

PART

3

Building Construction

Chapters 4 through 10

- **Chapter 4** Foundations
- **Chapter 5** Floors
- **Chapter 6** Wall Construction
- **Chapter 7** Wall Covering
- **Chapter 8** Roof-Ceiling Construction
- **Chapter 9** Roof Assemblies
- **Chapter 10** Chimneys and Fireplaces
No changes addressed

Chapters 4 through 10 address the prescriptive methods for building foundations, floor construction, wall construction, wall coverings, roof construction, roof assemblies, chimneys, and fireplaces. Concrete, masonry, and wood foundations; retaining walls; supporting soil properties; surface drainage; and foundation dampproofing and drainage are found in Chapter 4. Chapters 5, 6, and 8 contain the construction provisions for floors, walls, and roofs, respectively, with most of the provisions addressing light-frame construction. Chapter 7 addresses interior finishes, such as drywall and plaster installations, and exterior wall coverings, including water-resistive barriers, flashings, siding, and veneer, to provide a durable weather-resistant exterior. Chapter 9 covers the various waterproof roof assemblies, including roofing underlayment, roof eave ice barrier, flashings, asphalt shingles, and other roof coverings. Site-built masonry fireplaces and chimneys as well as prefabricated fireplaces and chimneys, including their weather-tight roof terminations, are addressed in the provisions of Chapter 10. ■

R 404.4

Retaining Walls

R 507.1, R 507.4

Decking

R 507.2

Deck Ledger Connection to Band Joist

R 507.2.4

Alternative Deck Lateral Load Connection

R 507.5, R 507.6, R 507.7

Deck Joists and Beams

R 507.8

Deck Posts

R 610.7

Drilling and Notching in Structural Insulated Panels

R 703.3

Siding Material Thickness and Attachment

R 703.6

Wood Shakes and Shingles on Exterior Walls

R 703.9

Exterior Insulation and Finish Systems (EIFS)

R 703.11.2.2

Design Wind Pressure Rating of Vinyl Siding Installed over Foam Plastic Sheathing



R703.13, R703.14

Insulated Vinyl Siding and Polypropylene Siding

R703.15, R703.16, R703.17

Cladding Attachment over Foam Sheathing

R806.1

Attic Ventilation

TABLE R806.5

Insulation for Condensation Control in Unvented Attics

R905.1.1

Underlayment

CHANGE TYPE: Modification

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.

2017 CODE: R404.4 Retaining walls. Retaining walls that are not laterally supported at the top and that retain in excess of 24 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.

CHANGE SIGNIFICANCE: The type of wall addressed in Section R404.4 is a detached retaining wall of concrete or hollow, grouted or solid masonry, not supported at the top and laterally supported at the bottom against sliding and overturning by a footing covered by soil. The wall would typically be a site retaining wall primarily resisting lateral soil loads. When the wall must resist additional loads, such as vehicles parked above or fences built on top of the wall that are subject to wind loads, a wall with more than 24 inches of unbalanced backfill must be designed in accordance with accepted engineering practice.

Section R404.4 also has a new trigger height of 48 inches (previously 24 inches) for unbalanced backfill to be consistent with Section R404.1.3. This section specifically requires that concrete or masonry foundation walls supporting more than 48 inches of unbalanced fill and not laterally supported must have an engineered design.

The definition of a retaining wall within the provision is modified to clarify that this type of wall is not intended to support structural loads. A similar wall that does support structural loads is addressed by other sections.

R404.4

Retaining Walls



Photo Courtesy of Peter Kulczyk

Retaining wall

R507.1, R507.4

Decking

CHANGE TYPE: Modification

CHANGE SUMMARY: The code sets the maximum allowable spacing for deck joists supporting the various types of common decking materials.

2017 CODE: 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 R507.4 Maximum joist spacing

Material type and nominal size	Maximum on-center joist spacing	
	Perpendicular to joist	Diagonal to joist ^a
1 ¹ / ₄ -inch thick wood	16 inches	12 inches
2-inch thick wood	24 inches	16 inches
Plastic composite	In accordance with Section R507.3	In accordance with Section R507.3

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



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Decking

CHANGE SIGNIFICANCE: The new Table R507.4 sets the maximum joist spacing for support of decking materials. The spacing is based on the type and thickness of the decking material and its orientation to the joist. Decking placed diagonally to the direction of the joists must span a greater distance than decking installed perpendicular to the joists. Therefore, a diagonal installation requires reduced spacing of the supports. The joist spacing values reflect current construction conventions and recommended best practices. However, the new spacing values for support of decking are based on typical decking materials which perform satisfactorily in deck construction and match current construction practices.

Lumber decking with a 2-inch nominal thickness allows a joist spacing of 24 inches on center when applied perpendicular to the supports and 16 inches on center when applied diagonally. For nominal 1¼-inch wood decking, the spacing is reduced to 16 inches and 12 inches, respectively. Plastic composite decking must comply with the requirements of ASTM D7032 and be installed in accordance with the manufacturer's instructions, as prescribed in Section R507.3.

R507.2

Deck Ledger Connection to Band Joist

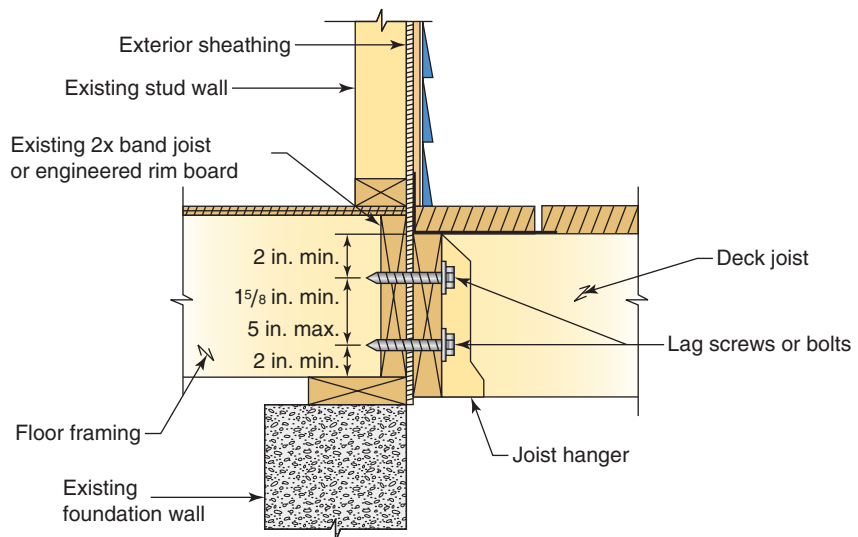
CHANGE TYPE: Clarification

CHANGE SUMMARY: The deck ledger section is reorganized to better describe the minimum requirements for connection of deck ledgers to band joists.

2017 CODE: R507.2 Deck ledger connection to band joist. For decks supporting a total design load of 50 pounds per square foot (2394 Pa) [40 pounds per square foot (1915 Pa) live load plus 10 pounds per square foot (479 Pa) dead load], the connection between a deck ledger of pressure-preservative-treated Southern Pine, incised pressure-preservative-treated Hem-Fir, or *approved* decay-resistant species, and a 2-inch (51 mm) nominal lumber band joist bearing on a sill plate or wall plate shall be constructed with ½-inch (12.7 mm) lag screws or bolts with washers in accordance with Table R507.2. Lag screws, bolts and washers shall be hot-dipped galvanized or stainless steel. Deck ledger connections to band joists shall be in accordance with this section, Tables R507.2 and R507.2.1, and Figures R507.2.1(1) and R507.2.1(2). For other grades, species, connection details and loading conditions, deck ledger connections shall be designed in accordance with Section R301.

R507.2.1 Placement of lag screws or bolts in deck ledgers and band joists. The lag screws or bolts in deck ledgers and band joists shall be placed in accordance with Table R507.2.1 and Figures R507.2.1(1) and R507.2.1(2).

R507.2.1 Ledger details. Deck ledgers installed in accordance with Section R507.2 shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, pressure-preservative-treated Southern Pine, incised pressure-preservative-treated Hem-fir, or *approved*, naturally durable, No. 2 grade or better lumber. Deck ledgers 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.



Deck ledger connection to band joist

R507.2.2 Alternate deck ledger connections.—Deck ledger connections not conforming to Table R507.2 shall be designed in accordance with accepted engineering practice. Girders supporting deck joists shall not be supported on deck ledgers or band joists. Deck ledgers shall not be supported on stone or masonry veneer.

R507.2.2 Band joist details. Band joists attached by a ledger in accordance with Section R507.2 shall be a minimum 2-inch-nominal (51 mm), solid-sawn, spruce-pine-fir lumber or a minimum 1-inch by 9½-inch (25 mm by 241 mm) dimensional, Douglas Fir, laminated veneer lumber. Band joists attached to a ledger in accordance with Section R507.2 shall be fully supported by a wall or sill plate below.

R507.2.3 Ledger to band joist fastener details. Fasteners used in deck ledger connections in accordance with Table R507.2 shall be hot-dipped galvanized or stainless steel and shall be installed in accordance with Table R507.2.1 and Figures R507.2.1(1) and R507.2.1(2).

R507.2 continues

TABLE R507.2 Fastener Spacing for a Southern Pine or Hem-fir Deck Ledger and A 2-Inch-Nominal Solid-Sawn Spruce-pine-fir Band Joist^{c,t,s} Deck Ledger Connection to Band Joist^{a,b} (Deck live load = 40 psf, deck dead load = 10 psf, snow load ≤ 40 psf)

Connection Details	Joist Span						
	6' and less	6'1" to 8'	8'1" to 10'	10'1" to 12'	12'1" to 14'	14'1" to 16'	16'1" to 18'
	On-center spacing of fasteners ^{d,e}						
½ inch diameter lag screw with ^{t,s} ⅜-½ inch maximum sheathing ^{c,d}	30	23	18	15	13	11	10
½ inch diameter bolt with ^{t,s} ⅜-½ inch maximum sheathing ^d	36	36	34	29	24	21	19
½ inch diameter bolt with ^{t,s} ⅜ 1 inch maximum sheathing and ½ inch washers ^{b,t,e}	36	36	29	24	21	18	16

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

- a. Ledgers shall be flashed in accordance with Section R703.8 to prevent water from contacting the house band joist.
- b. Snow load shall not be assumed to act concurrently with live load.
- c. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- d. Sheathing shall be wood structural panel or solid sawn lumber.
- e. Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber, or foam sheathing. Up to ½-inch thickness of stacked washers shall be permitted to substitute for up to ½ inch of allowable sheathing thickness when combined with wood structural panel or lumber sheathing. The maximum gap between the face of the ledger board and face of the wall sheathing shall be ½ inch.
- b. Lag screws and bolts shall be staggered in accordance with Section R507.2.1
- e. Deck ledger shall be minimum 2 × 8 pressure-preservative-treated No. 2 grade lumber, or other approved materials as established by standard engineering practice.
- d. When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1-inch-thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel band joist), the ledger attachment shall be designed in accordance with accepted engineering practice.
- f. A minimum 1 × 9 ½ Douglas Fir laminated veneer lumber rim board shall be permitted in lieu of the 2-inch nominal band joist.

R507.2 continued

CHANGE SIGNIFICANCE: Section R507.2 addressing the prescriptive method for connecting a deck ledger to the band joist (rim board) has been reorganized to clarify the requirements. Redundant language has been removed, prescriptive options have been moved from the table footnotes to the section text, and language describing the approved materials has been revised to provide consistency. Section R507.2 adds the defined term “naturally durable lumber” to the materials allowed for a deck ledger connection using the prescriptive provisions. In the 5th Edition (2014) FBCR, the description of allowable species for ledger material was not consistent between the section text, the table title, and the table footnotes. Section R507.2 referred to decay-resistant properties of pressure-preservative-treated pine or hem-fir, and then continued with a reference to “approved decay-resistant species,” leaving it to the building official to decide whether pine and hem-fir were approved. The heading of Table R507.2, however, referred only to pine and hem-fir and not the use of decay-resistant species. Lastly, table footnotes e and f referenced use of any pressure-preservative-treated, #2 grade lumber species or use of engineered lumber.

The 5th Edition (2014) FBCR text required a nominal 2-inch band joist in Table R507.2. Although code users recognized that 2 inches was intended as a minimum dimension, thicker band joists were not specifically addressed. In the 6th Edition (2017) FBCR, the term “minimum” is moved in front of the size description. The sheathing thickness of $1\frac{5}{32}$ inch is updated to $\frac{1}{2}$ inch to accommodate the thickness of common foam plastic sheathing.

Table R507.2 first appeared in the 5th Edition (2014) FBCR to provide an easy-to-follow prescriptive means for attaching a deck to a dwelling. Other methods may still be used, and often are, to provide equivalent connection capacities, as long as the method is approved by the building official. For example, proprietary fasteners are commonly installed following the manufacturer’s instructions and based on equivalent capacities. Testing to develop the prescriptive method in Table R507.2 was performed with three configurations:

1. $\frac{1}{2}$ -inch lag screw with $1\frac{5}{32}$ -inch OSB between the ledger and the band joist
2. $\frac{1}{2}$ -inch bolt with $1\frac{5}{32}$ -inch OSB between the ledger and the band joist
3. $\frac{1}{2}$ -inch bolt with $\frac{1}{2}$ -inch stack of washers and $1\frac{5}{32}$ -inch OSB between the ledger and the band joist

These three cases correspond to the three rows of the ledger table. Based on testing, for the first two configurations, the ledger, OSB, and band joist must be in direct contact with one another. For the third configuration, an additional gap filled by the washers is permitted between the ledger and the band joist. Minor changes have occurred to the table in the past two code cycles.

Note that the terms “band joist” and “rim board” are used synonymously and are interchangeable in this significant change and throughout the book.