

# 2018 International Residential Code Changes Related to Wood Construction

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## Introduction

The 2018 International Residential Code (IRC) was approved by the International Code Council (ICC) during their 2015/2016 code development cycle. This article outlines changes to the IRC as they relate to wood construction. Accompanying discussion of each change is the ICC code change tracking number [bracketed] that can be used to search for more information regarding the change on the ICC website (iccsafe.org), including the reason the proponent offered for the change and any modifications made during the hearing process. The Appendix to this paper, beginning on page 22, contains a strikethrough/underline format of changes where it is deemed helpful for understanding the code changes outlined herein.



## Referenced Standards

References to code-referenced standards are updated to reflect the most recent editions [ADM94-16]. The 2018 editions of the AWC *National Design Specification*® (NDS®) for Wood Construction and the *Wood Frame Construction Manual (WFCM) for One-and-Two Family Dwellings* were approved.

The 2015 *Permanent Wood Foundation Design Specification* is still referenced in 2018 IRC.

The following updated APA-The Engineered Wood Association standards were also approved for reference:

- ANSI A190.1-2017 Structural Glued Laminated Timber

- ANSI/APA PRG-320-2017 Standard for Performance-Rated Cross-Laminated Timber
- ANSI/APA PRP 210-2014 Standard for Performance-Rated Engineered Wood Siding
- ANSI/APA PRR 410-2016 Standard for Performance-Rated Engineered Wood Rim Boards

## Approved Agencies

Product certification report writing agencies were introduced into the definition of Approved Agency. [ADM6-16 AM]

## Fasteners and Framing

Most changes are not shown in detail in Appendix A for brevity.

- Tables R602.3(1) Fastening Schedule and R602.10.3(4) Seismic Adjustment Factors to the Required Length

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**KEYWORDS:** fasteners, wall bracing, decks, sprinklers, span tables

of Wall Bracing (RB219-16] have been modified to correct the 10d common nail length, remove redundant requirements for stud nailing, and create consistency in the IRC for roof sheathing attachment.

- Roof Sheathing Ring Shank nails have been added to Table R602.3(1) Fastening Schedule with the designation RSRS-01 (2-3/8" x 0.113") as an option for roof sheathing attachment. A new Footnote j references ASTM F 1667 *Standard Specification for Driven Fasteners: Nails, Spikes, and Staples* [RB220-16].
- Footnote f of the spacing of roof sheathing fasteners at roof edges, eaves, and ridges in Table R602.3(1) Fastening Schedule was modified for conformity with wind load design provisions in *ASCE 7-10 Minimum Design Loads for Buildings and Other Structures*, and in R802.5.2.1 unsupported cantilever roof sheathing is limited to 9 inches beyond gable end framing [RB221-16].
- Tables for interior and exterior wall girder and header spans were revised to reflect Southern Pine No. 2 instead of Southern Pine No. 1 design values in IRC Tables R602.7(1) and R602.7(2). Revised spans also distinguish between spans for dropped versus raised headers with footnotes [RB226-16 and RB227-16].
- A technical error in Figure R602.7.2 for rim board header construction was corrected and the construction detail call-outs were improved [RB228-16].
- The number of full height studs required to be provided at openings was reduced to correct unnecessary conservatism and the associated Table R602.7.5 Minimum Number of Full Height Studs at Each End of Headers in Exterior Walls was simplified [RB229-16].
- The nail size for continuous structural fiberboard (SFB) sheathing in the wall bracing Table R602.10.4 [RB240-16] was modified to remove the 8d common nail size no longer recommended for use in wall bracing applications.
- A redundant footnote, footnote (f), was removed from IRC Table R802.5.2 Rafter/Ceiling Joist Heel Joint Connections [RB319-16].

## Fire Resistance and Sprinklers

- Rake overhang and eave fire-resistance rating requirements are clarified in IRC R302.1 [RB30-16 AM].
- Use of IBC Section 703.3 is now permitted as an alternative to testing for establishing exterior wall and common wall fire-resistance ratings in townhouses and two-family dwellings. New references are made in IRC Tables R302.1(1) and R302.1(2) for exterior walls, and Sections R302.2 and R302.3 for townhouses and two-family dwellings, respectively [RB32-16 AM].
- Clarification of townhouse separation with two one-hour walls instead of one common two-hour wall was added in IRC R302.2 [RB44-16 AM].
- Electric heating appliances were added to an exception in IRC R302.13 requiring floors above crawl spaces containing fuel-fired appliances to be membrane-protected. With the modification, floors above crawl spaces with electric heating appliances will no longer be exempt, but must be protected similar to crawl spaces with fuel-fired appliances [RB68-16 AMPC1].

## Structural

- References to *ANSI 117-2015 Standard Specifications for Structural Glued Laminated Timber of Softwood Species* are updated [RB189-16].
- Floor framing bearing details in IRC R502.6 for balloon framing are clarified [RB192-16 AM].
- Decks
  - o The order of prescriptive deck provisions is reorganized in IRC R507 [RB198-16].
  - o Prescriptive details for materials and flashing were added, including a new table for fastener specification [RB202-16 AM].
  - o New footing provisions were added, with a new table for footing sizes, including exceptions for freestanding decks without footings where joists bear directly on grade or on precast concrete pier blocks, revised footing diagrams, and a caution about footings in problem or questionable soils [RB205-16, RB206-16, RB207-16, RB208-16, RB213-16, and RB214-16].

- o Post height provisions were slightly revised, and 8x8 posts have been included [RB212-16].
- o Beam support and connection requirements are clarified [RB200-16].
- o Deck joist span table and diagrams were revised, reflecting in part the AWC *DCA-6 Prescriptive Residential Wood Deck Construction Guide*, notably with a modification to clarify maximum cantilever spans [RB210-16].
- o A general provision for acceptance of alternative decking materials and fastening in accordance with the manufacturer's installation instructions was added [RB209-16 AMPC1].
- o Provisions for deck connection to the main structure (ledger connections) and the transmission of lateral loads were clarified [RB203-16].
- A new Table R602.3(6) for exterior load-bearing tall stud walls was added [RB218-16 AM].
- The application of wall bracing tables was clarified, adding horizontal blocking as an item number for wall bracing length adjustments for wind and seismic, and adding alternate braced wall (ABW), portal frame with hold-downs (PFH), and portal frame at garage (PFG) bracing methods to the seismic bracing table [RB230-16 AM, RB231-16, RB234-16 AM, RB235-16 AMPC2, RB237-16, RB241-16 AM] in IRC R602.10. Due to the nature of the changes to tables, only portions of the text changes are shown in Appendix A.
- New provisions require that vinyl over foam be installed over backing able to resist wind forces, or the vinyl be designed for wind pressures using the loads specified in Chapter 3 and Table R703.11.2, or the manufacturer's design wind pressure rating if provided [RB305-16 AM].
- Roof framing provisions are rewritten and reorganized, and now include the use of low slope roof rafters in IRC R802 [RB310-16 AM].
- ASTM D 5055 *Standard Specification for Establishing and Monitoring Structural Capacities of Prefabricated Wood I-Joists* is added as a reference for establishment of design properties for wood I-joists [RB315-16].

## Conclusion

The *2018 IRC* is available from ICC ([www.iccsafe.org](http://www.iccsafe.org)) and represents the state-of-the-art for design and construction of buildings within its scope. In addition to referencing new standards such as the *2018 NDS* and *2018 WFCM*, other changes to wood provisions reflect the latest available information at time of code development. In some situations, a building designer may want to use a more up-to-date code provision or consensus standard than is recognized in the building code adopted by a jurisdiction. In those cases, building officials, in accordance with Section R104.11 of the *IRC*, are permitted to accept designs prepared in accordance with newer consensus reference standards. IRC Section R104.11 allows a jurisdiction to accept new technologies in materials and building construction provided documentation is provided to the jurisdiction that demonstrate equivalency in quality, strength, durability and safety.

## Citation

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**Appendix: 2018 IRC Changes Related to Wood Construction –  
Strikethrough/Underline Format**

ICC Code Change Tracking Number	Strikethrough/Underline Text
ADM6-16 AM	<p><b>SECTION 202 DEFINITIONS</b>  <b>APPROVED AGENCY.</b> An established and recognized agency that is regularly engaged in conducting tests, or furnishing inspection services, <u>or furnishing product certification, where such agency and</u> has been approved by the building official.</p>
RB30-16 AM (table unchanged – only footnotes for fire-resistance rated projections revised)	<p><b>TABLE R302.1 (1) EXTERIOR WALLS</b>  a. <del>Roof-eave</del> <u>The</u> fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave <u>overhang</u> if fireblocking is provided from the wall top plate to the underside of the roof sheathing.  b. <del>Roof-eave</del> <u>The</u> fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave rake <u>overhang where</u> <del>provided that</del> gable vent openings are not installed.</p> <p><b>TABLE R302.1 (2) EXTERIOR WALLS – DWELLINGS WITH FIRE SPRINKLERS</b>  b. <del>Roof-eave</del> <u>The</u> fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the eave <u>overhang</u> if fireblocking is provided from the wall top plate to the underside of the roof sheathing.  c. <del>Roof-eave</del> <u>The</u> fire-resistance rating shall be permitted to be reduced to 0 hours on the underside of the <del>eave</del> <u>rake overhang where</u> <del>provided that</del> gable vent openings are not installed.</p>
RB44-16 AM	<p><b><u>R302.2 Townhouses.</u></b> Walls separating townhouse units shall be constructed in accordance with Section R302.2.1 or Section R302.2.2.</p> <p><b><u>R302.2.1 Double Walls.</u></b> Each townhouse shall be separated by two 1-hour fire-resistance rated wall assemblies tested in accordance with ASTM E119, UL 263 or Section 703.3 of the International Building Code.</p> <p><b><del>R302.2</del> <u>R302.2.2 Townhouses. Common Walls.</u></b> (unchanged except the following)</p> <ol style="list-style-type: none"> <li>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, <del>or</del> <u>UL 263 or Section 703.3 of the International Building Code.</u></li> <li>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, <del>or</del> <u>UL 263 or Section 703.3 of the International Building Code.</u></li> </ol>

RB68-16 AMPC1	<p><b>R302.13 Fire protection of floors.</b> Floor assemblies that are not required elsewhere in this code to be fire-resistance rated, shall be provided with a 1/2-inch gypsum wallboard membrane, 5/8-inch wood structural panel membrane, or equivalent on the underside of the floor framing member. Penetrations or openings for ducts, vents, electrical outlets, lighting, devices, luminaires, wires, speakers, drainage, piping and similar openings or penetrations shall be permitted.</p> <p><b>Exceptions:</b> (all unchanged except #2)  2. Floor assemblies located directly over a crawl space not intended for storage or <u>for the installation of fuel-fired or electric-powered heating appliances.</u></p>				
RB192-16 AM	<p><b>R502.6 Bearing.</b> The ends of each joist, beam or girder shall have not less than 1-1/2 inches of bearing on wood or metal, have not less than 3 inches of bearing on masonry or concrete <u>or be supported by approved joist hangers. Alternatively, the ends of joists shall be supported on a 1-inch by 4-inch ribbon strip and shall be nailed to the adjacent stud.</u> The bearing on masonry or concrete shall be direct, or a sill plate of 2-inch-minimum nominal thickness shall be provided under the joist, beam or girder. The sill plate shall provide a minimum nominal bearing area of 48 square inches.</p>				
RB198-16 AS	New Section			Old Section	
	R507.1	Decks	Reference to Section 301 for conditions not described in R507. Move attachment criteria to new Section R507.8	R507.1	Decks
	R507.2	Materials	New		
	R507.2.1	Wood Materials	New		
	R507.2.2	Plastic composite deck boards, stairs treads, guards, or handrails	Renumbering of all Sections and Sub-sections in R507.3 to R507.2	R507.3	Plastic composite deck boards, stairs treads, guards, or handrails
	R507.2.3	Fasteners and Connectors	New		
R507.3	Deck footings	Creates reference to Section R403.1.4 for footing depth and new table for minimum footing size	NA	NA	



	New Section			Old Section	
	R507.4	Deck posts	Renumbering	R507.8	Deck posts
R507.4.1	Deck post to deck footing	Renumbering	R507.8.1	Deck post to deck footing	
R507.5	Deck Beams	Renumbering and clarification	R507.6	Deck Beams	
R507.5.1	Deck post to deck beam	Renumbering and clarification	R507.7.1	Deck post to deck beam	
R507.6	Deck Joists	Renumbering and clarification	R507.5	Deck Joists	
R507.6.1	Lateral restraint at supports	Renumbering	R507.5.1	Lateral restraint at supports	
R507.6.2	Deck joist and deck beam bearing	Renumbering	R507.7	Deck joist and deck beam bearing	
R507.7	Decking	Renumbering	R507.4	Decking	
R507.8	Vertical and lateral supports	Moving attachment to house criteria from previous R507.1	R507.1	Decks	
R507.9	Vertical and lateral support at band joists	Renumbering	R507.1, R507.2	Decks, Deck ledger connection	
R507.9.1	Vertical supports	Creates introductory section	NA	NA	
R507.9.1.1	Ledger details	Renumbering and language simplification	R507.2.1	Ledger details	
R507.9.1.2	Band joist details	Renumbering and language simplification	R507.2.2	Band joist details	
R507.9.1.3	Ledger to band joist fastener details	Renumbering and language simplification	R507.2.3	Ledger to band joist fastener details	
R507.9.1.4	Alternate ledger details	Renumbering	R507.2	Deck ledger connection	
R507.9.2	Deck lateral load connection	Renumbering and language simplification	R507.2.4	Deck lateral load connection	

RB198-16 AS  
(continued)

<p>RB200-16 AMPC1</p>	<p><b>R507.6 R507.5 Deck Beams.</b>  ...Beams shall be permitted to cantilever at each end up to one-fourth of the actual allowable beam span. <u>Splices Deck beams of multispans beams other materials shall be located at interior post locations permitted where designed in accordance with accepted engineering practices.</u></p> <p><b>R507.7 R507.5.1 Deck joist and deck beam bearing.</b>  ...Joist framing into the side of a ledger board or beam shall be supported by approved joist hangers. <u>Joists Where multispans beams bear on intermediate posts, each ply must have full bearing on a beam shall be connected to the beam to resist lateral displacement the post in accordance with Figures R507.5.1(1) and R507.5.1(2).</u></p> <p><b>R507.7.1 R507.5.2 Deck post beam connection to deck beam supports.</b>  Deck beams shall be attached to <u>deck posts supports in a manner capable of transferring vertical loads and resisting horizontal displacement. Deck beam connections to wood posts shall be in accordance with Figure R507.7.1 or by other equivalent means capable to resist lateral displacement Figures R507.5.1(1) and R507.5.1(2).</u> Manufactured post-to-beam connectors shall be sized for the post and beam sizes. Bolts shall have washers under the head and nut.  <b>Exception:</b> Where deck beams bear directly on footings in accordance with Section R507.8.1.</p> <p><b>Table R507.6 DECK BEAM SPAN LENGTHS</b>  Adds single-ply 2x6 to 2x12 beam options for Southern pine and adds footnote g to title. <u>g. Beam cantilevers are limited to the adjacent beam's span divided by 4.</u></p> <p><b>Figure R507.7.1 R507.5.1(1) DECK BEAM TO DECK POST</b>  Replaces figure to now show splice requirements.</p> <p><b>FIGURE R507.5.1(2) NOTCHED POST-TO-BEAM CONNECTION</b>  Adds figure showing connection dimension requirements.</p> <p><b>FIGURE R507.6 R507.5 TYPICAL DECK BEAM SPANS</b>  Replaces figure to show multispans beam spans.</p>
<p>RB202-16 AM</p>	<p><b>R507.2 Materials.</b> <u>Materials used for the construction of decks shall comply with this section.</u></p> <p><b>R507.2.1 Wood materials.</b> <u>Wood materials shall be No.2 grade or better lumber, preservative-treated in accordance with Section R317 or approved, naturally durable lumber, and termite protected where required in accordance with Section R318. Where design in accordance with Section R301 is provided, wood structural members shall be designed using the wet service factor defined in AWC NDS. Cuts, notches, and drilled holes of preservative treated wood members shall be treated in accordance with Section R317.1.1. All preservative-treated wood products in contact with the ground shall be labeled for such usage.</u></p>

RB202-16 AM  
(continued)

**R507.2.1.1 Engineered wood products.** Engineered wood products shall be in accordance with Section R502.

**R507.2.3 Fasteners and connectors.** Metal fasteners and connectors used for all decks shall be in accordance with Section R317.3 and Table R507.2.3.

**TABLE R507.2.3 FASTENER AND CONNECTOR SPECIFICATIONS FOR DECKS** <sup>a,b</sup>

Item	Material	Minimum Finish/Coating	Alternate Finish/Coating <sup>e</sup>
Nails and timber rivets	In accordance with	Hot-dipped galvanized per ASTM A153	Stainless steel, silicon bronze or copper
Bolts <sup>c</sup> Lag screws <sup>d</sup> (including nuts and washers)	In accordance with ASTM A307 (bolts), ASTM A563 (nuts), ASTM F844 (washers)	Hot-dipped galvanized per ASTM A153, Class C (Class D for $\frac{3}{8}$ -inch diameter and less) or mechanically galvanized per ASTM B695, Class 55 or 410 stainless steel	Stainless steel, silicon bronze or copper
Metal connectors	Per manufacturer's specification	ASTM A653 type G185 zinc coated galvanized steel or post hot-dipped galvanized per ASTM A123 providing a minimum average coating weight of 2.0 oz./ft <sup>2</sup> (total both sides)	Stainless steel

**NOTES**

- a. Equivalent materials, coatings and finishes shall be permitted.
- b. Fasteners and connectors exposed to salt water or located within 300 feet of a salt water shoreline shall be stainless steel.
- c. Holes for bolts shall be drilled a minimum  $\frac{1}{32}$ " and a maximum  $\frac{1}{16}$ " larger than the bolt.
- d. Lag screws  $\frac{1}{2}$ " and larger shall be predrilled to avoid wood splitting per National Design Specification (NDS) for Wood Construction.
- e. Stainless steel driven fasteners shall be in accordance with ASTM F 1667.

**R507.2.4 Flashing.** Flashing shall be corrosion-resistant metal of minimum nominal 0.019 inch thickness or approved nonmetallic material that is compatible with the substrate of the structure and the decking materials.

**R507.2.5 Alternate materials.** Alternate materials, including glass and metals shall be permitted.



<p>RB203-16 AS</p>	<p><b>R507.2 R507.9 Deck ledger connection to Vertical and lateral supports at band joist.</b> Deck ledger connections to band joists <u>Vertical and lateral supports for decks shall be in accordance comply with this section, Tables R507.2 and R507.2.1, and Figures R507.2.1(1) and R507.2.1(2).</u> For other grades, species, connection details and loading conditions, deck ledger connections shall be designed in accordance with Section R301.</p> <p><b>R507.9.1 Vertical supports.</b> Vertical loads shall be transferred to the band joists with ledgers in accordance with this section.</p> <p><b>R507.2.1 R507.9.1.1 Ledger details.</b> Deck ledgers installed in accordance with Section R507.2 shall be a minimum 2-inch by 8-inch nominal, pressure-preservative-treated Southern pine, incised pressure-preservative-treated Hem-fir, or approved, naturally durable, No. 2 grade or better lumber. Deck ledgers installed in accordance with Section R507.2 shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.</p> <p><b>R507.2.2 R507.9.1.2 Band joist details.</b> Band joists attached by supporting a ledger in accordance with Section R507.2 shall be a minimum 2-inch nominal, solid-sawn, spruce-pine-fir or better lumber or a minimum 1-inch by 9½-inch dimensional, Douglas fir or better, laminated veneer lumber. Band joists attached by a ledger in accordance with Section R507.2 shall be <u>bear fully supported by a wall or sill plate below on the primary structure capable of supporting all required loads.</u></p> <p><b>R507.2.3 R507.9.1.3 Ledger to band joist fastener details.</b> Fasteners used in deck ledger connections in accordance with Table R507.2 R507.9.1.3(1) shall be hot-dipped galvanized or stainless steel and shall be installed in accordance with Table R507.2.1 R507.9.1.3(2) and Figures R507.2.1(1) R507.9.1.3(1) and R507.2.1(2) R507.9.1.3(2).</p> <p><b>R507.9.1.4 Alternate ledger details.</b> Alternate framing configurations supporting a ledger constructed to meet the load requirements of Section R301.5 shall be permitted.</p>
<p>RB205-16 AM, RB206-16 AS, RB207-16 AS, RB208-16 AS, RB213-16 AS, RB214-16 AS</p>	<p><b>R507.3 Footings.</b> Decks shall be supported on concrete footings or other approved structural systems designed to accommodate all loads in accordance with Section R301. Deck footings shall be sized to carry the imposed loads from the deck structure to the ground as shown in Figure R507.3. The footing depth shall be in accordance with Section R403.1.4.</p> <p><b>Exception:</b> Free-standing decks consisting of joists directly supported on grade over their entire length.</p> <p><b>R507.3.1 Minimum size.</b> The minimum size of concrete footings shall be in accordance with Table R507.3.1, based on the tributary area and allowable soil-bearing pressure in accordance with Table R401.4.1.</p>

<p>RB205-16 AM, RB206-16 AS, RB207-16 AS, RB208-16 AS, RB213-16 AS, RB214-16 AS (continued)</p>	<p><b>R507.3.2 Minimum depth.</b> Deck footings shall extend below the frost line specified in <u>Table R301.2(1) in accordance with Section R403.1.4.1.</u></p> <p><b>Exceptions:</b></p> <ol style="list-style-type: none"> <li>1. <u>Free-standing decks that meet all of the following criteria:</u> <ol style="list-style-type: none"> <li>1.1. <u>The joists bear directly on precast concrete pier blocks at grade without support by beams or posts.</u></li> <li>1.2. <u>The area of the deck does not exceed 200 square feet.</u></li> <li>1.3. <u>The walking surface is not more than 20 inches above grade at any point within 36 inches measured horizontally from the edge.</u></li> </ol> </li> <li>2. <u>Free-standing decks need not be provided with footings that extend below the frost line.</u></li> </ol> <p><b>R507.4.1 Deck post to deck footing connection.</b> Where posts shall bear on concrete footings in accordance with Section R403 and <u>Figure R507.34.1, Posts shall be restrained to prevent lateral displacement at the bottom support.</u> 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 in surrounding soils or concrete piers. <u>Other footing systems shall be permitted.</u></p> <p><b>Exception:</b> <u>Where expansive, compressible, shifting or other questionable soils are present, surrounding soils shall not be relied on for lateral support.</u></p>
<p>RB209-16 AMPC1</p>	<p><b>R507.4 R507.7 Decking.</b> Maximum allowable spacing for joists supporting decking shall be in accordance with <u>Table R507.4 R507.7.</u> Wood decking shall be attached to each supporting member with not less than two 8d threaded nails or two No. 8 wood screws. <u>Other approved decking or fastener systems shall be installed in accordance with the manufacturer's installation requirements.</u></p> <p><b>TABLE R507.4 R507.7 MAXIMUM JOIST SPACING FOR DECKING</b> Adds Decking to the header of all three columns.</p>
<p>RB210-16 AS</p>	<p><b>R507.5 R507.6 Deck joists.</b> Maximum allowable spans for wood deck joists, as shown in <u>Figure R507.5 R507.6,</u> shall be in accordance with <u>Table R507.5 R507.6.</u> <u>Deck joists The maximum joist spacing shall be permitted to limited by the decking material in accordance with Table R507.7. The maximum joist cantilever shall be limited to not greater than one-fourth of the actual, adjacent joist span or the maximum cantilever length specified in Table R507.6, whichever is less.</u></p> <p><b>R507.7 R507.6.1 Deck joist and deck beam bearing.</b> The ends of each joist and beam <u>joists shall have not less than 1½ inches of bearing on wood or metal and not less than 3 inches on concrete or masonry for the over its entire width. Joists bearing on top of the a multiple-ply beam or ledger shall be fastened in accordance with Table R602.3(1). Joists bearing on top of a single ply beam or ledger shall be attached by a mechanical connector. Joist framing into the side of a beam or 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.</u></p>

**R507.5.1 R507.6.2 Lateral Deck joist lateral restraint at supports.**

**TABLE R507.5 R507.6 DECK JOIST SPANS FOR COMMON LUMBER SPECIES (ft.-in.)**

SPECIES <sup>a</sup>	SIZE	ALLOWABLE JOIST SPAN <sup>b</sup>			MAXIMUM CANTILEVER <sup>c,f</sup>		
		SPACING OF DECK JOISTS (inches)			SPACING OF DECK JOISTS WITH CANTILEVERS (inches)		
		12	16	24	12	16	24
<b>Southern pine</b>	2 x 6	9-11	9-0	7-7	1-3	1-4	1-6
	2 x 8	13-1	11-10	9-8	2-1	2-3	2-5
	2 x 10	16-2	14-0	11-5	3-4	3-6	2-10
	2 x 12	18-0	16-6	13-6	4-6	4-2	3-4
<b>Douglas fir-larch<sup>d</sup> hem-fir<sup>d</sup> spruce-pine-fir<sup>d</sup></b>	2 x 6	9-6	8-8	7-2	1-2	1-3	1-5
	2 x 8	12-6	11-1	9-1	1-11	2-1	2-3
	2 x 10	15-8	13-7	11-1	3-1	3-5	2-9
	2 x 12	18-0	15-9	12-10	4-6	3-11	3-3
<b>Redwood, western cedars, ponderosa pine<sup>e</sup>, red pine<sup>e</sup></b>	2 x 6	8-10	8-0	7-0	1-0	1-1	1-2
	2 x 8	11-8	10-7	8-8	1-8	1-10	2-0
	2 x 10	14-11	13-0	10-7	2-8	2-10	2-8
	2 x 12	17-5	15-1	12-4	3-10	3-9	3-1

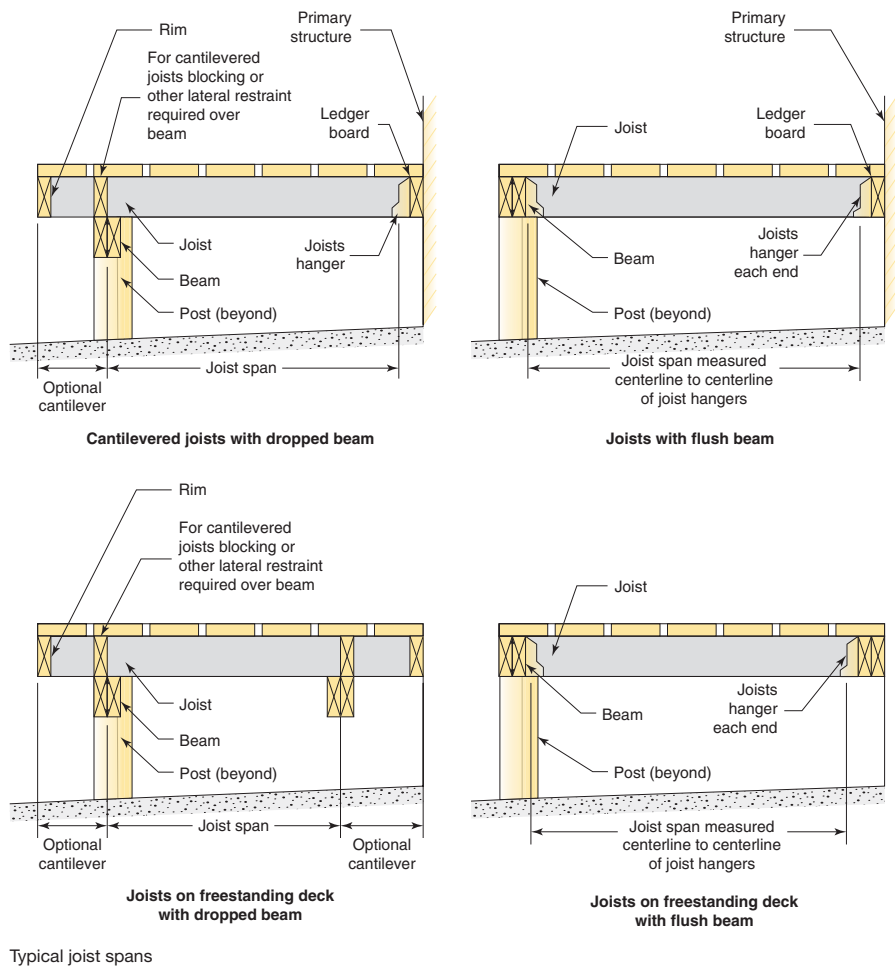
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

- a. No. 2 grade with wet service factor.
- b. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360.
- c. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220-pound point load applied to end.
- d. Includes incising factor.
- e. Northern species with no incising factor.
- f. Cantilevered spans not exceeding the nominal depth of the joist are permitted.

RB210-16 AS  
(continued)

RB210-16 AS  
(continued)

**FIGURE R507.5 R507.6**



**R507.8 R507.4 Deck posts.** For single-level wood-framed decks with beams sized in accordance with Table R507.6 R507.5, deck post size shall be in accordance with Table R507.8 R507.4.

**TABLE R507.8 R507.4 DECK POST HEIGHT <sup>a</sup>**

DECK POST SIZE	MAXIMUM HEIGHT <sup>b</sup> (feet-inches)
4 x 4	6-9 <sup>c</sup>
4 x 6	8
6 x 6	14
8 x 8	14

**Notes:**

a. Measured to the underside of the beam.

b. Based on 40 psf live load.

c. The maximum permitted height is 8 feet for one-ply and two-ply beams. The maximum permitted height for three-ply beams on post cap is 6 feet 9 inches.

RB212-16 AS

RB212-16 AS  
(continued)

**R507.8.1 R507.4.1 Deck post to deck footing connection.** Where posts bear on concrete footings in accordance with Section R403 and Figure R507.8.1 R507.4.1, 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 in surrounding soils or concrete piers. Other footing systems shall be permitted.

RB218-16 AM

**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:** (unchanged except new #3)

3. Exterior load-bearing studs not exceeding 12 feet in height provided in accordance with Table R602.3(6). The minimum number of full height studs adjacent to openings shall be in accordance with Section R602.7.5. The building shall be located in Exposure B, the roof live load shall not exceed 20 psf, and the ground snow load shall not exceed 30 psf. Studs and plates shall be No. 2 grade lumber or better.

**TABLE R602.3(6) ALTERNATE WOOD BEARING WALL STUD SIZE, HEIGHT AND SPACING**

STUD HEIGHT	SUPPORTING	STUD SPACING <sup>a</sup>	ULTIMATE DESIGN WIND SPEED					
			115 mph		130 mph <sup>b</sup>		140 mph <sup>b</sup>	
			Maximum roof/floor span <sup>c</sup>		Maximum roof/floor span <sup>c</sup>		Maximum roof/floor span <sup>c</sup>	
			12 ft.	24 ft.	12 ft.	24 ft.	12 ft.	24 ft.
11 ft.	Roof Only	12 in.	2 x 4	2 x 4	2 x 4	2 x 4	2 x 4	2 x 4
		16 in.	2 x 4	2 x 4	2 x 4	2 x 6	2 x 4	2 x 6
		24 in.	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6
11 ft.	Roof and One Floor	12 in.	2 x 4	2 x 6	2 x 4	2 x 6	2 x 4	2 x 6
		16 in.	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6
		24 in.	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6
12 ft.	Roof Only	12 in.	2 x 4	2 x 4	2 x 4	2 x 6	2 x 4	2 x 6
		16 in.	2 x 4	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6
		24 in.	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6
12 ft.	Roof and One Floor	12 in.	2 x 4	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6
		16 in.	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6
		24 in.	2 x 6	2 x 6	2 x 6	2 x 6	2 x 6	DR

DR = Design Required.

- a. Wall studs not exceeding 16 inches on center shall be sheathed with minimum 1/2-inch gypsum board on the interior and 3/8-inch wood structural panel sheathing on the exterior. Wood structural panel sheathing shall be attached with 8d nails not greater than 6 inches on center along panel edges and 12 inches on center at intermediate supports, and all panel joints shall occur over studs or blocking.
- b. Where the ultimate design wind speed exceeds 115 mph, studs shall be attached to top and bottom plates with connectors having a minimum 300-pound lateral capacity.
- c. The maximum span is applicable to both single- and multiple-span roof and floor conditions. The roof assembly shall not contain a habitable attic.

RB221-16 AM

**Table R602.3(1) FASTENING SCHEDULE**

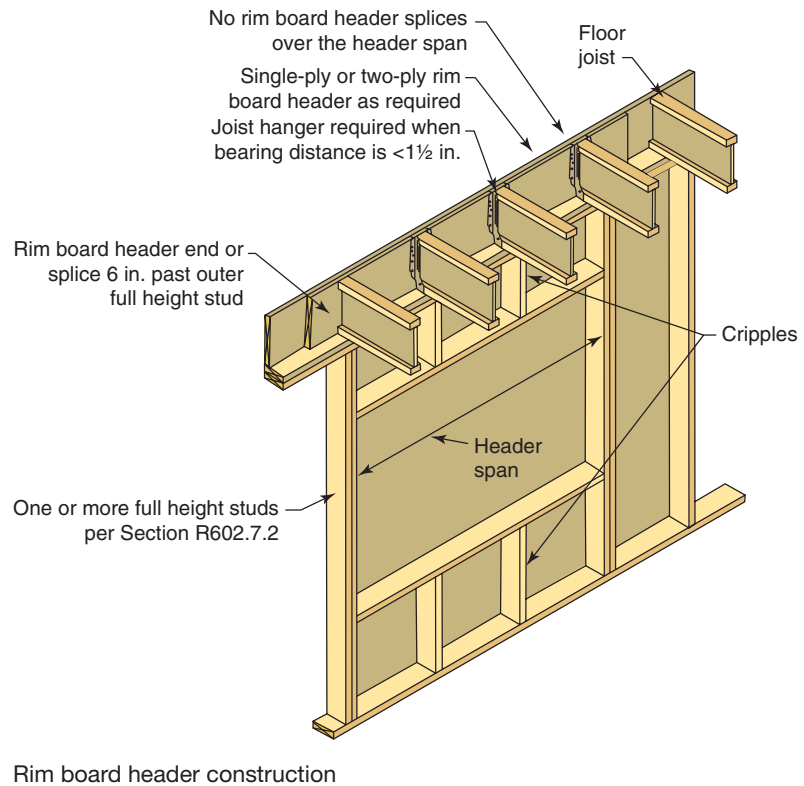
f. For wood structural panel roof sheathing attached to gable end roof framing and to intermediate supports within 48 inches of roof edges and ridges, nails shall be spaced at 6 inches on center where the ultimate design wind speed is less than 130 mph and shall be spaced 4 inches on center where the ultimate design wind speed is 130 mph or greater but less than 140 mph.

f. Where the ultimate design wind speed is 130 mph or less, nails for attaching wood structural panel roof sheathing to gable end wall framing shall be spaced 6 inches on center. Where the ultimate design wind speed is greater than 130 mph, nails for attaching panel roof sheathing to intermediate supports shall be spaced 6 inches on center for minimum 48-inch distance from ridges, eaves and gable end walls; and 4 inches on center to gable end wall framing.

**R803.2.3 Installation.** Wood structural panel used as roof sheathing shall be installed with joints staggered or not staggered in accordance with Table R602.3(1), APA E30 for wood roof framing or with Table R804.3 for cold-formed steel roof framing. Wood structural panel roof sheathing in accordance with Table R503.2.1.1(1) shall not cantilever more than 9 inches beyond the gable endwall unless supported by gable overhang framing.

RB228-16 AS

**IRC Figure R602.7.2 RIM BOARD HEADER CONSTRUCTION**



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**TABLE R602.7.5 MINIMUM NUMBER OF FULL-HEIGHT STUDS AT EACH END OF HEADERS IN EXTERIOR WALLS<sup>a</sup>**

MAXIMUM HEADER SPAN (feet)	ULTIMATE DESIGN WIND SPEED AND EXPOSURE CATEGORY	
	< 140 mph, Exposure B or < 130 mph, Exposure C	≤ 115 mph, Exposure B <sup>b</sup>
4	1	1
6	2	1
8	2	1
10	3	2
12	3	2
14	3	2
16	4	2
18	4	2

RB229-16 AS

- a. For header spans between those given, use the minimum number of full height studs associated with the larger header span.
- b. The tabulated minimum number of full-height studs is applicable where jack studs are provided to support the header at each end in accordance with Table R602.7(1). Where a framing anchor is used to support the header in lieu of a jack stud in accordance with Note d of Table R602.7(1), the minimum number of full-height studs at each end of a header shall be in accordance with requirements for wind speed < 140 mph, Exposure B.

**R602.10.4.4 Panel joints.** Vertical joints of panel sheathing shall occur over and be fastened to common studs. Horizontal joints of panel sheathing in *braced wall panels* shall occur over and be fastened to common blocking of a thickness of 1½ inches or greater.

**TABLE R602.10.3(3) BRACING REQUIREMENTS BASED ON SEISMIC DESIGN CATEGORY**

- e. Methods PFG and CS-SFB do not apply in Seismic Design Categories D<sub>0</sub>, D<sub>1</sub> and D<sub>2</sub>.
- f. Where more than one bracing method is used, mixing methods shall be in accordance with Section R602.10.4.1.

**R602.10.4.1 Mixing methods.** Mixing of bracing methods shall be permitted as follows:  
 4. Mixing of continuous sheathing methods CSWSP, CS-G and CS-PF along a *braced wall line* shall be permitted. Intermittent methods ABW, PFH and PFG shall be permitted to be used along a *braced wall line* with continuous sheathed methods, provided that the length of required bracing for that braced wall line is determined in accordance with Table R602.10.3(1) or R602.10.3(3) using the highest value of the bracing methods used.

RB230-16 AM,  
 RB231-16 AS,  
 RB234-16 AM,  
 RB235-16 AMPC2,  
 RB237-16 AS,  
 RB241-16 AM

**R703.11.2 Foam Installation over foam plastic sheathing.** ~~Vinyl~~ Where vinyl siding and/or insulated vinyl siding used with is installed over foam plastic sheathing, the vinyl siding shall comply with Section R703.11 and shall be installed in accordance with Sections R703.11.2.1, R703.11.2.2 or R703.11.2.3. shall have a design wind pressure resistance complying with Section Table R703.11.2.

**Exceptions:**

1. Where the foam plastic sheathing is applied directly over wood structural panels, fiberboard, gypsum sheathing or other approved backing capable of independently resisting the design wind pressure, the vinyl siding shall be installed in accordance with Sections R703.3.3 and R703.11.1.
2. Where the vinyl siding manufacturer's product specifications provide an approved design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's installation instructions.
3. Where the foam plastic sheathing and its attachment have a design wind pressure resistance complying with Sections R316.8 and R301.2.1, the vinyl siding shall be installed in accordance with Sections R703.3.3 and R703.11.1.

**TABLE R703.11.2 ADJUSTED MINIMUM DESIGN WIND PRESSURE REQUIREMENT FOR VINYL SIDING**

ULTIMATE DESIGN WIND SPEED (MPH)	ADJUSTED MINIMUM DESIGN WIND PRESSURE (ASD) (PSF) <sup>a, b</sup>					
	Case 1: With interior gypsum wallboard <sup>c</sup>			Case 2: Without interior gypsum wallboard <sup>c</sup>		
	Exposure			Exposure		
	B	C	D	B	C	D
110	-44.0	-61.6	-73.1	-62.9	-88.1	-104.4
115	-49.2	-68.9	-81.7	-70.3	-98.4	-116.7
120	-51.8	-72.5	-86.0	-74.0	-103.6	-122.8
130	-62.2	-87.0	-103.2	-88.8	-124.3	-147.4
> 130	Not Allowed <sup>d</sup>					

a. Linear interpolation is permitted.

b. The table values are based on a maximum 30-foot mean roof height and effective wind area of 10 square feet for Wall Zone 5 (corner), and the ASD design wind pressure from Table R301.2(2) multiplied by the following adjustment factors: 2.6 (Case 1) and 3.7 (Case 2) for wind speeds less than 130 mph and 3.7 (Case 2) for wind speeds greater than 130 mph.

c. Gypsum wallboard, gypsum panel product or equivalent.

d. For the indicated wind speed condition, foam sheathing only on the exterior of frame walls with vinyl siding is not allowed unless the vinyl siding complies with an adjusted minimum design wind pressure requirement as determined in accordance with Note b and the wall assembly is capable of resisting an impact without puncture at least equivalent to that of a wood frame wall with minimum 7/16-inch OSB sheathing as tested in accordance with ASTM E1886.

RB-305-16 AM

<p>RB-305-16 AM (continued)</p>	<p><b>R703.11.2.1 Basic wind speed not exceeding 115 miles per hour and Exposure Category B.</b> Where the ultimate design wind speed does not exceed 115 miles per hour (51 m/s), the exposure category is B and gypsum board, gypsum panel product or equivalent is installed on the side of the wall opposite the foam plastic sheathing, the minimum siding fastener penetration into wood framing shall be 1 1/4 inches (32 mm) using minimum 0.120-inch-diameter (3 mm) nail (shank) with a minimum 0.313-inch diameter head, 16 inches (406 mm) on center. The foam plastic sheathing shall be minimum 1 1/2-inch-thick (12.7 mm) (nominal) extruded polystyrene in accordance with ASTM C 578, 1 1/2-inch-thick (12.7 mm) (nominal) polyisocyanurate in accordance with ASTM C 1289 or 1-inch-thick (25 mm) (nominal) expanded polystyrene in accordance with ASTM C 578.</p> <p><b>R703.11.2.2 Basic wind speed exceeding 115 miles per hour or Exposure Categories C and D.</b> Where the ultimate design wind speed exceeds 115 miles per hour (51 m/s), the exposure category is C or D, or all conditions of Section R703.11.2.1 are not met, the adjusted design pressure rating for the assembly shall meet or exceed the loads listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3). The design wind pressure rating of the vinyl siding for installation over solid sheathing as provided in the vinyl siding manufacturer's product specifications shall be adjusted for the following wall assembly conditions:</p> <ol style="list-style-type: none"> <li>1. For wall assemblies with foam plastic sheathing on the exterior side and gypsum wall board, gypsum panel product or equivalent on the interior side of the wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.39.</li> <li>2. For wall assemblies with foam plastic sheathing on the exterior side and without gypsum wall board, gypsum panel product or equivalent on the interior side of wall, the vinyl siding's design wind pressure rating shall be multiplied by 0.27.</li> </ol> <p><b>R703.11.2.3 Manufacturer specification.</b> Where the vinyl siding manufacturer's product specifications provide an approved design wind pressure rating for installation over foam plastic sheathing, use of this design wind pressure rating shall be permitted and the siding shall be installed in accordance with the manufacturer's instructions.</p>
<p>RB310-16 AM, RB221-16 AM</p>	<p><b>R802.2 Design and construction.</b> The framing details required in Section R802 apply to roof and ceiling assembly shall provide continuous ties across the structure to roofs having a minimum slope of three units vertical in 12 units horizontal (25-percent slope) or greater prevent roof thrust from being applied to the supporting walls. <u>Roof-ceilings</u> The assembly shall be designed and constructed in accordance with the provisions of this chapter and Figures R606.11(1), R606.11(2) and R606.11(3) or in accordance with AWC NDS. Components of roof-ceilings shall be fastened in accordance with Table R602.3(1).</p> <p><b>R802.3 Ridge.</b> A ridge board used to connect opposing rafters shall be not less than 1 inch (nominal) thickness and not less in depth than the cut end of the rafter. <u>Where ceiling joist or rafter ties do not provide continuous ties across the structure, a ridge beam shall be provided and supported on each end by a wall or girder.</u></p> <p><b>R802.4 Rafters.</b> Rafters shall be in accordance with this section.</p>

RB310-16 AM,  
RB221-16 AM  
(continued)

**R802.5 R802.4.1 Allowable rafter spans Rafter size.** Spans for Rafters shall be sized based on the rafter spans in accordance with Tables R802.5.1(1) R802.4.1(1) through R802.5.1(8) R802.4.1(8). Rafter spans shall be measured along the horizontal projection of the rafter. For other grades and species and for other loading conditions, refer to the AWC STJR. The span of each rafter shall be measured along the horizontal projection of the rafter.

**R802.3 R802.4.2 Framing details.** Rafters shall be framed not more than 1½-inch offset from each other to a ridge board or directly opposite from each other with a collar tie, gusset plate as a tie or ridge strap in accordance with Table R602.3(1). Ridge board Rafters shall be not less than 1-inch (25 mm) nominal thickness and not less nailed to the top wall plates in depth than the cut end of the rafter. At valleys and hips there shall be a valley or hip rafter not less than 2-inch accordance with Table R602.3(1) nominal thickness and not less in depth than the cut end of the rafter. Hip and valley rafters shall be supported at the ridge by a brace to a bearing partition or be designed to carry and distribute the specific load at that point. Where unless the roof pitch assembly is less than three units vertical in 12 units horizontal (25-percent slope), structural members that support rafters and ceiling joists, such as ridge beams, hips and valleys, shall be designed as beams required to comply with the uplift requirements of Section R802.11.

**R802.4.3 Hips and Valleys.** Hip and valley rafters shall be not less than 2-inch nominal thickness and not less in depth than the cut end of the rafter. Hip and valley rafters shall be supported at the ridge by a brace to a bearing partition or be designed to carry and distribute the specific load at that point.

**R802.4.4 Rafter supports.** Where the roof pitch is less than 3:12 (25-percent slope), structural members that support rafters, such as ridges, hips and valleys, shall be designed as beams, and bearing shall be provided for rafters in accordance with Section R802.6.

**R802.5.1 R802.4.5 Purlins.** Installation of purlins to reduce the span of rafters is permitted as shown in Figure R802.5.1 R802.4.5. Purlins shall be sized not less than the required size of the rafters that they support. Purlins shall be continuous and shall be supported by 2-inch by 4-inch braces installed to bearing walls at a slope not less than 45 degrees from the horizontal. The braces shall be spaced not more than 4 feet on center and the unbraced length of braces shall not exceed 8 feet.

**R802.4.6 Collar ties.** Where collar ties are used to connect opposing rafters, they shall be located in the upper third of the attic space and fastened in accordance with Table R602.3(1). Collar ties shall be not less than 1 inch by 4 inches nominal, spaced not more than 4 feet on center. Ridge straps in accordance with Table R602.3(1) shall be permitted to replace collar ties.

**R802.5 Ceiling joists.** Ceiling joists shall be continuous across the structure or securely joined where they meet over interior partitions in accordance with Table R802.5.2 R802.5.1(9).

**R802.4 R802.5.1 Allowable Ceiling joist spans size.** Spans for Ceiling joists shall be sized based on the joist spans in accordance with Tables R802.4(1) R802.5.1(1) and R802.4(2) R802.5.1(2). For other grades and species and for other loading conditions, refer to the AWC STJR.

RB310-16 AM,  
RB221-16 AM  
(continued)

**R802.3.1 R802.5.2 Ceiling joist and rafter connections.** Ceiling joists and rafter connections. Where ceiling joists and rafter connections are used, they shall be nailed connected to each other in accordance with Table R802.5.1(9), and the rafter shall be nailed to rafters at the top wall plate in accordance with Table R602.3(1) R802.5.2. Ceiling joists shall be continuous or securely joined in accordance with Table R802.5.1(9) where they meet over interior partitions and are nailed to adjacent rafters to provide a continuous tie across the building where such joists are parallel to the rafters.

Where ceiling joists are not connected to the rafters at the top wall plate, joists connected higher in the attic shall be installed as rafter ties, or rafter ties they shall be installed to provide a continuous tie in the bottom third of the rafter height in accordance with Figure R802.4.5 and Table R802.5.2. Where the ceiling joists are installed above the bottom third of the rafter height, the ridge shall be designed as a beam. Where ceiling joists do not run parallel to rafters, rafter ties shall be installed. Rafter ties shall be not less than 2 inches by 4 inches (51 mm by 102 mm) (nominal), installed in accordance with the connection requirements in Table R802.5.1(9), or connections of equivalent capacities shall be provided. Where ceiling joists or rafter ties are not provided, the ridge formed by these rafters shall be supported by a wall or girder designed in accordance with accepted engineering practice. Collar ties or ridge straps to resist wind uplift the ceiling joists shall be connected in to the upper third of the attic space top plates in accordance with Table R602.3(1). Collar ties Each rafter shall be not less than 1 inch by 4 inches (25 mm by 102 mm) (nominal), spaced not more than 4 feet (1219 mm) on center tied across the structure with a rafter tie or a 2-inch x 4-inch kicker connected to the ceiling diaphragm with nails equivalent in capacity to Table R802.5.2.

**R802.3.2 R802.5.2.1 Ceiling joists lapped.** Ends of ceiling joists shall be lapped not less than 3 inches (76 mm) or butted over bearing partitions or beams and toenailed to the bearing member. Where ceiling joists are used to provide resistance to rafter thrust, lapped joists shall be nailed together in accordance with Table R802.5.1(9) R802.5.2 and butted joists shall be tied together in a manner to resist such thrust. Joists that do not resist thrust shall be permitted to be nailed in accordance with Table R602.3(1). Wood structural panel roof sheathing, in accordance with Table R503.2.1.1(1), shall not cantilever more than 9 inches beyond the gable endwall unless supported by gable overhang framing.

**R802.5.2.2 Rafter ties.** Wood rafter ties shall be not less than 2 inches by 4 inches installed in accordance with Table R802.5.2 at each rafter. Other approved rafter tie methods shall be permitted.

**R802.3.3 R802.5.2.3 Blocking.** Blocking shall be not less than utility grade lumber.

#### **Related changes**

1. Renumbered the following tables:

- R802.4(1) as R802.5.1(1) - no change to table.
- R802.4(2) as R802.5.1(2) - no change to table.
- R802.5.1(1) as R802.4.1(1) - no change to table.
- R802.5.1(2) as R802.4.1(2) - no change to table.
- R802.5.1(3) as R802.4.1(3) - no change to table.
- R802.5.1(4) as R802.4.1(4) - no change to table.
- R802.5.1(5) as R802.4.1(5) - no change to table.

<p>RB310-16 AM, RB221-16 AM (continued)</p>	<p>R802.5.1(6) as R802.4.1(6) - no change to table.  R802.5.1(7) as R802.4.1(7) - no change to table.  R802.5.1(8) as R802.4.1(8) - no change to table.  R802.5.1(9) as R802.5.2 - no change to table.</p> <p>2. Renumbered Figure R802.5.1 as R802.4.5 and delete all cross references to section numbers from the table and delete "Note: Where ceiling joists..."</p> <p>3. Renumbered the cross reference in Table R602.3(1), item 4: Table R802.5.1(9) as R802.5.2.</p>
<p>RB315-16 AS</p>	<p><b><u>R802.1.8 Prefabricated wood I-joists. Structural capacities and design provisions for prefabricated wood I-joists shall be established and monitored in accordance with ASTM D5055.</u></b></p>

Code change jargon explained:

RB###-16 XX – this is a specific, unique code change from the 2016 hearing cycle. The last two to four characters describe whether the code change was accepted by the committee reviewing the code change: (1) as submitted, (2) as modified by the committee, or (3) as modified at the public comment hearing.

AS – Code change approved as originally written and submitted

AM – Code change modified by IRC building committee

AMPC – Code change modified by public comment at the public comment hearings