



National
Association
of Home
Builders

2021

International Codes Suggested Amendments





State and local HBAs should consider these amendments to maintain cost-effective and affordable code provisions when discussing the adoption of the 2021 International Codes. NAHB developed these amendments based on the outcome of the 2018-2019 ICC Code Development Cycles.

Each amendment is shown in *legislative text* (underline and ~~strikethrough~~) and includes a supporting reason statement explaining why the jurisdiction should consider them.. Some of the suggested amendments, such as those for energy code provisions and the residential sprinklers, have additional supporting documents and information on the NAHB website and are so indicated.

From the "*Amendment Lookup*" page read the brief introduction and choose the amendment you are interested in. The underlined portion is a hotlink to the amendment.

This document is available upon request in "Word" format. You can copy and or change any portion of the "Word" document to fit your precise needs, if you would like the word document sent to you or if you have questions, please contact:

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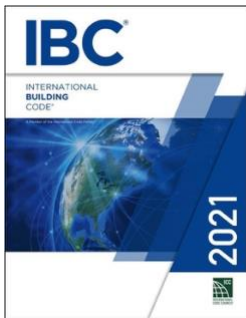
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1. Mezzanines

This amendment removes IBC language that does not apply to mezzanines within one- and two-family dwellings.

Revise as follows:

R325.1 General. Mezzanines shall comply with Sections R325 through R325.5.

R325.2 Mezzanines. The clear height above and below mezzanine floor construction shall be not less than 7 feet (2134 mm).

R325.3 Area limitation. The aggregate area of a mezzanine or mezzanines shall be not greater than one-third of the floor area of the room or space in which they are located. The enclosed portion of a room shall not be included in a determination of the floor area of the room in which the mezzanine is located.

Exception: The aggregate area of a mezzanine located within a dwelling unit equipped with an automatic sprinkler system in accordance with Section P2904 shall not be greater than one-half of the floor area of the room, provided that the mezzanine meets all of the following requirements:

1. Except for enclosed closets and bathrooms, the mezzanine is open to the room in which such mezzanine is located.
2. The opening to the room is unobstructed except for walls not more than 36 ~~42~~ inches (1067 mm) in height, beams, columns and posts.
3. The exceptions to Section R325.5 are not applied.

R325.4 Means of egress. The means of egress for mezzanines shall comply with the applicable provisions of Section R311.

R325.5 Openness. Mezzanines shall be open and unobstructed to the room in which they are located except for walls not more than 36 inches (914 mm) in height, beams, columns and posts.

Exceptions:

1. Mezzanines or portions thereof are not required to be open to the room in which they are located, provided that the aggregate floor area of the enclosed space is not greater than 10 percent of the mezzanine area.
- ~~2. In buildings that are not more than two stories above grade plane and equipped throughout with an automatic sprinkler system in accordance with Section R313, a mezzanine shall not be required to be open to the room in which the mezzanine is located.~~

Reason:

This amendment reduces the allowable height of a wall enclosing a mezzanine that is greater than one-third of the room below but less than one-half of the room below to 36" to match the standard guard height required in the IBC as well as matching the allowable wall height in section R325.5, and adds beams to exception #2 and section R325.5 as part of the list of structural components.

This change also deletes exception #2 to the openness requirements of the mezzanine. This exception was extracted directly from the IBC and addresses mezzanines in office buildings, supermarkets, industrial facilities, and other types of buildings where it may be desirable to fully enclose a mezzanine to provide office space, employee breakrooms, storage rooms, or similar uses. In a typical one- and two-family dwelling or a townhouse, mezzanines are generally open to the floor below except for the guard required by code or any closets or bathrooms. If a homeowner or builder desires an enclosed mezzanine, they could apply IBC Section 505 to the construction of the mezzanine.

2. Wind-Borne Debris Protection – Definition of Wind-Borne Debris Region

This amendment modifies the definition of "wind-borne debris region" so protection where the wind speed is 130 miles per hour or greater is only required within one mile of the coastal mean high-water line, rather than within one mile of any body of water greater than one mile in width including inland lakes and large rivers.

Revise as follows:

[RB] WINDBORNE DEBRIS REGION. Areas within hurricane-prone regions located in accordance with one of the following:

1. Within 1 mile (1.61 km) of the coastal mean high-water line where ~~an Exposure D condition exists upwind at the waterline and~~ the ultimate design wind speed, V , is 130 mph (58 m/s) or greater.
2. In areas where the ultimate design wind speed, V , is 140 mph (63.6 m/s) or greater; or Hawaii.

Reason:

This amendment restores the definition of the wind-borne debris region that existed prior to the 2021 IRC. While billed by the proponents as a clarification that could reduce cost, the change to the definition in the 2021 IRC is a significant change that will cause more confusion than it eliminates and greatly expand where wind-borne debris protection is required.

The use of the word "coastal" in the 130-mph trigger for wind-borne debris protection used in previous editions clearly implied an intent to trigger protection for sites near open water such as the Atlantic Ocean or the Gulf of Mexico. The traditional 130-mph trigger did not apply to water bodies such as fully landlocked lakes or rivers that do not feed directly into the ocean. It would not even apply to rivers that do open to the ocean if the shorelines of such rivers are more than one mile from the mean high-water line at the actual coast.

However, many such lakes or rivers are more than a mile wide in at least one direction and a site located upwind of that direction could be classified as Exposure D. Therefore, the revised definition in the 2021 IRC would in fact appear to capture sites near the shorelines of large inland lakes or wide rivers (whether open to the ocean or not) if the wind speed at the site also equals or exceeds 130 mph. Sites along wide bays and estuaries that are more than a mile from where such features open to the ocean or Gulf would also be captured.

A close examination of the 130-mph wind contour for Risk Category II buildings (the category that covers dwellings and most multifamily construction) reveals several areas for which the revised definition would potentially trigger wind-borne debris protection where it is not already required. Notable examples include the following:

- *Narraganset Bay and the Sakonnet River in RI near Providence, RI*
- *Shinnecock Bay on Long Island (Hampton Bays, Shinnecock Hills, East Quogue)*
- *Lake Mattamuskeet in Hyde County, North Carolina*
- *White Lake in Bladen County, North Carolina*
- *Lakes Moultrie and Marion in South Carolina*
- *Lake Houston northwest of Houston (near Atascocita)*
- *Lake Corpus Christi northwest of Corpus Christi*

However, these areas, or similar areas, have not necessarily experienced widespread wind-borne debris damage in hurricanes. For example, sites where FEMA's MAT report on Hurricane Harvey specifically documented wind-borne debris impacts were in areas where the wind speed per the 2009 IRC and ASCE 7-05 (the locally adopted editions at the time) required protection regardless of the proximity to the coast. Many of the sites were also within one mile of the Gulf of Mexico, so protection would be required even under the current coastal mean high-water line trigger. Similarly, where the Irma MAT report documented wind-borne debris damage in Ramrod and Little Torch Key, protection is already required based on the design wind speed and again, most of the area of both islands could be considered "within one mile of the coastal mean high-water line"

Even in Hurricane Katrina, wind-borne debris damage around Lake Pontchartrain (which is technically an estuary rather than an inland lake) was limited to specific conditions. The FEMA and NIST reports did not document wind-borne debris damage in areas such as Laplace, Madisonville, Mandeville and Lacombe, which all lie near where the 130 mph wind contour crosses Lake Pontchartrain. Reported wind-borne debris damage from Katrina primarily occurred in urban areas (e.g. downtown New Orleans) or suburban commercial areas (e.g. Slidell) where blow-off from aggregate roofs occurred, or in areas along the actual Gulf coastline where wind-borne debris protection would be required anyway as the ultimate wind speed is 140mph or higher

The Home Innovation Research Lab calculated the cost impact for installing common methods of wind-borne debris protection on a typical home with 360 square feet of glazing. The added cost was around \$1,800 a home if wood structural panels are used, \$3,400 if manually operated hurricane shutters are used, and \$9,600 if impact-resistant glazing is provided.

Contrary to the proponent's statement the changes to the definition would not increase the cost of construction, these are clearly significant impacts that can price thousands of people in an area out of a new home. This negative impact on affordability is particularly concerning where the revised definition may impact a small, rural, lower-income community that may be miles from the Atlantic or Gulf coast but just happens to be adjacent to a lake or river large enough to trigger Exposure D conditions. Homebuyers and renters in these communities or other communities impacted by this change may find themselves only able to afford older, existing houses that were not built to any edition of the IRC and are significantly less resistant to a variety of hazards than newer homes.

3. Fire Separation Distance

This amendment would return the fire separation distances between structures to those required before residential sprinklers became part of the International Residential Code.

Revise as follows:

Delete Tables R302.1(1) and R302.1(2) and replace with new table.

TABLE R302.1 EXTERIOR WALLS

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	Fire-resistance rated	1 hour—tested in accordance with ASTM E 119 or UL 263 with exposure from the outside	0 feet
	Not fire-resistance rated	0 hours	3 feet ^a
Projections	Not allowed	N/A	< 2 feet
	Fire-resistance rated	1 hour on the underside ^{b, c}	2 feet ^a
Openings in walls	Not fire-resistance rated	0 hours	3 feet
	Not allowed	N/A	< 3 feet
Penetrations	Unlimited	0 hours	3 feet ^a
	All	Comply with Section R302.4	< 3 feet
		None required	3 feet ^a

For SI: 1 foot = 304.8 mm.

N/A = Not Applicable

- For residential subdivisions where all *dwelling*s are equipped throughout with an automatic sprinkler system installed in accordance with Section P2904, the *fire separation distance* for nonrated exterior walls and rated projections shall be permitted to be reduced to 0 feet, and unlimited unprotected openings and penetrations shall be permitted, where the adjoining *lot* provides an open setback *yard* that is 6 feet or more in width on the opposite side of the property line.
- The roof eave fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave if fireblocking is provided from the wall top plate to the underside of the roof sheathing.
- The roof eave fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave provided that gable vent openings are not installed.

Reason:

During the supplemental code cycle before the 2006 edition of the IRC, the fire separation distances were increased by 2 feet without any scientific data or reports that proved the allowable distance found in previous editions of the IRC contributed to any increase in exposure fires from one dwelling to another. Despite this fact, the IRC code development committee has failed to return this section to the earlier language.

To this day, there are no known reports or studies that demonstrate the previously allowed 3-foot separation distance from the property line and 6-foot separation between structures failed to provide the minimum required safe distance

4. Self Closing Devices

This amendment removes the requirement for all doors separating the garage from the interior dwelling to be equipped with a self-closing and latching device.

Revise as follows:

R302.5.1 Opening protection. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted. Other openings between the garage and residence shall be equipped with solid wood doors not less than 1 3/8 inches (35 mm) in thickness, solid or honeycomb core steel doors not less than 1 3/8 inches (35 mm) thick, or 20- minute fire-rated doors. ~~Doors shall be self-latching and equipped with a self-closing or automatic closing device.~~

Reason:

NAHB strongly disagrees with the new requirement for door closures on openings between the garage and the house. For many years, proponents argued that fires that originate in the garage could pass through these openings but failed to provide any reliable data or statistics. As a result, the committee and the governmental members repeatedly disapproved this requirement.

During the 2009-10 code development process, the proponents returned with a new reason to prevent the spread of carbon monoxide from vehicles and the by-products produced by burning thermoplastics. While the proponents were able to produce an extremely lengthy dissertation on the hazards of carbon monoxide and the number of false alarms created by carbon monoxide detectors, nowhere in their written or oral testimony did they link any statistical substantiation to need for closures on these openings nor has there been any other evidence produced by other parties.

5. Guard Requirement

This amendment reinstates the guard requirement only for those areas where the elevation difference from the walking edge to the ground directly below is more than 30 inches.

Revise as follows:

R312.1.1 Where required. Guards shall be provided for those portions of open-sided walking surfaces, including floors, stairs, ramps and landings that are located more than 30 inches (762 mm) measured vertically to the floor or grade below. ~~at any point within 36 inches (914 mm) horizontally to the edge of the open side~~ Insect screening shall not be considered as a guard.

Reason:

This amendment retains the provisions of the 2015 IRC and previous editions, where guardrails were required when the elevation difference between the walking surface was greater than 30 inches to the floor or grade directly below. The IRC was amended in 2018 to require a guardrail where the elevation difference is greater than 30 inches from the walking surface to a horizontal point 36 inches adjacent to the leading edge of the walking surface to the grade or floor below. This change will now require the building official to carry a four-foot level to conduct inspections.

The proponent of this change referred to work conducted, and reports written by the ICC Code Technology Committee (CTC). At no time during the public hearings was any technical justification presented to substantiate the change requiring the building official to measure 36 inches away from the leading edge of the walking surface or tread to determine when a guardrail should or should not be required. After reviewing the many reports from the CTC website, it is still unclear from where the 36-inch requirement was derived. There are no studies that can support claims that this will have an effect on reducing possible injuries. While the proponent promotes this as a means for consistent enforcement of the guard requirements, there is no evidence of increased risk to the safety of the occupant if the current method of measuring from the edge of the walking surface to grade below is used.

6. Residential Fire Sprinklers

This amendment would delete the mandatory requirement for residential sprinklers from the International Residential Code. A companion amendment titled Fire Separation Distance returns the fire separation distances between structures to those required before residential sprinklers became part of the IRC.

Revise as follows:

Delete Section R313 entirely

~~SECTION R313 AUTOMATIC FIRE SPRINKLER SYSTEMS~~

~~**R313.1 Townhouse automatic fire sprinkler systems.** An automatic fire sprinkler system shall be installed in townhouses.~~

~~**Exception:** An automatic fire sprinkler system shall not be required where additions or alterations are made to existing townhouses that do not have an automatic fire sprinkler system installed.~~

~~**R313.1.1 Design and installation.** Automatic fire sprinkler systems for townhouses shall be designed and installed in accordance with Section P2904 or NFPA 13D.~~

~~**R313.2 One- and two-family dwellings automatic fire systems.** An automatic fire sprinkler system shall be installed in one- and two-family dwellings.~~

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

~~**R313.2.1 Design and installation.** Automatic fire sprinkler systems shall be designed and installed in accordance with Section P2904 or NFPA 13D.~~

Reason:

Since the inclusion of the mandatory requirement for residential sprinklers in the 2009 IRC, more than 42 states have amended or passed legislation removing the residential sprinkler mandate for new one- and two- family dwellings. Of those states, 27 prohibit communities from requiring fire sprinkler systems from being installed. It is important to note that the voluntary installation of residential sprinklers is still allowed.

*The median age of one- and two-family housing in the U.S. is 35 years, and that number continues to increase. These older homes are more likely to have outdated electrical systems, appliances, use space heaters or display other characteristics that lead to a greater risk of a fire starting. Newer homes have fire blocking, hardwired smoke alarms and egress windows installed to today's codes, all of which increase the chances of surviving a fire. **Even as homes built to today's residential code get older, they will continue to provide protection for families through their improved safety.***

While questions regarding construction code requirements intended to increase the safety of homes cannot, and should not, be decided solely on the issue of cost, it is reasonable to ask if there is a demonstrated state- or region-specific need for the requirement or if an acceptable level of safety can be achieved through other, less expensive means. The cost of an incremental increase in the margin of safety can be quite high.

Higher regulatory costs have real consequences for working American families. These regulations end up pushing the price of housing beyond the means of many teachers, police officers, firefighters and other middle-class workers. Every \$838 increase in construction costs adds an additional \$1,000 to the final price of the home, and in the U.S., over 150,000 households would no longer qualify for a mortgage based on that \$1,000 increase to a median-priced home. The average cost of a sprinkler system is \$6,000.

Mandating costly incremental increases in safety will only protect those who can afford them and will

often decrease safety for those who cannot. Families who cannot qualify to purchase homes due to the increased costs from mandatory code requirements such as fire sprinklers will have to live in housing that is less safe, because that housing was built to less stringent code requirements.

7. Protection of Building Envelope

This amendment eliminates the requirement to provide an exterior-rated door at the top of a stairway that is enclosed by breakaway walls and provides access to a dwelling elevated on piers or piles in a coastal flood zone.

Revise as follows:

~~**R322.3.5.1 Protection of building envelope.** An exterior door that meets the requirements of Section R609 shall be installed at the top of stairs that provide access to the building and that are enclosed with walls designed to break away in accordance with Section R322.3.4.~~

Reason:

This amendment deletes the requirement added in the 2015 IRC that an exterior door be provided at the top of a stairway enclosed by breakaway walls and providing access to a dwelling located in a Coastal A Zone or Zone V special flood hazard area and elevated on piers or piles. While having a door at the top of such a stair may be good practice, the additional requirements associated with it being an exterior door are overly conservative, particularly if the door at the bottom of the enclosed stair is also an exterior door. By requiring compliance with all of the requirements of Section R609, the specified door would need to have a design pressure rating consistent with the design wind speed for the site, the door frame would need to be stiffened to resist the loads from such a door, proper anchorage of the door to the frame would need to be provided, and the door opening would need head, jamb, and sill flashing. The minimum added cost to provide a standard exterior door with flashing in lieu of a standard interior door is around \$300; a hurricane wind-rated door would add an additional \$200-\$300 to the minimum costs.

It is noted that this requirement does not appear in the basic construction requirements of the National Flood Insurance Program in accordance with 44 CFR 60.3. It is also not specified as a practice that a community would earn credit for mandating and enforcing under FEMA's Community Rating Service and would not lead to discounted flood insurance premiums.

8. Habitable Attics

This amendment removes the requirement that a habitable attic needs to be sprinklered in order to permit one to be constructed over a two-story dwelling or to provide one larger than one-third of the floor area below.

Revise as follows:

R326.1 General. Habitable attics shall comply with Sections R326.2 and R326.3.

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.

R326.3 Story above grade plane. A habitable attic shall be considered a story above *grade plane*.

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

1. The aggregate area of the habitable attic is ~~either of the following: 1.1. Not~~ not greater than one-third of the floor area of the story below.
~~1.2. Not greater than one-half of the floor area of the story below where the habitable attic is located within a dwelling unit equipped with a fire sprinkler system in accordance with Section P2904.~~
2. The occupiable space is enclosed by the roof assembly above, knee walls, if applicable, on the sides and the floor ceiling assembly below.
3. The floor of the habitable attic does not extend beyond the exterior walls of the story below.
- ~~4. Where a habitable attic is located above a third story, the dwelling unit or townhouse unit shall be equipped with a fire sprinkler system in accordance with Section P2904.~~

R326.4 Means of egress. The means of egress for habitable attics shall comply with the applicable provisions of Section R311.

Reason:

These modifications remove portions of the newly added Section R326 Habitable Attics. The proponent of this code change stated that it was necessary to add the new language in the IRC since there was inconsistency between the IRC and IBC and that a habitable attic should have similar requirements as a mezzanine in the IBC.

This section places limits on the aggregate area of a habitable attic of not greater than one-third of the floor area of the story below. Having this upper limit on the area would allow for a habitable attic without considering it as a story and would address concerns of it being a full story or equal to the area of the floor(s) below.

Exception #4 has been amended for deletion since it would require the dwelling unit or townhouse unit to be equipped with a fire sprinkler if a habitable attic is located above the third story. While an enclosed mezzanine of similar dimensions would require a sprinkler per Section R325.5, a habitable attic, regardless of use, would require an emergency and escape rescue opening, while a mezzanine does not if it's not a sleeping room. The addition of a sprinkler system would add significant cost to a new dwelling unit or townhouse that is unnecessary.

9. Foundation Anchorage

This amendment provides an exception to the requirement for attaching bottom plates of braced wall panels on the interior of a dwelling to foundations with anchor bolts. The exception applies in low-wind, low-seismic areas where gypsum board is used as the bracing method for the interior wall in question.

Revise as follows:

R403.1.6 Foundation anchorage. Wood sill plates and wood walls supported directly on continuous foundations shall be anchored to the foundation in accordance with this section.

Cold-formed steel framing shall be anchored directly to the foundation or fastened to wood sill plates anchored to the foundation. Anchorage of cold-formed steel framing and sill plates supporting cold-formed steel framing shall be in accordance with this section and Section R505.3.1 or R603.3.1.

Wood sole plates at all exterior walls on monolithic slabs, wood sole plates of *braced wall panels* at building interiors on monolithic slabs and all wood sill plates shall be anchored to the foundation with minimum 1/2-inch diameter (12.7 mm) anchor bolts spaced a maximum of 6 feet (1829 mm) on center or *approved* anchors or anchor straps spaced as required to provide equivalent anchorage to 1/2-inch-diameter (12.7 mm) anchor bolts. Bolts shall extend a minimum of 7 inches (178 mm) into concrete or grouted cells of concrete masonry units. The bolts shall be located in the middle third of the width of the plate. A nut and washer shall be tightened on each anchor bolt. There shall be a minimum of two bolts per plate section with one bolt located not more than 12 inches (305 mm) or less than seven bolt diameters from each end of the plate section. Interior bearing wall sole plates on monolithic slab foundations that are not part of a *braced wall panel* shall be positively anchored with approved fasteners. Sill plates and sole plates shall be protected against decay and termites where required by Sections R317 and R318. Anchor bolts shall be permitted to be located while concrete is still plastic and before it has set. Where anchor bolts resist placement or the consolidation of concrete around anchor bolts is impeded, the concrete shall be vibrated to ensure full contact between the anchor bolts and concrete.

Exceptions:

1. Walls 24 inches (610 mm) total length or shorter connecting offset braced wall panels shall be anchored to the foundation with a minimum of one anchor bolt located in the center third of the plate section and shall be attached to adjacent braced wall panels at corners as shown in Item 9 of Table R602.3(1).
2. Connection of walls 12 inches (305 mm) total length or shorter connecting offset braced wall panels to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent braced wall panels at corners as shown in Item 9 of Table R602.3(1).
3. Where the basic wind speed in accordance with Figure R301.2(4)A does not exceed 115 miles per hour (51 m/s), the seismic design category is A or B and Method GB in accordance with Section R602.10 is used for a *braced wall line* on the interior of the dwelling, anchor bolts shall not be required for the wood sole plates of the *braced wall panels*. Positive anchorage with approved fasteners shall be provided.

Reason:

This amendment revises the language for anchorage of light-frame wood stud walls to the foundations of the house. As currently stated, the provisions require anchor bolts for the portions of a wall on the interior of a dwelling that are designated as braced wall panels for a braced wall line passing through the dwelling. To provide the required 7-inch embedment depth, a thickened slab or other continuous footing would be necessary. Chapters 4 and 6 of the IRC do not explicitly require a continuous foundation in these locations in low-wind, low-seismic areas, and they are not traditionally provided. If interpreted and enforced by plan reviewers and inspectors in these areas, disputes and project delays will result and/or homeowners will incur significant additional construction costs.

The ICC Ad-Hoc Committee on Wall Bracing revised this section during the 2007/2008 code cycle with the intent of ensuring that sufficient anchorage is provided along braced wall lines inside a dwelling to transfer lateral loads to either monolithic (thickened) slab foundations or continuous footings. While NAHB agrees that providing a continuous load path is important, the new language is overly broad in its application and not technically justified for many common conditions. The typical bracing method used for braced wall lines on the interior of a one- or two-story dwelling in a low-wind, low-seismic area is Method GB, consistent with the use of gypsum board as the typical interior wall finish material. The allowable shear capacity for Method GB when used on both sides of a braced wall is 200plf (pounds per linear foot). The standard fastener schedule, Table R602.3(1), specifies 3-16d nails at 16" spacing for fastening the bottom plate of a braced wall panel on the interior of a dwelling to floor framing below (such as a raised floor system over a crawlspace or pier-and-beam foundation). This standard nailing provides a 200plf allowable capacity, as would many typical post-installed anchors (e.g. wedge or expansion anchors) that are short enough to be installed in just a slab-on-grade without the need for thickened footings, or even power-actuated fasteners. 1/2" diameter anchor bolts at 6-foot spacing are not necessary for the proper anchorage of these walls.

The proposed amendment provides an exception to the requirement that an interior wall that also used as part of a braced wall line be fastened to a slab-on-grade with anchor bolts, rather than other methods of making a "positive connection" such as wedge or expansion anchors, power fasteners, or concrete nails. The exception is limited to areas of low wind and low seismic hazards and to walls braced using gypsum board, with its lower allowable shear capacity.

10. Stair Geometry (8-inch Riser)

This amendment revises the Internal Residential Code to coincide with the stair geometry to 8-inch riser by 9-inch tread depth as found in the UBC.

Revise as follows:

R311.7.5 Stair treads and risers. Stair treads and risers shall meet the requirements of this section. For the purposes of this section, dimensions and dimensioned surfaces shall be exclusive of carpets, rugs or runners.

R311.7.5.1 Risers. The riser height shall be not more than 8 inches (210 mm) ~~7 3/4 inches (196 mm)~~. The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the openings located more than 30 inches (762 mm), as measured vertically, to the floor or grade below do not permit the passage of a 4-inch-diameter (102 mm) sphere.

Exceptions:

1. The opening between adjacent treads is not limited on spiral stairways.
2. The riser height of spiral stairways shall be in accordance with Section R311.7.10.1.

R311.7.5.2 Treads. The tread depth shall be not less than 9 inches (229mm) ~~10 inches (254 mm)~~. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

Reason:

This amendment retains the stair geometry requirements allowed under the Uniform Building Code (UBC). This amendment allows the continued use of the 8" x 9" geometry, the dimensions still accepted by many state and local jurisdictions across the country. In fact, many adopt stair geometry requirements of 8 1/4" x 9".

The 8" x 9" geometry has always adequately provided for occupant safety in residential occupancies. No sound documentation or data has ever been presented demonstrating it is any less safe or a contributing factor in accidental residential falls than a stair geometry of 7 3/4" x 10" or other even more stringent geometries.

The safety benefits of the 7 3/4" riser and 10" tread stair geometry are technically unsubstantiated and are not practical in many home designs. If the footprint of the house must be increased to accommodate the additional space needed, adequately sized living spaces are sacrificed without any demonstrated gain. This can lead to an economic hardship on first-time home buyers of smaller homes, and in particular for construction on smaller lots, infill projects, and townhomes.

As outlined in Section R101.3 of the IRC, the intent of the code is to provide minimum requirements for occupant safety and health. There is adequate substantiation to show that 8-inch x 9 inch geometry provides this minimum level of occupant safety.

Notes/additional background:

This is an alternative amendment to accommodate those jurisdictions accustomed to or that wish to retain the use of past UBC requirements of an 8-inch maximum riser height and a 9-inch minimum tread depth.

Prior to changes in 1996 BOCA and 1995 CABO One-and-Two Family Building Code, stair geometry

requirements were set at an 8 1/4 inch maximum for risers and a 9-inch minimum tread depth. For these dimensions, please see suggested amendment "Stair Geometry (8 1/4" x 9")."

11. Stair Geometry (8.25-inch Riser)

This amendment revises the 2012 IRC to return stair geometry to the 8 1/4-inch riser by 9-inch tread depth of the 2006 IRC.

Revise as follows:

R311.7.5 Stair treads and risers. Stair treads and risers shall meet the requirements of this section. For the purposes of this section, dimensions and dimensioned surfaces shall be exclusive of carpets, rugs or runners.

R311.7.5.1 Risers. The riser height shall be not more than 8 1/4 inch (210mm) ~~7 3/4 inches (196 mm)~~. The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. Open risers are permitted provided that the openings located more than 30 inches (762 mm), as measured vertically, to the floor or grade below do not permit the passage of a 4-inch-diameter (102 mm) sphere.

Exceptions:

1. The opening between adjacent treads is not limited on spiral stairways.
2. The riser height of spiral stairways shall be in accordance with Section R311.7.10.1.

R311.7.5.2 Treads. The tread depth shall be not less than 9 inches (229mm) ~~10 inches (254 mm)~~. The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8 inch (9.5 mm).

Reason:

This amendment retains the stair geometry requirements allowed under the Building Officials and Code Administrators National Building Code (BOCA). This amendment allows the continued use of the 8 1/4" x 9" geometry, the dimensions still accepted by many state and local jurisdictions across the country.

These dimensions, originally accepted in the first draft of the IRC and the historic dimensions in the Council of American Building Official's CABO One- and Two-family Building Code, adequately provide for stair safety in residential occupancies. No sound documentation or data has ever been presented demonstrating these proposed dimensions are any less safe or are a contributing factor in accidental residential falls than a stair geometry of 7 3/4"x 10".

The safety benefits of the 7 3/4" riser and 10" tread stair geometry are technically unsubstantiated and are not practical in many home designs. If the footprint of the house must be increased to accommodate the additional space needed, adequately sized living spaces are sacrificed without any demonstrated gain. This can lead to an economic hardship on first-time home buyers of smaller homes, and in particular for construction on smaller lots, infill projects, and townhomes.

As outlined in Section R101.3 of the IRC, the intent of the code is to provide minimum requirements for occupant safety and health. There is adequate substantiation to show that 8 1/4-inch x 9 inch geometry provides this minimum level of occupant safety.

Notes/additional background:

Prior to the Building Officials and Code Administrators 1996 BOCA National Building Code, and the 1995 CABO One-and-Two Family Building Code, stair geometry requirements were set at the 8 1/4" x 9" dimensions.

An alternative amendment is available for jurisdictions that wish to retain the use of past UBC requirements of an 8-inch maximum riser height and 9-inch minimum tread depth. For that amendment, please see suggested amendment "Stair Geometry (8" x 9")."

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2021 International Building Code

1. Sound Transmission

This amendment adds an exception to remove the impact sound requirement between a dwelling or sleeping unit and a public or service area.

1. Sound Transmission

This amendment adds an exception to remove the impact sound requirement between a dwelling or sleeping unit and a public or service area.

Revise as follows:

1206.3 Structure-Borne Sound. Floor-ceiling assemblies between dwelling units and sleeping units or between a dwelling unit or sleeping unit and a public or service area within the structure shall have an impact insulation class rating of not less than 50 where tested in accordance with ASTM E492, or have a Normalized Impact Sound Rating (NISR) of not less than 45 if field tested in accordance with ASTM E1007. Alternatively, the impact insulation class of floor-ceiling assemblies shall be established by engineering analysis based on a comparison of floor-ceiling assemblies having impact insulation class ratings as determined by the test procedures in ASTM E492.

Exception: Floor/ceiling assemblies between a dwelling unit or sleeping unit and a public or service area shall not be required to have an impact insulation rating.

Reason:

This amendment adds an exception to Section 1206.3 Impact Sound Transmission to address the impact sound requirement of the floor/ceiling assembly between a dwelling or sleeping unit and a public or service area in order to reduce the cost of the required IIC rating. The floor/ceiling assemblies between these areas would not be required to have an impact insulation rating. This would address the noise such as the impact sound of an object dropping on the floor. By adding the exception, it has the potential to reduce the cost of construction, which ranges between \$8,000 to \$15,000 per dwelling unit.

These modifications would only affect the impact sound requirements of Section 1206.3 and not the airborne sound requirements of Section 1206.2.

2021 International Fire Code

1. NFPA 13R Sprinklers Systems

This amendment revises the permitted height of the floor level of the highest story in a Group R occupancy that allows for NFPA 13R sprinklers.

2. Fire Apparatus Access Roads – Alternative to Road

This amendment adds an exception permitting fire apparatus access roads to be a driveway, pathway or other approved surface that creates a fire lane not accessible to motor vehicles.

3. Fire Apparatus Road – Increase Dwelling Trigger

This amendment adds an exception raising the trigger for a second fire apparatus access road to 50 dwellings if the width is 26 feet and the development is not in a wildland-urban interface area.

NFPA 13R Sprinkler Systems

This amendment revises the permitted height of the floor level of the highest story in a Group R occupancy that allows for NFPA 13R sprinklers.

Revise as follows:

2021 International Fire Code

903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or less above grade plane.
2. The floor level of the highest story is ~~30~~ 35 feet (~~9144~~ 10668 mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 of the International Building Code shall be measured from grade plane.

2021 International Building Code

[F] 903.3.1.2 NFPA 13R sprinkler systems. Automatic sprinkler systems in Group R occupancies shall be permitted to be installed throughout in accordance with NFPA 13R where the Group R occupancy meets all of the following conditions:

1. Four stories or fewer above grade plane.
2. The floor level of the highest story is ~~30~~ 35 feet (~~9144~~ 10668mm) or less above the lowest level of fire department vehicle access.
3. The floor level of the lowest story is 30 feet (9144 mm) or less below the lowest level of fire department vehicle access.

The number of stories of Group R occupancies constructed in accordance with Sections 510.2 and 510.4 shall be measured from grade plan

Reason:

This amendment revises the permitted maximum height from 30-feet to 35-feet for the floor level in a Group R occupancy that will allow for a NFPA 13R sprinkler system.

NFPA 13R has been the standard for installing fire sprinkler in low-rise residential occupancies since 1989. It is scoped to multifamily buildings with a maximum of four stories, but the 2013 edition allowed these buildings to be on top of a fire-separated podium or pedestal, significantly increasing their overall allowed height to 60 feet. The 2018 editions of the IFC and IBC added requirements to address concerns regarding the fire safety of the attics in these podium-style buildings.

The amended language aims at rectifying a change to the 2021 IFC which limited the permitted height to 30 feet instead of reverting back to the pre-2013 limits of four stories total, This was done even before the effects of the increased fire safety measures in the 2018 edition could be assessed. This amendment is a compromise between the result of last cycle and the original four-story threshold in the standard. The proposed 35-foot height is well below the 60-foot threshold of previous code editions and more realistically allows for 4-story Group R buildings with floor-to-ceiling heights of 8 to 10 feet which is common in multifamily buildings.

By increasing the permitted height, it will decrease the cost of construction that allows for a 13R sprinkler system instead of a full 13 sprinkler system, which can save over \$2,100 per unit in a multi-family building (Home Innovation Research Labs, Cost Analysis of Proposed Group A Code Changes (2018-2019 ICC Code Development Cycle) – October 2018).

Costs associated with requirements for attic protection in NFPA 13 systems not only includes the additional sprinklers and piping but also costs associated with increased hydraulic demand and water supply as well as necessary freeze protection in cold and even moderate climates. Greater density and spacing of sprinklers, larger pipe diameter, sprinklers in concealed spaces, and especially, requirements for attic protection (with some exceptions) all contribute to the added cost. This cost increase does not include the final cost with markup to the building owner or the potential need to add a fire pump in the NFPA 13 system.

Below are the costs based on a four-story, 48-unit apartment building.

Table F117-A. Cost of NFPA 13 Sprinkler System Compared to NFPA 13R System

Component	Unit	Material	Labor	Total	w/O&P	Qty	Cost
Residential sprinkler heads	EA	16	21.50	37.5	53	292	15,476
3/4" diameter CPVC piping (NFPA 13R)	LF	7	6.90	13.9	19.05	4292	81,763
Wet standpipe riser, schedule 20, 4" diameter pipe	FL	5800	2875	--	8675	4	34,700
Total NFPA 13R System							131,939
Additional sprinkler heads (attic)	EA	16	21.50	37.5	53	44	2,332
Additional sprinkler heads (non-exempt bathrooms)	EA	16	21.50	37.5	53	2	106
3/4" diameter CPVC piping (NFPA 13R)	LF	7	6.90	13.9	19.05	(4292)	(81,763)
1-1/2" CPVC piping (NFPA 13)	LF	18.55	9.75	28.3	36.50	4292	156,658
Additional 1-1/2" CPVC piping for new sprinkler heads (NFPA 13)	LF	18.55	9.75	28.3	36.50	618	22,557
Additional floor, wet standpipe riser, schedule 20, 4" diameter pipe	FL	1475	890	--	2365	1	2,365
Total NFPA 13 System							234,194
Total to Builder							102,255

Fire Apparatus Access Roads – Alternative to a Road

This amendment adds an exception permitting fire apparatus access roads to be a driveway, pathway or other approved surface that creates a fire lane not accessible to motor vehicles.

Revise as follows:

D102.1 Access and loading. Facilities, buildings or portions of buildings hereafter constructed shall be accessible to fire department apparatus by way of an approved fire apparatus access road with an asphalt, concrete or other approved driving surface capable of supporting the imposed load of fire apparatus weighing up to 75,000 pounds (34 050 kg).

Exception: Where two fire apparatus access roads are required by Section 503.1.2 or this appendix, the additional fire apparatus access road is permitted to be a driveway, pathway, court or other approved fire lane not accessible to public motor vehicles where designed by a registered design professional to meet the loading requirements and minimum specifications of Section 503 and this appendix, and the surface provides all-weather driving capabilities. Marking or signs shall be provided in accordance with Section 503.3 and Section D103.6.

Reason:

The current provisions of IFC Section 503, Appendix D and the definition of “fire department apparatus road” as written can be interpreted to require the construction of an actual road, street, lane or other feature potentially accessible to public vehicular traffic as well as fire department vehicles, complete with curbs and gutters, shoulders and other components and making a complete intersection with a main road, street, highway, etc. adjacent to the development. However, for long, narrow parcels of land which can only be physically accessed along one of the narrow sides, such an interpretation may result in placing the intersection created by the second access road closer to the main access to the development than is permitted by local highway or zoning ordinances.

Nothing in IFC Section 503 or Appendix D requires the additional road intersect a public way at the same elevation as the public way, or even be a true “road” accessible to vehicular traffic. A code-compliant “road” could simply be a driveway or other pathway primarily intended for pedestrian use but constructed to meet the width, loading and other requirements of a fire apparatus access road. Such a pathway would not need to form a true intersection with public streets but could simply end at a sloped or roll-up curb. The defined term “fire lane” includes such alternatives.

The pointer to the base code requirements for fire apparatus access roads in Section 503 insures the minimum 20 foot width required per Section 503.2.1, the requirement to maintain the access road or fire lane unobstructed per Section 503.4, and the requirements for gates where they are provided are all recognized and maintained, in addition to the dimensional and loading requirements within Appendix D.

The exception could reduce the cost of constructing a fire apparatus access road by allowing for the elimination of curbs and gutters or other elements associated with a road open to public vehicles. The exception would also enable more cost-effective development of sites where the only option under which development of the site would otherwise be permitted would be providing alternative, potentially costly, means of fire protection.

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Fire Apparatus Access Roads – Increase Dwelling Trigger

This amendment adds an exception raising the trigger for a second fire apparatus access road to 50 dwellings if the width is 26 feet and the development is not in a wildland-urban interface area.

Revise as follows:

D107.1 One- or two-family dwelling residential developments. Developments of one- or two-family dwellings where the number of dwelling units exceeds 30 shall be provided with two separate and approved fire apparatus access roads.

Exceptions:

1. Where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1, 903.3.1.2 or 903.3.1.3, access from two directions shall not be required.
- ~~2. The number of dwelling units on a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the fire code official.~~
3. Where there are not more than 50 dwellings on a single public or private fire apparatus access road complying with Section D107.1.1.

D107.1.1 One- or two-family dwelling residential developments having less than 50 units.

Developments of one- or two-family dwellings where the number of dwelling units does not exceed 50 shall be permitted to have a single approved fire apparatus access road provided all of the following requirements are met:

1. The minimum unobstructed width of the single fire apparatus access road shall be 26 feet (7925 mm) and shall otherwise comply with Section 503 and Appendix Section D103.
2. Where the fire apparatus access road exceeds 150 feet in length the width and turnaround provisions of Section D103.4 shall be met.
3. A minimum of one fire hydrant on each side of the fire apparatus access road in accordance with Section 507.5 shall be provided. The fire code official shall be permitted to require additional hydrants and hydrant spacing based on the length of the fire apparatus access road, fire flow requirements, and the distance from any point on the street or road frontage to a hydrant.
4. The development is not located in a wildland-urban interface area as defined in the International Wildland-Urban Interface Code

D107.1.2 Future Development. The number of dwelling units on a single fire apparatus access road shall not be increased unless fire apparatus access roads will connect with future development, as determined by the fire code official.

Reason:

One of the barriers to affordable housing frequently cited by NAHB members is availability of lots for development. In some cases, the dimensions of such parcels, surrounding development, surrounding terrain or other constraints make it difficult if not impossible to provide a second fire department apparatus road, even if constructed as a sidewalk, bike path or other feature only accessible to fire trucks, not accessible to public motor vehicles. A developer may either be faced with having to sacrifice planned dwelling units or providing alternative, potentially costly, means of fire protection in order to construct the development. Either solution increases the cost of construction for the homes in the development and may render them unaffordable to homebuyers or renters with modest incomes. Or, the developer may be forced to abandon the lot, meaning the IFC has improperly acted as a de facto zoning code.

The current 30 dwelling trigger is low compared to a multifamily development can contain up to 100 units. One of the reasons for the second fire department apparatus road is in case the primary access to the development is blocked by traffic congestion or an accident. Given the average household size is between 2 and 3 people, clearly a 100-unit multifamily building is likely to generate more traffic than 30 single-family houses. Average lot size has also been shrinking, so if travel distance is a concern, it will take less time for fire equipment to traverse many current single-family developments than it may have previously. There is no reason for such a low trigger as 30 homes.

This amendment adds a new subsection that raises the trigger to 50 dwellings, or half the number of dwelling units at which a multifamily development triggers the second fire department apparatus road, if the minimum unobstructed width of the primary fire department apparatus road is increased to 26 feet in width to aid in both fire department access and evacuation, at least one hydrant be placed on each side of the road to minimize the need to run hoses across a road, obstructing both traffic and fire vehicles, and the development is not in a wildfire-prone area.

A pointer to the dead-end turnaround requirements in Section D103.4 underscores the fact a single fire apparatus access road needs to comply with all the requirements of Section 503 and Appendix D. It is noted Table D103.4 requires the fire code official to approve the minimum width and turnarounds for dead-end access roads exceeding 750 in length.

This amendment will reduce the cost of constructing for developments of 31 to 50 houses by eliminating the need for the second fire apparatus access road and enabling development of slightly larger parcels. The exception would also enable more cost-effective development of sites where the only option under which development of the site would otherwise be permitted would be providing alternative, potentially costly, means of fire protection.