City of Austin
Significant Changes to the 2015 IRC Presentation
Disclaimer

• This presentation only covers added or modified code language deemed applicable to the Austin area. Please reference the ICC publication, *Significant Changes to the International Residential Code 2015 Edition*, for the complete text.

• Any code section modified per the proposed local amendments is not covered in this presentation.

Legend

Yellow = code modification; added text
Green text = added code section
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R101.2, R202 – Accessory Structures

R101.2 Scope. The provisions of the International Residential Code for One- and Two-family Dwellings 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.

Section R202  DEFINITIONS

Accessory Structure. A structure not greater than 3,000 square feet (279 m²) in floor area, and not more than two stories in height, the use of which is customarily accessory to and incidental to that of dwelling(s) and which that is located on the same lot.
R301.2.1.3 Wind speed conversion.

CHANGE SUMMARY: Ultimate design wind speed values replace basic wind speed values for 3-sec gust wind speeds in Section R301.2.1. A wind speed conversion table has been added for conversion from ultimate design to nominal design wind speeds.

Where referenced documents are based on nominal design fastest-mile-wind speeds and do not provide the means for conversion between the ultimate design wind speeds and the nominal design wind speeds, the ultimate design three-second gust basic wind speeds, \( V_{ult} V_{3s} \), of Figure R301.2(4)A shall be converted to nominal design fastest-mile-wind speeds, \( V_{asd} V_{fm} \), using Table R301.2.1.3.

<table>
<thead>
<tr>
<th>( V_{ult} )</th>
<th>110</th>
<th>115</th>
<th>120</th>
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</tbody>
</table>

For SI: 1 mile per hour = 0.447 m/s.

a. Linear interpolation is permitted
R301.2.1.1.1 Sunrooms

Shall comply with AAMA/NPEA/NSA 2100.
For the purpose of applying the criteria of AAMA/NPEA/NSA-2100 based on the intended use, sunrooms shall be identified as one of the following categories by the permit applicant, design professional, or the property owner in the construction documents. Component and cladding pressures shall be used for the design of elements that do not qualify as main wind force resisting systems. Main wind force resisting systems pressures shall be used for the design of elements assigned to provide support and stability for the overall sunroom.

**Category I:** A thermally isolated sunroom with walls that are open or enclosed with insect screening or 0.5 mm (20 mil) maximum thickness plastic film. The space is nonhabitable and unconditioned.

**Category II:** A thermally isolated sunroom with enclosed walls. The openings are enclosed with translucent or transparent plastic or glass. The space is nonhabitable and unconditioned.

**Category III:** A thermally isolated sunroom with enclosed walls. The openings are enclosed with translucent or transparent plastic or glass. The sunroom fenestration complies with additional requirements for air infiltration resistance and water-penetration resistance. The space is nonhabitable and unconditioned.

**Category IV:** A thermally isolated sunroom with enclosed walls. The sunroom is designed to be heated or cooled by a separate temperature control or system and is thermally isolated from the primary structure. The sunroom fenestration complies with additional requirements for water penetration resistance, air infiltration resistance, and thermal performance. The space is nonhabitable and conditioned.

**Category V:** A sunroom with enclosed walls. The sunroom is designed to be heated or cooled and is open to the main structure. The sunroom fenestration complies with additional requirements for water-penetration resistance, air infiltration resistance, and thermal performance. The space is habitable and conditioned.
**R301.2.1.4 Wind Exposure Category**

**CHANGE SUMMARY:** Wind Exposure Category A is a legacy category that no longer exists in the IBC and ASCE 7, which is the basis for determination of wind exposure categories. In the 2015 IRC, Exposure Category A is deleted.

In the 2012 IRC, Wind Exposure Category D applied to regions adjacent to open water in non-hurricane-prone regions. Wind Exposure Category D now applies to open water, mud and salt flats, and unbroken ice fields. Exposure Category D also applies in hurricane-prone regions to residences on or near the ocean shore.

12. Exposure B. Urban and suburban areas, wooded areas, or other terrain with numerous closely spaced obstructions having the size of single-family dwellings or larger. Exposure B shall be assumed unless the site meets the definition of another type exposure.

23. Exposure C. Open terrain with scattered obstructions, including surface undulations or other irregularities, having heights generally less than 30 feet (9,144 mm) extending more than 1,500 feet (457 m) from the building site in any quadrant. This exposure shall also apply to any building located within Exposure B–type terrain where the building is directly adjacent to open areas of Exposure C–type terrain in any quadrant for a distance of more than 600 feet (183 m). This category includes flat, open country and grasslands.

34. Exposure D. Flat, unobstructed areas exposed to wind flowing over open water, smooth mud flats, salt flats, and unbroken ice for a distance of not less than 5,000 feet (1,524 m) 1 mile (1.61 km). Shorelines in Exposure D include inland waterways, the Great Lakes, and coastal areas of California, Oregon, Washington and Alaska. This exposure shall apply only to those buildings and other structures exposed to the wind coming from over the water unobstructed area. Exposure D extends inland downwind from the shoreline edge of the unobstructed area a distance of 600 feet (183 m) 1500 feet (457 m) or 20 10 times the height of the building or structure, whichever is greater.
Table R301.2.1.5.1 Ultimate Design Wind Speed Modification for Topographic Wind Effect a, b

<table>
<thead>
<tr>
<th>Ultimate Design Wind Speed from Figure R301.2(4)A</th>
<th>Average Slope of the Top Half of Hill, Ridge, or Escarpment (percent)</th>
<th>Required Ultimate Design Wind Speed-up, Modified for Topographic Wind Speed Up (mph)</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>150</td>
<td>180 N/A N/A N/A N/A N/A N/A</td>
<td></td>
</tr>
</tbody>
</table>

a. Table applies to a feature height of 500 feet or less and dwellings sited a distance equal or greater than half the feature height.
b. Where the ultimate design wind speed as modified by Table R301.2.1.5.1 exceeds 140 mph, the building shall be considered as "wind design required" in accordance with Section R301.2.1.1.
R301.3 Story Height

CHANGE SUMMARY: Story height of wood and steel wall framing, insulated concrete, and SIP walls may not exceed 11 feet, 7 inches. Masonry wall height is limited to 13 feet, 7 inches.

1. For wood wall framing, the story height shall not exceed 11 feet 7 inches (3531 mm) and the laterally unsupported bearing wall stud height permitted by Table R602.3(5) plus a height of floor framing not to exceed 16 inches (406 mm).

Exception: For wood-framed wall buildings with bracing in accordance with Tables R602.10.3(1) and R602.10.3(3), the wall stud clear height used to determine the maximum permitted story height may be increased to 12 feet (3658 mm) without requiring an engineered design for the building wind and seismic force-resisting systems provided that the length of bracing required by Table R602.10.3(1) is increased by multiplying by a factor of 1.10 and the length of bracing required by Table R602.10.3(3) is increased by multiplying by a factor of 1.20. Wall studs are still subject to the requirements of this section.
R302.2 Townhouse Separation

CHANGE SUMMARY: The provisions for separating townhouses with structurally independent fire-resistant-rated walls in accordance with Section R302.1 have been removed in favor of the common wall provisions of Section R302.2. Common walls separating townhouses must now be rated for 2 hours when an automatic fire sprinkler system is not installed in the townhouse dwelling units.

R302.2 Townhouses. Each townhouse shall be considered a separate building and shall be separated by fire-resistance rated wall assemblies meeting the requirements of Section R302.1 for exterior walls. Common walls separating townhouses shall be assigned a fire resistance rating in accordance with Section R302.2 Item 1 or 2. The common wall shared by two townhouses shall be constructed without plumbing or mechanical equipment, ducts, or vents in the cavity of the common wall. The wall shall be rated for fire exposure from both sides and shall extend to and be tight against exterior walls and the underside of the roof sheathing. 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.

Exceptions:
1. Where a fire 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 E 119 or UL 263.

2. Where a fire 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 E 119 or UL 263.
R302.2 Townhouse Separation (cont)

Common 1-hour fire-resistance-rated wall continuous from foundation to roof sheathing

Electrical installations are permitted in common wall. Electrical boxes must meet fire-resistant penetration requirements.

No plumbing, mechanical, ducts, or vents— in common wall

Common 2-hour fire-resistance-rated wall continuous from foundation to roof sheathing

Townhouse dwelling unit A

Townhouse dwelling unit B

One-hour common wall for townhouses with sprinklers

Two-hour common wall for townhouses without sprinklers

Common walls separating townhouses
R304.1 Minimum Habitable Room Area

CHANGE SUMMARY: The requirement for one habitable room with a minimum floor area of 120 square feet has been removed from the code.

R304.1 Minimum area. Every dwelling unit shall have at least one habitable room that shall have not less than 120 square feet (11 m\(^2\)) of gross floor area.

R304.2 Other rooms. Other habitable rooms shall have a floor area of not less than 70 square feet (6.5 m\(^2\)).

Exception: Kitchens.
R305 Ceiling Height

CHANGE SUMMARY: The minimum ceiling height for bathrooms, toilet rooms, and laundry rooms has been reduced to 6 feet 8 inches. The exception for allowing beams, girders, ducts, or other obstructions to project to within 6 feet, 4 inches of the finished floor has been expanded to include basements with habitable space.

R305.1 Minimum height. Habitable space, hallways, bathrooms, toilet rooms, laundry rooms 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 must 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). At least 50 percent of the required floor area of the room must have a ceiling height of at least 7 feet (2134 mm) and no portion of the required floor area may have a ceiling height of less than 5 feet (1524 mm).

2. Bathrooms shall have a minimum ceiling height of 6 feet 8 inches (2032 mm) at the center of the front clearance area for fixtures as shown in Figure R307-1. 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 minimum ceiling height of not less than 6 feet 8 inches (2032 mm) above an minimum area not less than 30 inches (762 mm) by 30 inches (762 mm) at the showerhead.
R305 Ceiling Height (cont)

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.

R305.1.1 Basements. Portions of basements that do not contain habitable space, or hallways, bathrooms, toilet rooms and laundry rooms 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 may project to within 6 feet 4 inches (1931 mm) of from the finished floor.
R308.4.2 Glazing Adjacent to Doors

**CHANGE SUMMARY:** Glazing installed perpendicular to a door in a closed position and within 24 inches of the door only requires safety glazing if it is on the hinge side of an in-swinging door.

**R308.4.2 Glazing adjacent to doors.** Glazing in an individual fixed or operable panel adjacent to a door shall be considered to be a hazardous location where the nearest vertical edge of the glazing is within a 24-inch (610 mm) arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) above the floor or walking surface shall be considered a hazardous location and it meets either of the following conditions:

1. Where the glazing is within 24 inches (610 mm) of either side of the door in the plane of the door in a closed position,
2. Where the glazing is on a wall perpendicular to the plane of the door in a closed position and within 24 inches (610 mm) of the hinge side of an in-swinging door.

**Exceptions:**
1. Decorative glazing.
2. Where there is an intervening wall or other permanent barrier between the door and the glazing.
3. Glazing in walls on the latch side of and perpendicular to the plane of the door in a closed position
4. Where access through the door is to a closet or storage area 3 feet (914 mm) or less in depth. Glazing in this application shall comply with Section R308.4.3.
5. Glazing that is adjacent to the fixed panel of patio doors.
R308.4.2 Glazing Adjacent to Doors (cont)
**R308.4.5 Glazing and Wet Surfaces**

**CHANGE SUMMARY:** The exception from the safety glazing requirements for glazing that is 60 inches or greater from the water’s edge of a bathtub, hot tub, spa, whirlpool, or swimming pool has been expanded to include glazing that is an equivalent distance from the edge of a shower, sauna, or steam room.

**R308.4.5 Glazing and wet surfaces.** Glazing in walls, enclosures, or fences containing or facing hot tubs, spas, whirlpools, saunas, steam rooms, bathtubs, showers, and indoor or outdoor swimming pools where the bottom exposed edge of the glazing is less than 60 inches (1524 mm) measured vertically above any standing or walking surface shall be considered to be a hazardous location. This shall apply to single glazing and all panes in multiple glazing.

**Exception:** Glazing that is more than 60 inches (1524 mm), measured horizontally and in a straight line, from the water’s edge of a bathtub, hot tub, spa, whirlpool, or swimming pool or from the edge of a shower, sauna, or steam room.
R311.7.10.1 Spiral Stairways

CHANGE SUMMARY: The code adds a definition of spiral stairway that omits any requirement for a center post to allow for design flexibility. The code now limits the size of spiral stairways by restricting the radius at the walkline to a dimension not greater than 24. inches. The method of measurement for tread depth now matches the winder provisions and measures at the intersection of the walkline and the tread nosings rather than perpendicular to the leading edge of the tread.

R311.7.10.1 Spiral stairways. Spiral stairways are permitted, provided that the minimum clear width at and below the handrail shall be is not less than 26 inches (660 mm) with and the walkline radius is not greater than 24. inches (622 mm). Each tread having shall have a 7½ inch (190 mm) minimum tread depth at 12 inches (914 mm) from the narrower edge of not less than 6½ inches (171 mm) at the walkline. All treads shall be identical, and the rise shall be not more than 9½ inches (241 mm). A minimum Headroom shall be not less than 6 feet, 6 inches (1982 mm) shall be provided.

Section R202 Definitions

STAIRWAY, SPIRAL. A stairway with a plan view of closed circular form and uniform section-shaped treads radiating from a minimum-diameter circle.
R311.7.11, R311.7.12 Alternating Tread Devices and Ship Ladders

CHANGE SUMMARY: Alternating tread devices and ship ladders have been added to the stair provisions. Neither device is approved for use as a means of egress.

Section R202 Definitions

**Alternating tread device.** A device that has a series of steps between 50 and 70 degrees (0.87 and 1.22 rad) from horizontal, usually attached to a center support rail in an alternating manner so that the user does not have both feet on the same level at the same time.

**R311.7.11 Alternating tread devices.** Alternating tread devices shall not be used as an element of a means of egress. Alternating tread devices shall be permitted provided the required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at and below the handrails shall be not less than 20 inches (508 mm).
R311.7.11.1 Treads of alternating tread devices. Alternating tread devices shall have a tread depth of not less than 5 inches (127 mm), a projected tread depth of not less than 8 inches (216 mm), a tread width of not less than 7 inches (178 mm), and a riser height of not more than 9 inches (241 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projections of adjacent treads. The riser height shall be measured vertically between the leading edges of adjacent treads. The riser height and tread depth provided shall result in an angle of ascent from the horizontal of between 50 and 70 degrees (0.87 and 1.22 rad). The initial tread of the device shall begin at the same elevation as the platform, landing, or floor surface.

R311.7.11.2 Handrails of alternating tread devices. Handrails shall be provided on both sides of alternating tread devices and shall comply with R311.7.8.2 thru R311.7.8.4. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

R311.7.12 Ship ladders. Ship ladders shall not be used as an element of a means of egress. Ship ladders shall be permitted provided a required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at and below the handrails shall be not less than 20 inches.
R311.7.10.11, R311.7.12 Alternating Tread Devices and Ship Ladders (cont)

R311.7.12.1 Treads of ship ladders. Treads shall have a tread depth of not less than 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the nosing projection is not less than 8. inches (216 mm). The riser height shall be not more than 9. inches (241 mm).

R311.7.12.2 Handrails of ship ladders. Handrails shall be provided on both sides of ship ladders and shall comply with Sections R311.7.8.2 thru R311.7.8.4. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).
R311.8 Ramps

CHANGE SUMMARY: Ramps that do not serve the required egress door are now permitted to have a slope not greater than 1 unit vertical in 8 units horizontal.

R311.8.1 Maximum slope. Ramps serving the egress door required by Section R311.2 shall have a maximum slope of not more than 1 unit vertical in 12 units horizontal (8.3 percent slope). All other ramps shall have a maximum slope of 1 unit vertical to 8 units horizontal (12.5 percent slope).

Exception: Where it is technically infeasible to comply because of site constraints, ramps shall have a maximum slope of not more than 1 unit vertical in 8 units horizontal (12.5 percent slope).
R312.1.2 Guard Height

CHANGE SUMMARY: The provision requiring that the guard height be measured from the surface of adjacent fixed seating has been removed from the code.

**R312.1.2 Height.** Required guards at open-sided walking surfaces, including stairs, porches, balconies, or landings, shall be not less than 36 inches (914 mm) high in height as measured vertically above the adjacent walking surface, adjacent fixed seating or the line connecting the leading edges of the treads.

**Exceptions:**

1. Guards on the open sides of stairs shall have a height not less than 34 inches (864 mm) measured vertically from a line connecting the leading edges of the treads.
2. Where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) as measured vertically from a line connecting the leading edges of the treads.
R314 Smoke Alarms

CHANGE SUMMARY: Battery-operated smoke alarms are permitted for satisfying the smoke alarm power req’ts when alterations, repairs, and additions occur. Household fire alarm systems no longer require monitoring by an approved supervising station. New provisions address smoke alarms installed near bathrooms and cooking appliances.

R314.1 General. Smoke alarms shall comply with NFPA 72 and Section R314.

R314.1.1 Listings. Smoke alarms shall be listed in accordance with UL 217. Combination smoke and carbon monoxide alarms shall be listed in accordance with UL 217 and UL 2034.

R314.2 Where required. Smoke alarms shall be provided in accordance with this section.

R314.2.1 New construction. Smoke alarms shall be provided in dwelling units.

R314.2.2 Alterations, repairs, and additions. Where alterations, repairs, or additions requiring a permit occur, or when one or more sleeping rooms are added or created in existing dwellings, the individual dwelling unit shall be equipped with smoke alarms located as required for new dwellings. (Exceptions not shown for brevity and clarity.)

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.
   3. On each additional story of the dwelling, including basements and habitable attics but and not including crawl spaces and uninhabitable attics. In dwellings 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. Smoke alarms shall be installed 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 Section R314.3.
R314 Smoke Alarms (cont)

R314.3.1 Installation near cooking appliances. Smoke alarms shall not be installed in the following locations unless this would prevent placement of a smoke alarm in a location required by Section R314.3.

1. Ionization smoke alarms shall not be installed less than 20 feet (6096 mm) horizontally from a permanently installed cooking appliance.
2. Ionization smoke alarms with an alarm-silencing switch shall not be installed less than 10 feet (3048 mm) horizontally from a permanently installed cooking appliance.
3. Photoelectric smoke alarms shall not be installed less than 6 feet (1828 mm) horizontally from a permanently installed cooking appliance.
R314 Smoke Alarms (cont)

R314.5 R314.4 Interconnection. Where more than one smoke alarm is required to be installed within an individual dwelling unit in accordance with Section R314.3, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all of the alarms in the individual dwelling unit. Physical interconnection of smoke alarms shall not be required where listed wireless alarms are installed and all alarms sound upon activation of one alarm.

(Some 2012 IRC provisions not shown for brevity and clarity.)

R314.5 Combination alarms. Combination smoke and carbon monoxide alarms shall be permitted to be used in lieu of smoke alarms.

R314.4 R314.6 Power source. Smoke alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and where primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Exceptions:

1. Smoke alarms shall be permitted to be battery operated when installed in buildings without commercial power.
2. Smoke alarms installed in accordance with Section R314.2.2 shall be permitted to be battery powered. (Removed text not shown for brevity and clarity.)
R314 Smoke Alarms (cont)

R314.7 Fire alarm systems. Fire alarm systems shall be permitted to be used in lieu of smoke alarms and shall comply with Sections R314.7.1 through R314.7.4.

R314.2 Smoke detection systems. R314.7.1 General. Fire alarm systems shall comply with the provisions of this code and the household fire warning equipment provisions of NFPA 72. Smoke detectors shall be listed in accordance with UL 268. (*Removed text not shown for brevity and clarity.*)

R314.7.2 Location. Smoke detectors shall be installed in the locations specified in Section R314.3.

R314.2 Smoke detection systems. R314.7.3 Permanent fixture. Where a household fire alarm system is installed using a combination of smoke detector and audible notification device(s), it shall become a permanent fixture of the occupancy and, owned by the homeowner. (*Removed text not shown for brevity and clarity.*)

R314.7.4 Combination detectors. Combination smoke/carbon monoxide detectors shall be permitted to be installed in fire alarm systems in lieu of smoke detectors, provided they are listed in accordance with UL 268 and UL 2075.
R315 Carbon Monoxide Alarms

CHANGE SUMMARY: Carbon monoxide alarms now require connection to the house wiring system with battery backup. Exterior work such as roofing, siding, windows, doors, and deck and porch additions no longer trigger the carbon monoxide alarm provisions for existing buildings. An attached garage is one criterion for requiring carbon monoxide alarms, but only if the garage has an opening into the dwelling. A carbon monoxide alarm is required in bedrooms when there is a fuel-fired appliance in the bedroom or adjoining bathroom. Carbon monoxide detection systems only require detectors installed in the locations prescribed by the code and not those locations described in NFPA 720.

R315.1 General. Carbon monoxide alarms shall comply with Section R315.

R315.1.1 Listings. Carbon monoxide alarms shall be listed in accordance with UL 2034. Combination carbon monoxide/smoke alarms shall be listed in accordance with UL 2034 and UL 217.

R315.2 Where required. Carbon monoxide alarms shall be provided in accordance with Sections R315.2.1 and R315.2.2.

R315.1.2 Carbon monoxide alarms. R315.2.1 New construction. For new construction, an approved carbon monoxide alarms shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms in dwelling units within which fuel-fired appliances are installed and in dwelling units that have attached garages—provided in dwelling units where either or both of the following conditions exist.
1. The dwelling unit contains a fuel-fired appliance.
2. The dwelling unit has an attached garage with an opening that communicates with the dwelling unit.

**R315.3 Location.** Carbon monoxide alarms in dwelling units shall be installed outside of each separate sleeping area in the immediate vicinity of the bedrooms. Where a fuel-burning appliance is located within a bedroom or its attached bathroom, a carbon monoxide alarm shall be installed within the bedroom.
R315 Carbon Monoxide Alarms (cont)

R315.4 Combination alarms. Combination carbon monoxide and smoke alarms shall be permitted to be used in lieu of carbon monoxide alarms.

R315.5 Power source. Carbon monoxide alarms shall receive their primary power from the building wiring where such wiring is served from a commercial source, and where primary power is interrupted, shall receive power from a battery. Wiring shall be permanent and without a disconnecting switch other than those required for overcurrent protection.

Exceptions:
1. Carbon monoxide alarms shall be permitted to be battery operated where installed in buildings without commercial power.
2. Carbon monoxide alarms installed in accordance with Section R315.2.2 shall be permitted to be battery powered.

R315.6 Carbon monoxide detection systems. Carbon monoxide detection systems shall be permitted to be used in lieu of carbon monoxide alarms and shall comply with Sections R315.6.1 to R315.6.4.

R315.6.1 General. Household carbon monoxide detection systems shall comply with NFPA 720. Carbon monoxide detectors shall be listed in accordance with UL 2075.
R315.6.2 Location. Carbon monoxide detectors shall be installed in the locations specified in Section R315.3. These locations supersede the locations specified in NFPA 720.
R315.6.3 Permanent fixture. Where a household carbon monoxide detection system is installed, it shall become a permanent fixture of the occupancy and owned by the homeowner. and shall be monitored by an approved supervising station.
R315.6.4 Combination detectors. Combination carbon monoxide/smoke detectors shall be permitted to be installed in carbon monoxide detection systems in lieu of carbon monoxide detectors, provided they are listed in accordance with UL 2075 and UL 268.
**R325 Mezzanines**

**CHANGE SUMMARY:** New provisions in Section R325 place limitations on the construction of mezzanines related to ceiling height and openness consistent with the *International Building Code* (IBC).

**Section R202 Definitions**

**Mezzanine, Loft**—An intermediate level or levels between the floor and ceiling of any story with an aggregate floor area of not more than one-third of the area of the room or space in which the level or levels are located.

**R301.2.2.3.1 Height limitations.** Wood-framed buildings shall be limited to three stories above grade plane or the limits given in Table R602.10.3(3). Cold-formed, steel-framed buildings shall be limited to less than or equal to three stories above grade plane in accordance with AISI S230. Mezzanines as defined in Section R202 that comply with Section R325 shall not be considered as stories. Structural insulated panel buildings shall be limited to two stories above grade plane.

**Section R325 Mezzanines**

**R325.1 General.** Mezzanines shall comply with Section R325.

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

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.

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 42 inches (1067 mm) in height, 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 no more than two stories above grade plane and equipped throughout with an automatic sprinkler system in accordance with NFPA 13R or NFPA 13D, a mezzanine having two or more means of egress shall not be required to be open to the room in which the mezzanine is located.
R403.1.1 Minimum Footing Size

**Change summary:** This code change divides minimum footing size and thickness into three expanded tables based on the type of construction being supported: light frame, light frame with veneer, and concrete or masonry. The values are also based on the type of foundation: slab on grade, crawl space, or basement.

**R403.1.1 Minimum size.** The minimum sizes width, $W$, and thickness, $T$, for concrete and masonry footings shall be as set forth in accordance with Tables R403.1(1) through R403.1(3) and Figure R403.1(1) or R403.1.3, as applicable. The footing width, $W$, shall be based on the load-bearing value of the soil in accordance with Table R401.4.1. Spread footings shall be at least 6 inches (152 mm) in thickness, $T$. Footing projections, $P$, shall be at least 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).
## R403.1.1 Minimum Footing Size (cont)

### TABLE R403.1(1) Minimum Width and Thickness for Concrete Footings for Light Frame Construction (inches)\textsuperscript{a,b}

<table>
<thead>
<tr>
<th>Snow Load or Roof Live Load</th>
<th>Story and Type of Structure with Light Frame</th>
<th>Load-Bearing Value of Soil (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1500</td>
</tr>
<tr>
<td>20 psf</td>
<td>1 story - slab on grade</td>
<td>12 × 6</td>
</tr>
<tr>
<td></td>
<td>1 story - with crawl space</td>
<td>12 × 6</td>
</tr>
<tr>
<td></td>
<td>1 story - plus basement</td>
<td>18 × 6</td>
</tr>
<tr>
<td></td>
<td>2 story - slab on grade</td>
<td>12 × 6</td>
</tr>
<tr>
<td></td>
<td>2 story - with crawl space</td>
<td>16 × 6</td>
</tr>
<tr>
<td></td>
<td>2 story - plus basement</td>
<td>22 × 6</td>
</tr>
<tr>
<td></td>
<td>3 story - slab on grade</td>
<td>14 × 6</td>
</tr>
<tr>
<td></td>
<td>3 story - with crawl space</td>
<td>10 × 6</td>
</tr>
<tr>
<td></td>
<td>3 story - plus basement</td>
<td>25 × 8</td>
</tr>
<tr>
<td>30 psf</td>
<td>1 story - slab on grade</td>
<td>12 × 6</td>
</tr>
<tr>
<td></td>
<td>1 story - with crawl space</td>
<td>13 × 6</td>
</tr>
<tr>
<td></td>
<td>1 story - plus basement</td>
<td>19 × 6</td>
</tr>
<tr>
<td></td>
<td>2 story - slab on grade</td>
<td>12 × 6</td>
</tr>
<tr>
<td></td>
<td>2 story - with crawl space</td>
<td>17 × 6</td>
</tr>
<tr>
<td></td>
<td>2 story - plus basement</td>
<td>23 × 6</td>
</tr>
<tr>
<td></td>
<td>3 story - slab on grade</td>
<td>15 × 6</td>
</tr>
<tr>
<td></td>
<td>3 story - with crawl space</td>
<td>20 × 6</td>
</tr>
<tr>
<td></td>
<td>3 story - plus basement</td>
<td>26 × 8</td>
</tr>
</tbody>
</table>
### TABLE R403.1.1(1) (Continued)

<table>
<thead>
<tr>
<th>Snow Load or Roof Live Load</th>
<th>Story and Type of Structure with Light Frame</th>
<th>Load-Bearing Value of Soil (psf)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3500</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4000</td>
</tr>
<tr>
<td>50 psf</td>
<td>1 story - slab on grade</td>
<td>12 x 6</td>
</tr>
<tr>
<td></td>
<td>1 story - with crawl space</td>
<td>12 x 6</td>
</tr>
<tr>
<td></td>
<td>1 story - plus basement</td>
<td>12 x 6</td>
</tr>
<tr>
<td></td>
<td>2 story - slab on grade</td>
<td>12 x 6</td>
</tr>
<tr>
<td></td>
<td>2 story - with crawl space</td>
<td>12 x 6</td>
</tr>
<tr>
<td></td>
<td>2 story - plus basement</td>
<td>12 x 6</td>
</tr>
<tr>
<td></td>
<td>3 story - slab on grade</td>
<td>12 x 6</td>
</tr>
<tr>
<td></td>
<td>3 story - with crawl space</td>
<td>12 x 6</td>
</tr>
<tr>
<td></td>
<td>3 story - plus basement</td>
<td>12 x 6</td>
</tr>
<tr>
<td>70 psf</td>
<td>1 story - slab on grade</td>
<td>12 x 9</td>
</tr>
<tr>
<td></td>
<td>1 story - with crawl space</td>
<td>12 x 8</td>
</tr>
<tr>
<td></td>
<td>1 story - plus basement</td>
<td>12 x 8</td>
</tr>
<tr>
<td></td>
<td>2 story - slab on grade</td>
<td>12 x 8</td>
</tr>
<tr>
<td></td>
<td>2 story - with crawl space</td>
<td>12 x 8</td>
</tr>
<tr>
<td></td>
<td>2 story - plus basement</td>
<td>12 x 8</td>
</tr>
<tr>
<td></td>
<td>3 story - slab on grade</td>
<td>12 x 6</td>
</tr>
<tr>
<td></td>
<td>3 story - with crawl space</td>
<td>12 x 6</td>
</tr>
<tr>
<td></td>
<td>3 story - plus basement</td>
<td>12 x 6</td>
</tr>
</tbody>
</table>

---

**Examples—Minimum Required Footing**

- **Two-story house with slab on grade foundation:**
  - Light-frame construction
  - Soil-bearing strength = 1500 psf
  - Roof Live Load = 20 psf
  - Minimum Footing Width
    - 2012: 15 x 6
    - 2015: 12 x 6
    - Smaller footing widths allowed

- **One-story house with storm wall foundation (crawl space):**
  - Light-frame construction
  - Soil-bearing strength = 1500 psf
  - Snow Load = 30 psf
  - 32 ft. wide building with interior load-bearing wall (see footnote b)

- **Footnote:** Building with roof widths smaller than 32 ft. to subtract 2 ft. from the footing width for every 2 ft. of width less than 32 ft.

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**Notes:**
- Interpolation allowed.
- Extrapolation is not allowed.
- Based on 12 ft. wide house with load-bearing center wall that carries half of the tributary attic and floor framing. For every 2 ft. of adjustment to the width of the house add or subtract 2 inches of footing width and 1 inch of footing thickness (but not less than 6 inches thick).
R403.1.6 Foundation Anchorage

Change summary: Anchor bolts are now required to be placed in the middle third of the sill plate. Approved anchors may be used instead of ½-inch anchor bolts.

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 Sections 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 (12.7 mm) diameter 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 be at least 1/2 inch (12.7 mm) in diameter and 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 foundation 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. Cold-formed steel framing systems shall be fastened to wood sill plates or anchored directly to the foundation as required in Section R505.3.1 or R603.3.1.
R403.1.6 Foundation Anchorage (cont)

Exceptions:

1. Foundation anchorage, spaced as required to provide equivalent anchorage to 1/2-inch diameter (12.7 mm) anchor bolts.

1.2. Walls 24 inches (610 mm) total length or shorter connecting offset \textit{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 \textit{braced wall panels} at corners, as shown in Item 9 of Table R602.3(1).

2.3. Connection of walls 12 inches (305 mm) total length or shorter connecting offset \textit{braced wall panels} to the foundation without anchor bolts shall be permitted. The wall shall be attached to adjacent \textit{braced wall panels} at corners, as shown in Item 9 of Table R602.3(1).
R404.4 Retaining Walls

Change summary: Retaining walls, freestanding walls not supported at the top, with more than 48 inches of unbalanced backfill must be designed by an engineer. Retaining walls resisting additional lateral loads and with more than 24 inches of unbalanced backfill must also be designed in accordance with accepted engineering practice.

R404.4 Retaining walls. Retaining walls that are not laterally supported at the top and that retain in excess of 48 inches (610 1219 mm) of unbalanced fill, or retaining walls exceeding 24 inches (610 mm) in height that resist lateral loads in addition to soil, shall be designed in accordance with accepted engineering practice to ensure stability against overturning, sliding, excessive foundation pressure, and water uplift. Retaining walls shall be designed for a safety factor of 1.5 against lateral sliding and overturning. This section shall not apply to foundation walls supporting buildings.
Tables R502.3.1(1), R502.3.1 (2)
Floor Joist Spans for Common Lumber Species

Change summary: Changes to Southern Pine (SP), Douglas Fir-Larch (DFL), and Hemlock Fir (HF) lumber capacities have changed the floor joist span length in the prescriptive tables of the IRC. Span lengths for Southern Pine have decreased; lengths for DFL and HF joists have increased.
R502.10 Framing of Floor Openings

Change summary: Requirements for header joist and trimmer connections in the framing of floor openings have been deleted. This section conflicted with Section R502.6, which contains minimum bearing lengths for all joists and headers.

R502.10 Framing of openings. Openings in floor framing shall be framed with a header and trimmer joists. When the header joist span does not exceed 4 feet (1219 mm), the header joist may be a single member the same size as the floor joist. Single trimmer joists may be used to carry a single header joist that is located within 3 feet (914 mm) of the trimmer joist bearing. When the header joist span exceeds 4 feet (1219 mm), the trimmer joists and the header joist shall be doubled and of sufficient cross section to support the floor joists framing into the header. Approved hangers shall be used for the header joist to trimmer joist connections when the header joist span exceeds 6 feet (1829 mm). Tail joists over 12 feet (3658 mm) long shall be supported at the header by framing anchors or on ledger strips not less than 2 inches by 2 inches (51 mm by 51 mm).
R507.1, R507.4 Decking

**Change summary:** The code sets the maximum allowable spacing for deck joists supporting the various types of common decking materials.

**R507.1 Decks.** Wood-framed decks shall be in accordance with this section or Section R301 for materials and conditions not prescribed herein. 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. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting. For decks with cantilevered framing members, connections 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.

**R507.4 Decking.** Maximum allowable spacing for joists supporting decking shall be in accordance with Table R507.4. Wood decking shall be attached to each supporting member with not less than (2) 8d threaded nails or (2) No. 8 wood screws.

<table>
<thead>
<tr>
<th>Material type and nominal size</th>
<th>Maximum on-center joist spacing</th>
<th>Perpendicular to joist</th>
<th>Diagonal to joist</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-1/4-inch thick wood</td>
<td>16 inches</td>
<td>12 inches</td>
<td></td>
</tr>
<tr>
<td>2-inch thick wood</td>
<td>24 inches</td>
<td>16 inches</td>
<td></td>
</tr>
<tr>
<td>Plastic composite</td>
<td>In accordance with Section R507.3</td>
<td>In accordance with Section R507.3</td>
<td></td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.01745 rad.

a. Maximum angle of 45 degrees from perpendicular for wood deck boards.
R507.2.4 Alternative Deck Lateral Load Connection

Change summary: When the prescriptive deck lateral load connection that has appeared in the previous editions of the code is chosen as a design option, the code now requires the two hold-down devices to be within 2 feet of the ends of the deck. A new lateral load connection option prescribes four hold-downs installed below the deck structure.

R507.2.3 R507.2.4 Deck lateral load connection. The lateral load connection required by Section R507.1 shall be permitted to be in accordance with Figure R507.2.3(1) or R507.2.3(2). Where the lateral load connection is provided in accordance with Figure R507.2.3(1), holddown tension devices shall be installed in not less than two locations per deck within 24 inches of each end of the deck. Each device shall have an allowable stress design capacity of not less than 1500 pounds (6672 N). Where the lateral load connections are provided in accordance with Figure R507.2.3(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).
R507.5, R507.6, R507.7 Deck Joists and Beams

Change summary: New sections and tables provide prescriptive methods for joists and beams in deck construction. Section R507.5 describes requirements for deck joists, Section R507.6 lists requirements for deck beams, and Section R507.7 describes minimum bearing requirements for joists and beams.

R507.5 Deck joists. Maximum allowable spans for wood deck joists, as shown in Figure R507.5, shall be in accordance with Table R507.5. Deck joists shall be permitted to cantilever a maximum of one-fourth of the actual, adjacent joist span.

R507.5.1 Lateral restraint at supports. Joist ends and bearing locations shall be provided with lateral restraint to prevent rotation. Where lateral restraint is provided by joist hangers or blocking between joists, their depth shall equal not less than 60 percent of the joist depth. Where lateral restraint is provided by rim joists, they shall be secured to the end of each joist with not less than (3) 10d (3 inch by 0.128 inch) (76 mm by 3 mm) nails or (3) No. 10 by 3 inch (76 mm) long wood screws.
R507.5, R507.6, R507.7 Deck Joists and Beams (cont)

TABLE R507.5 Deck Joist Spans for Common Lumber Species (ft, in.)

<table>
<thead>
<tr>
<th>Species &amp; Grade</th>
<th>Size</th>
<th>12</th>
<th>16</th>
<th>24</th>
<th>12</th>
<th>16</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southern pine</td>
<td>2 x 6</td>
<td>9-1</td>
<td>9-1</td>
<td>7-7</td>
<td>6-6</td>
<td>6-6</td>
<td>6-6</td>
</tr>
<tr>
<td></td>
<td>2 x 8</td>
<td>11-1</td>
<td>11-10</td>
<td>9-6</td>
<td>10-1</td>
<td>10-1</td>
<td>9-6</td>
</tr>
<tr>
<td></td>
<td>2 x 10</td>
<td>14-2</td>
<td>14-0</td>
<td>13-5</td>
<td>14-6</td>
<td>14-6</td>
<td>13-5</td>
</tr>
<tr>
<td></td>
<td>2 x 12</td>
<td>18-9</td>
<td>18-9</td>
<td>18-9</td>
<td>18-9</td>
<td>18-9</td>
<td>18-9</td>
</tr>
<tr>
<td>Douglas fir-larch</td>
<td>2 x 6</td>
<td>9-6</td>
<td>8-8</td>
<td>7-3</td>
<td>6-3</td>
<td>6-3</td>
<td>6-3</td>
</tr>
<tr>
<td></td>
<td>2 x 8</td>
<td>12-6</td>
<td>11-0</td>
<td>9-1</td>
<td>9-6</td>
<td>9-6</td>
<td>9-1</td>
</tr>
<tr>
<td></td>
<td>2 x 10</td>
<td>15-8</td>
<td>15-8</td>
<td>15-8</td>
<td>15-8</td>
<td>15-8</td>
<td>15-8</td>
</tr>
<tr>
<td></td>
<td>2 x 12</td>
<td>19-9</td>
<td>19-9</td>
<td>19-9</td>
<td>19-9</td>
<td>19-9</td>
<td>19-9</td>
</tr>
<tr>
<td>Redwood, western cedar, ponderosa pine, red pine</td>
<td>2 x 6</td>
<td>8-10</td>
<td>8-8</td>
<td>7-0</td>
<td>5-7</td>
<td>5-7</td>
<td>5-7</td>
</tr>
<tr>
<td></td>
<td>2 x 8</td>
<td>11-8</td>
<td>10-7</td>
<td>8-8</td>
<td>6-6</td>
<td>6-6</td>
<td>6-6</td>
</tr>
<tr>
<td></td>
<td>2 x 10</td>
<td>14-11</td>
<td>13-0</td>
<td>10-7</td>
<td>12-8</td>
<td>12-8</td>
<td>12-8</td>
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<tr>
<td></td>
<td>2 x 12</td>
<td>17-5</td>
<td>15-1</td>
<td>13-4</td>
<td>16-5</td>
<td>16-5</td>
<td>16-5</td>
</tr>
</tbody>
</table>

For SI: 1 inch = 25.4 mm, 1 foot = 0.3048 m, 1 pound per square foot = 0.0479 kPa.

- a. No. 2 grade with wet service factor.
- b. General snow load, live load = 40 psf, dead load = 10 psf, L/A = 300.
- c. General snow load, live load = 40 psf, dead load = 10 psf, L/A = 300 at main span, L/A = 100 at cantilever with a 220 pound point load applied to end.
- d. Includes bearing factor.
- e. Spans subject to service factor
- f. Cantilever spans not exceeding the nominal depth of the jois are permitted.
R507.5, R507.6, R507.7 Deck Joists and Beams (cont)

R507.6 Deck Beams. Maximum allowable spans for wood deck beams, as shown in Figure R507.6, shall be in accordance with Table R507.6. Beam plies shall be fastened with two rows of 10d (3 inch by 0.128 inch) (76 mm by 3 mm) nails minimum at 16 inches (406 mm) on center along each edge. Beams shall be permitted to cantilever at each end up to one-fourth of the actual beam span. Splices of multi-span beams shall be located at interior post locations.

R507.7 Deck joist and deck beam bearing. The ends of each joist and beam shall have not less than 1½ inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) on concrete or masonry for the entire width of the beam. Joist framing into the side of a ledger board or beam shall be supported by approved joist hangers. Joists bearing on a beam shall be connected to the beam to resist lateral displacement.
**R507.5, R507.6, R507.7 Deck Joists and Beams (cont)**

**R507.7.1 Deck post to deck beam.** Deck beams shall be attached to deck posts in accordance with Figure R507.8.7.1 or by other equivalent means capable of resisting lateral displacement. Manufactured post-to-beam connectors shall be sized for the post and beam sizes. All bolts shall have washers under the head and nut.

**Exception:** Where deck beams bear directly on footings in accordance with Section R507.8.1.
R507.8 Deck Posts

Change summary: New Section R507.8 establishes minimum sizes of wood posts supporting wood decks and describes the requirements for connection of deck posts to the footing.

R507.8 Deck posts. For single-level, wood-framed decks with beams sized in accordance with Table R507.6, deck post size shall be in accordance with Table R507.8.

<table>
<thead>
<tr>
<th>Deck Post Size</th>
<th>Maximum Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 x 4</td>
<td>8'</td>
</tr>
<tr>
<td>4 x 6</td>
<td>8'</td>
</tr>
<tr>
<td>6 x 6</td>
<td>14'</td>
</tr>
</tbody>
</table>

For SI: 1 foot = 304.8 mm

a. Measured to the underside of the beam

R507.8.1 Deck post to deck footing. Posts shall bear on footings in accordance with Section R403 and Figure R507.8.1. Posts shall be restrained to prevent lateral displacement at the bottom support. Such lateral restraint shall be provided by manufactured connectors installed in accordance with Section R507 and the manufacturers’ instructions or a minimum post embedment of 12 inches (305 mm) in surrounding soils or concrete piers.
Table R602.3(1) Fastening Schedule – Roof Requirements

**Change summary:** The Fastening Schedule now contains multiple nail size options. Clarification of roof rafter connections at ridge, valley, and hip is added.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description of Building Elements</th>
<th>Number and Type of Fastener</th>
<th>Spacing and Location of Fasteners</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Blocking between ceiling joints or rafters to top plate, toe-nailed</td>
<td>3-8d box (2 1/2” x 0.113”); or 3-8d common (2 1/2” x 0.131”); or 3-10d box (3” x 0.128”); or 3-3/8” x 0.131” nails</td>
<td>Toe nail</td>
</tr>
<tr>
<td>2</td>
<td>Ceiling joists to top plate, toe-nailed</td>
<td>3-8d box (2 1/2” x 0.113”); or 3-8d common (2 1/2” x 0.131”); or 3-10d box (3” x 0.128”); or 3-3/8” x 0.131” nails</td>
<td>Per joint toe nail</td>
</tr>
<tr>
<td>3</td>
<td>Ceiling joist not attached to parallel rafter, laps over partitions, face nail</td>
<td>4-8d 4-10d box (3” x 0.128”); or 3-16d 4-10d common (3 1/4” x 0.162”); or 4-13/8” x 0.131” nails</td>
<td>Face nail</td>
</tr>
<tr>
<td>4</td>
<td>Ceiling joist attached to parallel rafter (floor joint)</td>
<td>Per Table R602.5.1(9)</td>
<td>Face nail</td>
</tr>
<tr>
<td>5</td>
<td>Collar tie to rafter, face nail or 1 1/4” x 20 gage ridge strap to rafter</td>
<td>3-8d 4-10d box (3” x 0.128”); or 3-10d common (3” x 0.135”); or 4-3/8” x 0.137” nails</td>
<td>Face nail each rafter</td>
</tr>
<tr>
<td>6</td>
<td>Rafter or roof truss to plate, toe-nailed</td>
<td>3-10d box nails (3 1/4” x 0.135”); or 3-10d common nails (3 1/4” x 0.148”); or 4-3/8” x 0.137” nails</td>
<td>2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss</td>
</tr>
<tr>
<td>7</td>
<td>Roof rafters to ridge, valley or hip rafters or roof rafter to minimum 2” ridge beam, toe-nailed</td>
<td>4-10d box (3 1/4” x 0.135”); or 3-16d common (3 1/4” x 0.162”); or 4-10d box (3” x 0.128”); or 3-3/8” x 0.131” nails</td>
<td>Toe nail</td>
</tr>
</tbody>
</table>

(Footnotes not shown for brevity and clarity.)
Table R602.3(1) Fastening Schedule – Wall Requirements

Change summary: The Fastening Schedule for Structural Members now contains multiple nail size options. Clarification of double top plate splicing is added. Descriptions are updated in the IRC and the International Building Code (IBC) for attachments in walls as well.
### Table R602.3(1) Fastening Schedule – Floor Requirements

**Change summary:** The Fastening Schedule for Structural Members now contains multiple nail size options. Clarification of the joist-to-bandjoist (rim board) connection is added.

<table>
<thead>
<tr>
<th>Item</th>
<th>Description of Building Elements</th>
<th>Number and Type of Fasteners</th>
<th>Spacing of Fasteners and Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>Joist to sill, top plate or girder</td>
<td>4d box (21⁄8&quot; x 0.113&quot;), or 2-8d common, (21⁄8&quot; x 0.131&quot;), or 3-10d box (2&quot; x 0.138&quot;), or 3-3&quot; x 0.131&quot; nails</td>
<td>Top nail</td>
</tr>
<tr>
<td>22</td>
<td>Rim joist, band joist, or blocking to sill, or top plate (roof applications also)</td>
<td>4d box (21⁄8&quot; x 0.113&quot;), or 2-8d common, (21⁄8&quot; x 0.131&quot;), or 2-10d box (2&quot; x 0.138&quot;), or 3-3&quot; x 0.131&quot; nails</td>
<td>4&quot; o.c. top nail</td>
</tr>
<tr>
<td>23</td>
<td>1&quot; x 6&quot; subfloor or less to each joint</td>
<td>3-8d box (21⁄8&quot; x 0.113&quot;), or 2-8d common, (21⁄8&quot; x 0.131&quot;), or 3-10d box (2&quot; x 0.138&quot;), or 2 staples, 7⁄8&quot; crown, 16 ga, 1 or long</td>
<td>Face nail</td>
</tr>
<tr>
<td>24</td>
<td>2&quot; subfloor to joist or girders</td>
<td>2-8d or 3-8d box (19⁄32&quot; x 0.155&quot;), or 2-10d common (11⁄32&quot; x 0.162&quot;)</td>
<td>Blind and face nail</td>
</tr>
<tr>
<td>25</td>
<td>2&quot; planks (plank &amp; beam - floor &amp; roof)</td>
<td>3-10d or 6-10d box (19⁄32&quot; x 0.155&quot;)</td>
<td>At each bearing, face nail</td>
</tr>
<tr>
<td>26</td>
<td>Band or rim joist to joist</td>
<td>3-10d common (19⁄32&quot; x 0.162&quot;), or 2-10d box (2&quot; x 0.138&quot;), or 4 - 3&quot; x 0.134&quot; nails, or 4 - 3&quot; x 13 gauge staples, 15⁄8&quot; crown</td>
<td>End nail</td>
</tr>
<tr>
<td>27</td>
<td>Built-up girders and beams, 2-inch lumber layers</td>
<td>20d common (3&quot; x 0.102&quot;)</td>
<td>Nail each layer as follows: 32&quot; o.c. at top and bottom and staggered. Two nails at ends and at each splice.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10d box (3&quot; x 0.128&quot;), or 3-3&quot; x 0.131&quot; nails</td>
<td>24&quot; o.c. face nail at top and bottom staggered on opposite side.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>And: 2-20d common (4&quot; x 0.102&quot;), or 3-10d box (2&quot; x 0.128&quot;) or 3-3&quot; x 0.131&quot; nails</td>
<td>Face nail at ends and at each splice.</td>
</tr>
<tr>
<td>28</td>
<td>Ledger strip supporting joists or rafters</td>
<td>3-10d or 4-10d box (19⁄32&quot; x 0.155&quot;) or 3-10d common (31⁄32&quot; x 0.162&quot;)</td>
<td>At each joist or rafter, face nail</td>
</tr>
<tr>
<td>30</td>
<td>Bridging to joist</td>
<td>2-10d (2&quot; x 0.128&quot;)</td>
<td>Each end, box nail</td>
</tr>
</tbody>
</table>

*(Footnotes not shown for brevity and clarity.)*
R602.3.1 Stud Size, Height and Spacing

Change summary: Table R602.3.1 is deleted and the exception for walls greater than 10 feet tall is added to the text of Section R602.3.1. If studs in a tall wall meet Exception 2, they meet the requirements of the IRC and do not need engineering or use of an alternate standard.

R602.3.1 Stud Size, Height, and Spacing. The size, height, and spacing of studs shall be in accordance with Table R602.3(5).

Exceptions:

1. Utility grade studs shall not be spaced more than 16 inches (406 mm) on center, shall not support more than a roof and ceiling, and shall not exceed 8 feet (2438 mm) in height for exterior walls and load-bearing walls or 10 feet (3048 mm) for interior non-load-bearing walls.

2. Studs more than 10 feet in height which are in accordance with Table R602.3.1. Where snow loads are less than or equal to 25 pounds per square foot (1.2 kPa), and the ultimate design wind speed is less than or equal to 130 mph (58 m/s), 2-inch by 6-inch (38 mm by 140 mm) studs supporting a roof load with not more than 6 feet (1829 mm) of tributary length shall have a maximum height of 18 feet (5486 mm) where spaced at 16 inches (406 mm) on center, or 20 feet (6096 mm) where spaced at 12 inches (305 mm) on center. Studs shall be minimum No. 2 grade lumber.
R602.3.1 Stud Size, Height and Spacing (cont)

Example—Prescriptive Tall Walls

In the following three cases, tall walls meeting the IRC's limits are illustrated.

Case 1: 2 × 6 Continuous Studs Used in an 18-Foot Gable End Wall

The gable end wall studs do not support a roof load. They form a non-load-bearing wall. From Table R602.3(5), non-bearing walls may have studs up to 20 feet tall when using 2 × 6 lumber.

Case 2: 2 × 6 Continuous Studs Used in a 20-Foot Tall Wall Supporting a Projection (Roof Framing Parallel to Wall)

The studs used for a two-story projection where the roof framing runs parallel to the wall will carry a roof load. If the studs can meet all the limits of Section R602.3.1, Exception 2, then no engineering of the wall is required. The following four limits must be met:
1. Snow load >25 psf
2. Wind speed ≤120 mph
3. 2 × 6 construction
4. Roof load tributary width ≤60 feet

Assuming the first three conditions are met, the roof load tributary width limit must be met.
R602.7 Headers

CHANGE SUMMARY: The girder and header span tables of Chapter 5 have been moved into Chapter 6, to the header section. Multi-ply and single header tables are combined. A new section describing rim board headers is added.

**R602.7 Headers.** For header spans see Tables R602.7(1), R602.7(2) and R602.7(3); R502.5(1), R502.5(2), and R602.7.1.

**R602.7.1 Single Member Headers.** Single headers shall be framed with a single flat 2-inch-nominal (51 mm) member or wall plate not less in width than the wall studs on the top and bottom of the header in accordance with Figures R602.7.1(1) and R602.7.1(2) and face nailed to the top and bottom of the header with 10d box nails (3 inches x 0.128 inches) (76 mm by 3 mm) spaced 12 inches (305 mm) on center.

**R602.7.2 Rim Board Headers.** Rim board header size, material, and span shall be in accordance with Table R602.7(1) for rim board headers. Rim board headers shall be constructed in accordance with Figure R602.7.2 and shall be supported at each end by full height studs. The number of full height studs at each end shall be not less than the number of studs displaced by half of the header span based on the maximum stud spacing in accordance with Table R602.3(5). Rim board headers supporting concentrated loads shall be designed in accordance with accepted engineering practice.
### R602.7 Headers (cont)

**TABLE R602.7(1)**  
**Girder Spans and Header Spans for Exterior Bearing Walls**  
(Maximum Spans for Douglas Fir-Larch, Hem-Fir, Southern Pine and Spruce-Pine-Fir)  
and Required Number of Jack Studs  

<table>
<thead>
<tr>
<th>Ground Snow Load (psf)</th>
<th>10</th>
<th>20</th>
<th>30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building width (feet)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 x 8</td>
<td>4.4</td>
<td>3.1</td>
<td>2.5</td>
</tr>
<tr>
<td>2 x 10</td>
<td>4.4</td>
<td>3.1</td>
<td>2.5</td>
</tr>
<tr>
<td>2 x 12</td>
<td>4.4</td>
<td>3.1</td>
<td>2.5</td>
</tr>
<tr>
<td>2 x 20</td>
<td>4.4</td>
<td>3.1</td>
<td>2.5</td>
</tr>
</tbody>
</table>

(Percent of table not shown for brevity and clarity. No changes to footnotes.)

**TABLE R602.7(3)**  
**Girder and Header Spans for Open Porches**  
(Maximum Span for Douglas Fir-Larch, Hem-Fir, Southern Pine,  
and Spruce-Pine-Fir)  

<table>
<thead>
<tr>
<th>Supporting Roof</th>
<th>Ground Snow Load (psf)</th>
<th>Supporting Floor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30</td>
<td>50</td>
</tr>
<tr>
<td>Size</td>
<td>a</td>
<td>b</td>
</tr>
<tr>
<td>2 x 2 x 6</td>
<td>7.0</td>
<td>6.5</td>
</tr>
<tr>
<td>2 x 2 x 8</td>
<td>10.1</td>
<td>9.6</td>
</tr>
<tr>
<td>2 x 2 x 10</td>
<td>12.1</td>
<td>11.6</td>
</tr>
<tr>
<td>2 x 2 x 12</td>
<td>14.4</td>
<td>13.9</td>
</tr>
</tbody>
</table>

For 1/16 in. = 0.16 mm, 1 ft = 304.8 mm, 1 pound per square foot = 0.0489 kPa.

a. Spans are given in feet and inches.

b. Tabled values assume 22 grade lumber, 115 or 120 pound per square foot for minimum species. Use 50 psi ground snow load for cases in which ground snow load is less than 30 psi and the roof live load is equal to or less than 33 psi.

c. Depth of porch is measured horizontally from building line to the centerline of the header. Parapet width between those shown, spans are permitted to be interpolated.
R602.7.5 Supports for headers. Headers shall be supported on each end with one or more jack studs or with approved framing anchors in accordance with Table R602.7(1) or R602.7(2). The full height stud adjacent to each end of the header shall be end nailed to each end of the header with 4-16d nails (3.5 inches x 0.135 inches). The minimum number of full height studs at each end of a header shall be in accordance with Table R602.7.5.

<table>
<thead>
<tr>
<th>Header Span (feet)</th>
<th>16</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;= 1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>16</td>
<td>6</td>
<td>4</td>
</tr>
</tbody>
</table>
Table R602.10.3(1) Bracing Requirements Based on Wind Speed

**CHANGE SUMMARY:** Table values in Table R602.10.3(1) have changed slightly due to use of ultimate design wind speed values to calculate required bracing length.

<table>
<thead>
<tr>
<th>Ultimate Design Wind Speed (mph)</th>
<th>Story Location</th>
<th>Braced Wall Line Spacing (feet)</th>
<th>Method DWB, WSR, SEE, RES, PCE, HPS, RV-WSF, AEW, PTH, PPC, C2S, SFP</th>
<th>Methods C-S-WSF, C204, C26-FF</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>3.5</td>
<td>3.5</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>20</td>
<td>6.0</td>
<td>6.0</td>
<td>4.5</td>
<td>4.5</td>
</tr>
<tr>
<td>30</td>
<td>9.5</td>
<td>9.5</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>40</td>
<td>12.5</td>
<td>12.5</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>50</td>
<td>15.0</td>
<td>15.0</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>60</td>
<td>18.0</td>
<td>18.0</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>&lt;115</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>7.0</td>
<td>7.0</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>20</td>
<td>12.5</td>
<td>12.5</td>
<td>10.5</td>
<td>10.5</td>
</tr>
<tr>
<td>30</td>
<td>18.0</td>
<td>18.0</td>
<td>10.5</td>
<td>10.5</td>
</tr>
<tr>
<td>40</td>
<td>23.5</td>
<td>23.5</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>50</td>
<td>30.0</td>
<td>30.0</td>
<td>16.0</td>
<td>16.0</td>
</tr>
<tr>
<td>60</td>
<td>38.5</td>
<td>38.5</td>
<td>20.0</td>
<td>20.0</td>
</tr>
</tbody>
</table>

(Portions of table not shown for brevity and clarity.)
Table R602.10.5 Contributing Length of Method CS-PF Braced Wall Panels

**CHANGE SUMMARY:** The contributing length of continuously sheathed portal frames (Method CS-PF) in low-seismic regions has increased by 50 percent.

<table>
<thead>
<tr>
<th>Method [See Table R602.10.4]</th>
<th>Wall Height</th>
<th>Minimum Length* (in.)</th>
<th>Contributing Length (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDC A, B, and C</td>
<td>8 ft.</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>SDC E, D, and E</td>
<td>16</td>
<td>10 ft.</td>
<td>16</td>
</tr>
</tbody>
</table>

(Fortions of table and footnotes not shown for brevity and clarity.)

Comparison of nailing of CS-PF and PFG
R602.10.6.2 Method PFH: Portal Frame with Hold-Downs

CHANGE SUMMARY: Due to recent testing of Method PFH (Portal Frame with Hold-downs), the minimum required capacity of the hold-downs is lowered to 3500 lbs in the 2015 IRC. Additionally, the new testing confirms that two sill plates are sufficient under each braced wall panel of the portal frame rather than the three plates used for Method PFH for the 2012 IRC.

R602.10.6.2 Method PFH: Portal frame with hold-downs. Method PFH braced wall panels shall be constructed in accordance with Figure R602.10.6.2.
R602.10.11 Cripple Wall Bracing

CHANGE SUMMARY: A reduction is no longer required in determining the maximum distance between braced wall panels in a cripple wall. References to the bracing length adjustment tables clarify that increased bracing is required if gypsum wall finish is not applied to the cripple walls.

R602.10.11 Cripple wall bracing. Cripple walls shall be constructed in accordance with Section R602.9 and braced in accordance with this section. Cripple walls shall be braced with the length and method of bracing used for the wall above in accordance with Tables R602.10.3(1) and R602.10.3(3), and the applicable adjustment factors in Tables R602.10.3(2) or R602.10.3(4), respectively, except the length of the cripple wall bracing shall be multiplied by a factor of 1.15. The maximum distance between adjacent edges of braced wall panels shall be reduced from 20-feet (6069 mm) to 14-feet (4267 mm). Where gypsum wall board is not used on the inside of the cripple wall bracing, the length adjustments for the elimination of the gypsum wallboard, or equivalent, shall be applied as directed in Tables R602.10.3(2) and R602.10.3(4) to the length of cripple wall bracing required. This adjustment shall be taken in addition to the 1.15 increase.
Table R602.12 Simplified Wall Bracing

**CHANGE SUMMARY:** Simplified wall bracing is now allowed for one-to three-story dwellings and townhouses in Wind Exposure Category B or C with ultimate design wind speeds ($V_{ult}$) of 130 mph or less.

**R602.12 Simplified wall bracing.** Buildings meeting all of the conditions listed below shall be permitted to be braced in accordance with this section as an alternate to the requirements of Section R602.10. The entire building shall be braced in accordance with this section; the use of other bracing provisions of R602.10, except as specified therein, shall not be permitted.

1. There shall be not more than **two** three stories above the top of a concrete or masonry foundation or basement wall. Permanent wood foundations shall not be permitted.
2. Floors shall not cantilever more than 24 inches (607 mm) beyond the foundation or bearing wall below.
3. Wall height shall not be greater than 10 feet (2743 mm).
4. The building shall have a roof eave-to-ridge height of 15 feet (4572 mm) or less.
5. Exterior walls shall have gypsum board with a minimum thickness of 1/2 inches (12.7 mm) installed on the interior side fastened in accordance with Table R702.3.5.
6. The structure shall be located where the basic ultimate design wind speed is less than or equal to 90 130 mph (40 58 m/s), and the Exposure Category is A, B or C.
7. The structure shall be located in Seismic Design Category of A, B or C for detached one- and two-family dwellings or Seismic Design Category A or B for townhouses.
8. Cripple walls shall not be permitted in **two** three-story buildings.
### R602.12 Simplified Wall Bracing

#### Table R602.12.4
**Minimum Number of Bracing Units on Each Side of the Circumscribed Rectangle**

<table>
<thead>
<tr>
<th>Ultimate Design</th>
<th>Story Level</th>
<th>Eave-To-Ridge Height (feet)</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind Speed</td>
<td>110</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>160</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>190</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

**continued**

<table>
<thead>
<tr>
<th>Ultimate Design</th>
<th>Story Level</th>
<th>Eave-To-Ridge Height (feet)</th>
<th>19</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50</th>
<th>60</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind Speed</td>
<td>110</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>160</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>190</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

---

- For 20 ft., 304.8 mm, 1 in. = 25.4 mm
- Interpolation shall not be permitted.
- Cripple walls or wood-framed basement walls in a walk-out condition of a one-story structure shall be designed as 2-story structures and the stories above shall be designed as the second and third stories, respectively, and shall be permitted in a two-story structure.
- Actual lengths of the sides of the circumscribed rectangle shall be rounded to the next highest unit of 10 when using this table.
- For expansion category B, nominal bracing units shall be a factor of 1.5 for a one-story building, 1.0 for a two-story building, and 0.5 for a three-story building.
Tables R802.4, R802.5 Ceiling Joist and Rafter Tables

CHANGE SUMMARY: Changes to Southern Pine, Douglas Fir-Larch, and Hemlock Fir capacities have changed the maximum spans for lumber in the ceiling joist and rafter span tables of the International Residential Code.
THANK YOU

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