior door hardware shall comply with Sections AY104.1.1 through ~~AY104.1.4~~ AY104.1.3.

**AY104.1.4 ~~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.~~

**Commenter's Reason:** A couple of floor modifications were presented in Rochester in attempt to address some concerns from industry. Those floor modifications have been included with this public comment as well as removing language that was deemed to be either too prescriptive or unenforceable.

**Cost Impact:** The net effect of the public comment and code change proposal will increase the cost of construction To provide the security provisions as outlined in this code change, an increase will occur. That increase will vary from \$40-60 for a single door to \$140-180 for a double sidelite unit.

Public Comment# 3475