

**CITY OF LAKE CHARLES
PERMIT CENTER
GUIDELINES FOR RESIDENTIAL CONSTRUCTION
One-And Two-Family Dwellings
Minimum Building Code Standards**

**2006 International Residential Code
2003 Wind Speed Standards (R301.2.1.1)**

The following is a non-exclusive summary of the Building Code which is provided to aid or assist contractors/permit holders, but this document is not to be viewed as a comprehensive statement of all applicable provisions which must be followed, and nothing in this document shall be construed as a waiver or limitation of any code provision, and it shall remain the responsibility of every contractor/permit holder to insure compliance with all code provisions.

I. Foundations

A. Slabs and Footing

1. Foundations shall be built on undisturbed soil or properly compacted fill material. Soil shall be treated for termites. (R403.1)
2. The top of the 3-1/2 inches concrete slab shall be at least 8" above the existing ground level. The load-bearing value of the soil shall not be less than 2,000 psf.
 - a) For single story structures the grade beam shall be a minimum of 12 inches wide and 20 inches deep and the bottom shall be flat.
 - b) For 2-story structures, the grade beam shall be a minimum of 16 inches wide and 20 inches deep.
 - c) For 3-story structures, the grade beam shall be a minimum of 24 inches wide and 20 inches deep.

All exterior footing shall be placed at least 12 inches below undisturbed ground surface. (Section 403)

3. Foundation Elevation – The top of the exterior foundation shall extend above the elevation of the street gutter at a point of discharge or the inlet of the approved drainage device a minimum of 12 inches. (R403.1.7.3)
4. For slabs on ground casts monolithically with a footing, a minimum of three - #4 (1/2 inch) rebar are required of which two shall be located in the middle third of the footing depth.

All joints, overlaps and intersections in the rebar shall be tied with wire or equivalent. All overlaps shall not be less than 25 inches. Minimum 6 mil plastic vapor barrier and 6 x 6 x 10 gauge wire mesh shall be installed in horizontal surface of the foundation. All rebar, paper barrier and mesh shall be in place at the time of the foundation inspection.

5. Anchor bolts, not less than 1/2 inch diameter or approved equal shall be installed not more than 6' apart and imbedded at least 7 inches into the concrete around the entire perimeter of the foundation. Where the seal is omitted for doorways, an anchor bolt shall be located within one foot of each side of the opening and within one foot from joints, corners, etc. (R403.1.6)

EXCEPTION: UL approved foundation anchor straps, spaced as required by the Code in UL specifications may be used in place of the 1/2 inch diameter anchor bolts.

- Concrete shall have a 28-day minimum compressive strength of 2500 psi.

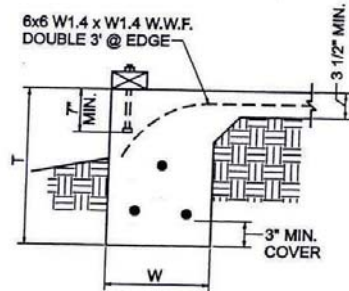


FIGURE 303E
MONOLITHIC EXTERIOR FOOTING

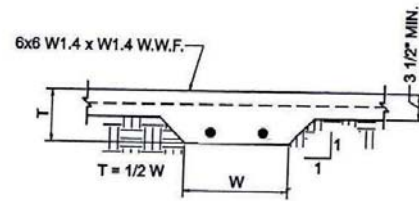
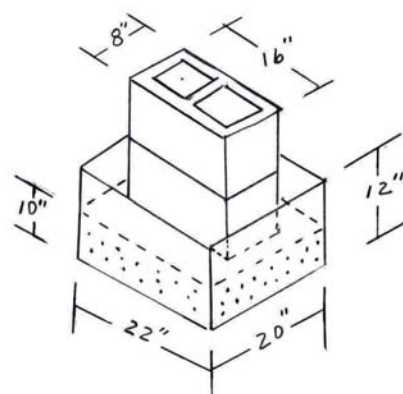
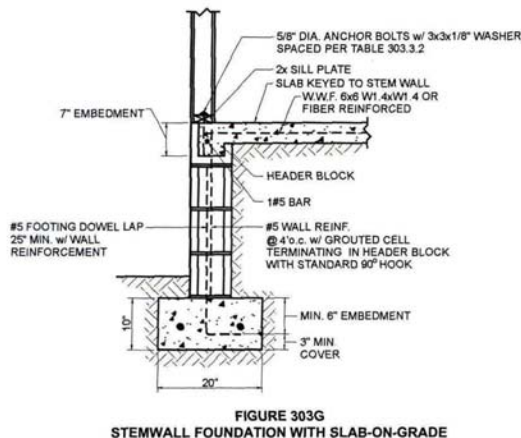


FIGURE 303F
MONOLITHIC INTERIOR FOOTING

II. Pier and Curtain Wall Foundations

A. Pier and curtain wall foundations shall be permitted to be used to support light frame construction, not more than two stories in height provided the following requirements are met (R404.1.5.1):

- All load bearing walls shall be placed on continuous concrete footings, placed integrally with the exterior wall footing.
- When structural, hollow concrete masonry units are used for isolated piers to support beams and girders, the cellular space shall be filled solid with concrete.
- Accepted pier blocks include: 8" x 16" CMU blocks
- The spacing of piers shall be a maximum of 6 feet apart. A termite shield shall be provided on the top of each pier. (2304.11.6 IBC)
- Anchorage – All piers shall be anchored/secured from the footing and pier to the sill.



III. Wall construction/Vertical Framing

A. Drilling and Notching

1. Any stud in an exterior wall or bearing partition may be cut or notched to a depth not exceeding 25 percent of its width. Studs in non-bearing partitions may be notched to a depth not to exceed 40 percent of a single stud width. (R602.6)

Studs may be drilled or bored, provided the diameter of the hole is no greater than 40 percent of a single stud width, the edge of the hole is no closer than 5/8 inch to the edge of the stud and the hole is not located in the same section of a cut or notch.

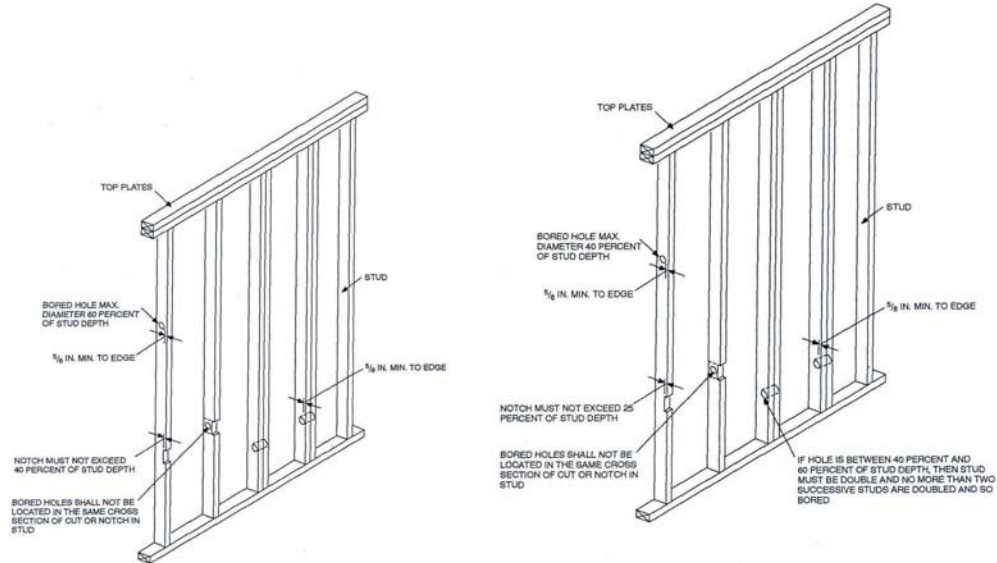
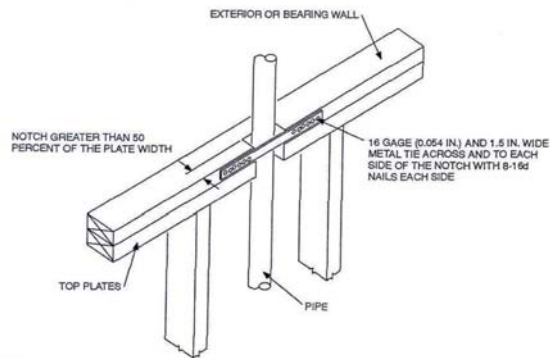


FIGURE R602.6(2)
NOTCHING AND BORED HOLE LIMITATIONS FOR INTERIOR NONBEARING WALLS

FIGURE R602.6(1)
NOTCHING AND BORED HOLE LIMITATIONS FOR EXTERIOR WALLS AND BEARING WALLS

2. Drilling and Notching of top plates

Cutting, drilling or notching of the top plate by more than 50 percent of its width, a galvanized metal tie of not less than .054 inches thick (16 gauge) and 1-1/2 inches wide shall be fastened to each plate across and to each side of the opening with not less than eight 16D nails at each side. (R602.6.1)



For SI: 1 inch = 25.4 mm.

FIGURE R602.6.1
TOP PLATE FRAMING TO ACCOMMODATE PIPING

B. Studs

1. The size, height and spacing of studs shall be in accordance with table R602.3.5 (5). Studs shall be a maximum of 24 inches on center in exterior and interior bearing walls, which shall be reduced to 16 inches on center in two-story construction. (R602.3.1)
2. Studs shall be capped with double topped plates installed to provide overlapping at corners in the intersection with bearing partitions or exterior walls. (R602.3.2)
3. Not less than three studs shall be installed at every corner of an exterior wall, and the wall shall be braced with diagonal braces or approved panels at each outside corner.

C. Headers

For openings more than 6 feet in width, on exterior walls or interior bearing partitions, each end of the header shall rest on two header studs. For openings less than 6 feet in width, each end of the header may rest on a single stud. Openings in non-bearing partitions may be framed with single studs and headers. (Header sizes – see Table R502.5(1)/R502.5(2))

D. Brick Ties

Masonry veneer shall be anchored to the supporting wall with corrugated corrosion-resistant metal ties spaced not more than 24” on center horizontally and vertically, and must be in place for the framing inspection. Metal ties shall not be less than 22 U.S. gauge X 7/8”. Distance separating the veneer from the sheathing material shall be a maximum of a nominal 1 inch. (R703.7.4.1)

Metal ties around the perimeter of openings shall be spaced not more than 3 feet on center and placed within 12 inches of the wall opening.

E. Weepholes

Weepholes shall be provided on exterior walls not less than 33 inches on center (R703.7.6).

F. Garage/Carport Separation.

1. The garage shall be separated from the residence and its attic area by not less than 1/2 –inch (12.7 mm) gypsum board applied to the garage side.

Garages beneath habitable rooms shall be separated from all habitable rooms above by not less than 5/8-inch (15.9 mm)

2. Openings from a private garage directly into a room used for sleeping purposes shall not be permitted.

Other openings between the garage and residence shall be equipped with solid wood doors not less than 1-3/8 inches (35mm) in thickness, solid or honeycomb core steel doors not less than 1-3/8 inches (35 mm) thick, or 20-minute fire-rated doors.

G. Bracing

1. One-story and top story of two- or three-story structures, bracing shall be located at each end and at least every 25 feet on center but not less than 16 percent of braced wall line.
2. First story of a two-story and second story of a three-story building, bracing shall be located at each end and at least every 25 feet on center, but not less than 16 percent of braced wall lined for method 3 and 25 percent of braced wall lined for methods 2, 4, 5, 6, 7 and 8.

**TABLE R602.10.1
WALL BRACING**

SEISMIC DESIGN CATEGORY OR WIND SPEED	CONDITION	TYPE OF BRACE ^{b, c}	AMOUNT OF BRACING ^{a, d, e}
Category A and B ($S_s \leq 0.35g$ and $S_{ds} \leq 0.33g$) or 100 mph or less	One story Top of two or three story	Methods 1, 2, 3, 4, 5, 6, 7 or 8	Located in accordance with Section R602.10 and at least every 25 feet on center but not less than 16% of braced wall line for Methods 2 through 8.
	First story of two story Second story of three story	Methods 1, 2, 3, 4, 5, 6, 7 or 8	Located in accordance with Section R602.10 and at least every 25 feet on center but not less than 16% of braced wall line for Method 3 or 25% of braced wall line for Methods 2, 4, 5, 6, 7 or 8.
	First story of three story	Methods 2, 3, 4, 5, 6, 7 or 8	Located in accordance with Section R602.10 and at least every 25 feet on center but not less than 25% of braced wall line for Method 3 or 35% of braced wall line for Methods 2, 4, 5, 6, 7 or 8.
Category C ($S_s \leq 0.6g$ and $S_{ds} \leq 0.50g$) or less than 110 mph	One story Top of two or three story	Methods 1, 2, 3, 4, 5, 6, 7 or 8	Located in accordance with Section R602.10 and at least every 25 feet on center but not less than 16% of braced wall line for Method 3 or 25% of braced wall line for Methods 2, 4, 5, 6, 7 or 8.
	First story of two story Second story of three story	Methods 2, 3, 4, 5, 6, 7 or 8	Located in accordance with Section R602.10 and at least every 25 feet on center but not less than 30% of braced wall line for Method 3 or 45% of braced wall line for Methods 2, 4, 5, 6, 7 or 8.
	First story of three story	Methods 2, 3, 4, 5, 6, 7 or 8	Located in accordance with Section R602.10 and at least every 25 feet on center but not less than 45% of braced wall line for Method 3 or 60% of braced wall line for Methods 2, 4, 5, 6, 7 or 8.

R602.10.3 Braced wall panel construction methods.

1. Nominal 1-inch-by-4-inch continuous diagonal braces let in to the top and bottom plates and the intervening studs or approved metal strap devices installed in accordance with the manufacturer's specifications. The let-in bracing shall be placed at an angle not more than 60 degrees or less than 45 degrees from the horizontal.
2. Wood boards of 5/8 inch net minimum thickness applied diagonally on studs spaced a maximum of 24 inches.
3. Wood structural panel sheathing with a thickness not less than 5/16 inch for 16-inch stud spacing and not less than 3/8 inch for 24-inch stud spacing.
4. One-half-inch (12.7 mm) or 25/32-inch (19.8mm) thick structural fiberboard sheathing applied vertically or horizontally on studs spaced a maximum of 16 inches on center.
5. When approved 1/2-inch gypsum board placed on studs spaced a maximum of 24 inches on center and fastened at 7 inches on center.
6. One-half inch particleboard wall sheathing panel studs 16-inch on center installed in accordance with Table R602.3(4).
7. Portland cement plaster on studs spaced a maximum of 16 inches on center and installed in accordance with Section R703.6.
8. Hardboard panel siding when installed in accordance with Table R703.4.

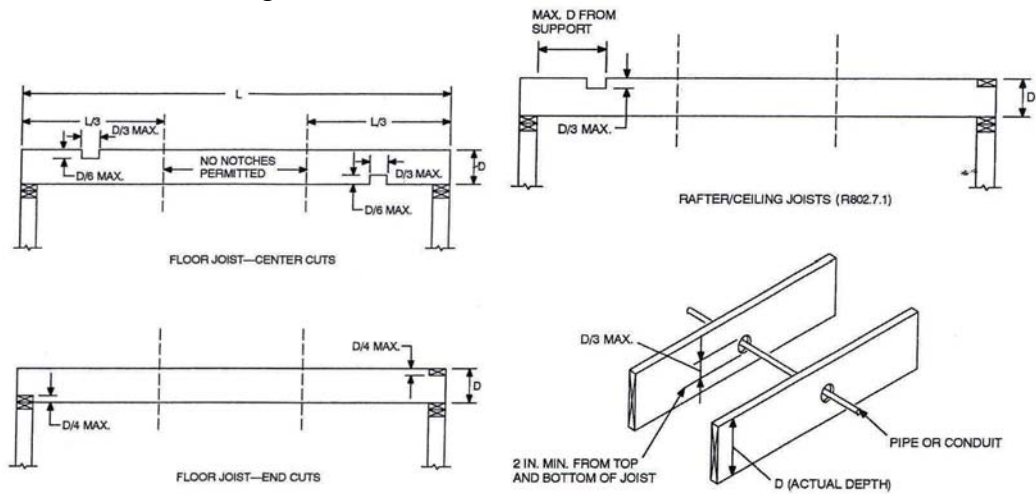
R602.10.4 Length of braced panels. For Methods 2, 3, 4, 6, 7 and 8 above, each braced wall panel shall be at least 48 inches (1219 mm) in length, covering a minimum of three stud spaces where studs are spaced 16 inches on center

IV. Floor Framing – Chapter 5

- A. Floor spans for floor joists shall be in accordance with Table R502.3.1 (1) and R502.3.1 (2) (attached)
- B. Floor joist framing from opposite sides of a beam girder, or partition shall be lapped at least 3 inches and nailed with minimum 3-10d. A wood or metal splice with strength equal to or greater than that provided by the nailed lap is permitted.
- C. Wood floor joists shall be supported laterally at the ends by full depth solid blocks not less than 2 inches nominal thickness; or by attachment to a header, band, or rim joist, or to an adjoining stud or provided with lateral support to prevent rotation. (R502.7)
- D. Floor joist framing into the side of a wood girder shall be supported by approved framing anchors or on ledger strips not less than nominal 2 inches by 2 inches. (R502.6.2)
- E. Draftstopping – When there is unusable space both above and below the concealed spaces of floor/ceiling assemblies, draftstopping shall be installed so that horizontal areas do not exceed 1000 square feet. Draftstopping shall divide the concealed spaces into approximate equal areas. Draftstopping material shall not be less than ½ inch gypsum, 3/8 inch wood structural panels, particle board or equivalent. (R502.12)
- F. Floor sheathing shall be in accordance with Section R503.

End joints R503.1.1. End joints in lumber used as subflooring shall occur over supports unless end-matched lumber is used, in which case each piece shall bear on at least two joists. Subflooring may be omitted when joist spacing does not exceed 16 inches (406 mm) and a 1-inch; (25.4 mm) nominal tongue-and-groove wood strip flooring is applied perpendicular to the joists.

- G. Drilling & notching of floor joist members shall not be cut, bored or notched in excess of the limitation in figure R502.8.



For SI: 1 inch = 25.4 mm.

FIGURE R502.8
CUTTING, NOTCHING AND DRILLING

V. Roof/Ceiling Construction

A. Joists and Rafter Spans

1. Ceiling joists spans for uninhabitable attics without storage – live load 10 pounds per square foot (Table R802.4 (1) attached).

Ceiling joists spans for uninhabitable attics with limited storage – live load 20 pounds per square foot (Table R802.4 (2) attached).

2. Rafter spans with a roof live load of 20 pounds per square foot, ceiling not attached to rafters (Table R802.5.1 (1) attached).

Rafter spans – roof live load of 20 pounds per square foot ceiling attached to rafters (Table R802.5.1 (2) attached).

- B. Ceiling joists and rafters shall be nailed to each other in accordance with Table R602.3 (1) and the assembly shall be nailed to the top wall plate in accordance with Table 602.3 (1).

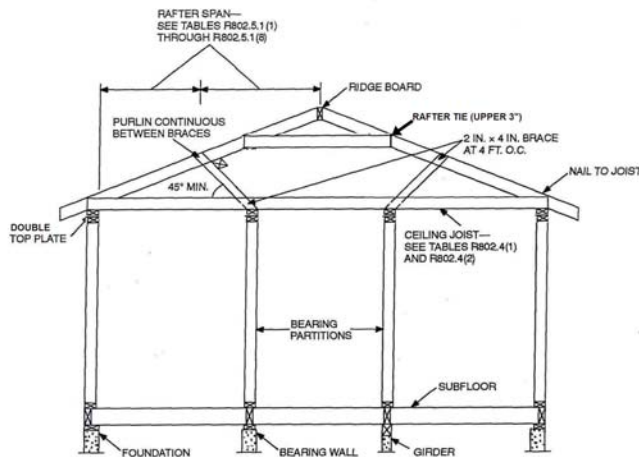
Ceiling joists shall be continuous or securely joined where they meet over interior partitions and nailed to adjacent rafters to provide a continuous tie across the building when such joists are parallel to the rafters. (R802.3.1)

Where ceiling joists are not parallel to the rafters, subflooring or metal straps attached to the ends of the rafters shall be installed in a manner to provide a continuous tie across the building or rafters shall be tied to a 1 inch by 4 inch minimum size cross ties. Rafter ties shall be spaced not more than 4 feet on center.

Ends of ceiling joists shall be lapped a minimum of 3 inches. Butted joists shall be tied together by approved methods. (R802.3.2)

The ends of each rafter or ceiling joists shall have not less than 1-1/2 inches of bearing on wood or metal and not less than 3 inches on masonry or concrete.

- C. Where rafter bracing is required, it may be accomplished by the use of a 2 x 4 or larger purlin laid on edge against the underside of the rafters, not more than half way down from the ridge. A minimum of a 2 x 4 knee brace spaced no further than 48 inches on center is to be notched around the purlin and nailed to the rafters where possible. The angle of the bracing shall not exceed 45 degrees. The knee brace shall be placed upon a wall or beam capable of supporting the load. A rafter shall not be braced from ceiling joists or strong backs except in individually approved situations. (R802.6).
- D. Ridges, hips and valley rafters shall not be less in depth than the cut end of the rafter (R802.3).
- E. When the header joist span exceeds 4 feet, the trimmer joist (cripple) and the header joist shall be doubled. (R802.9)
- F. Shingles
 - 1. Asphalt shingles shall only be used on roof slopes with a pitch of greater than 2 on 12. For roof slopes of 2 on 12 to 4 on 12, double underlayment application is required in accordance with Section 905.2.7. (R905.2.2)
 - 2. For normal application, asphalt shingles shall be secured to the roof with not less than 4 fasteners per shingle. (R905.2.6)
 - 3. Roof slopes greater than a 4 on 12 pitch shall have a minimum of one layer of underlayment felt. (R905.3.3.2)
- G. Roofs/Attic ventilation. The total net free ventilating area shall not be less than 1 to 300 provided at least 50 percent and not more than 80 percent of the required ventilating area is provided by ventilators located in the upper portion of the space to be ventilated. Example: 3000 sq. ft. attic must have at least 10 sq. ft. of attic ventilation with 50 percent in the upper portion. (R806)
- H. Attic Access. (R807) Attic spaces shall be provided with an interior access opening not less than 22 inches by 30 inches. A minimum of 30 inches unobstructed head room in the attic space shall be provided. See M1305.1.3 for access requirements where mechanical equipment is located in attics.
- I. When pre-fabricated wood trusses and/or pre-fabricated floor joist/ceiling components are installed, the manufacturer specifications must be submitted to the Permit Office



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.018 rad.
 NOTE: Where ceiling joints run perpendicular to the rafters, rafter ties shall be nailed to the rafter near the plate line and spaced not more than 4 feet on center.

**FIGURE R802.5.1
 BRACED RAFTER CONSTRUCTION**

General Requirements

A. Design Criteria

1. Construction in regions where the basic wind speeds from figure R301.2 (4) equal or exceed 110 mph shall be designed in accordance with Standards for Hurricane Resistance Residential Construction (SSTD10) or other methods provided in R301.2.1.1.
2. City Limits of Lake Charles is located below the 110 mph wind zone. All construction must meet or exceed these design standards.

B. Minimum Room Areas (R304).

Every dwelling shall have at least one habitable room that shall not have less than 120 sq. ft. of gross floor area. Other habitable rooms shall a floor area of not less than 70 sq. ft. (EXCEPTION: Kitchens). Habitable rooms shall not be less than 7 feet in any horizontal direction.

C. Ceiling Height (R305).

Habitable rooms, hallways, corridors, bathrooms, laundry rooms, etc., shall have a ceiling height of not less than 7 feet. (EXCEPTIONS: Beams, girders, etc.). Not more than 50 percent of the required floor area of a room or space is permitted to have a slope ceiling less than 7 feet in height with no portion of the required floor area less than 5 feet in height.

D. Sanitation (R306).

Every dwelling shall be provided with a water closet, lavatory, bathtub/shower, kitchen, sanitary sewer and approved water supply.

E. Emergency Escape and Rescue Openings (R310).

Every sleeping room shall have at least one operable emergency escape and rescue opening. They shall have a sill height of not more than 44 inches above the floor. Openings shall have a minimum net clear opening of 5.7 sq. ft. (EXCEPTION: Grade floor openings shall a minimum net clear opening of 5 sq. ft.) Minimum net clear height shall be 24 inches. Minimum net clear opening shall be 20 inches.

F. Means of Egress (R311).

1. The required exit door shall be a side hinge door not less than 3 feet in width and 6 feet 8 inches in height. Other doors shall not be required to comply with this minimum dimension.
2. Hallways shall not be less than 36 inches in width.

G. Exterior walls. Construction, projections, openings and penetrations of exterior walls of dwellings and accessory buildings shall comply with Table R302.1. These provisions shall not apply to walls, projections, openings or penetrations in walls that are perpendicular to the line used to determine the fire separation distance. Projections beyond the exterior wall shall not extend more than 12 inches (305 mm) into the areas where openings are prohibited. (R302.1)

Exceptions:

1. Detached tool sheds and storage sheds, playhouses and similar structures exempted from permits are not required to provide wall protection based on location on the lot. Projections beyond the exterior wall shall not extend over the lot line.
2. Detached garages accessory to a dwelling located within 2 feet (610 mm) of a lot line are permitted to have roof eave projections not exceeding 4 inches (102 mm).
3. Foundation vents installed in compliance with this code are permitted.

**TABLE R302.1
EXTERIOR WALLS**

EXTERIOR WALL ELEMENT		MINIMUM FIRE-RESISTANCE RATING	MINIMUM FIRE SEPARATION DISTANCE
Walls	(Fire-resistance rated)	1 hour with exposure from both sides	0 feet
	(Not fire-resistance rated)	0 hours	5 feet
Projections	(Fire-resistance rated)	1 hour on the underside	2 - 5 feet
	(Not fire-resistance rated)	0 hours	5 feet
Openings	Not allowed	N/A	< 3 feet
	25% Maximum of Wall Area	0 hours	3 feet
	Unlimited	0 hours	5 feet
Penetrations	All	Comply with Section R317.3	< 5 feet
		None required	5 feet

N/A = Not Applicable.

H. Stairways (R311.5).

NOTE: FOR RESIDENTIAL CONSTRUCTION ONLY;
SEE IBC FOR COMMERCIAL STAIR REQUIREMENTS.

1. Stairways shall not be less than 36 inches. Minimum head room shall not be less than 6 feet 8 inches.
2. Maximum riser height shall be 7-3/4 inches. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8 inch.
3. The minimum tread depth shall be 10 inches
4. The flight of stairs shall not have a vertical rise greater than 12 feet.
5. A handrail shall be provided on at least one side of each continuous run of treads with four or more risers. Handrails shall not be less than 34 inches or more than 38 inches measured vertically from the slope of the tread.

I. Guard Rails (R312).

1. Porches, balconies, raised floors, etc. more than 30 inches above the floor shall have guards not less than 36 inches in height.
2. Open-sided stairs with a total riser more than 30 inches above the floor or grade shall have guards not less than 34 inches in height.
3. Required guards in open-sided stairways, raised floor areas, porches, balconies, etc. shall have intermediate rails which do not allow the passage of a sphere 4 inches or more in diameter. (EXCEPTION: Openings for required guards on the side of stair treads shall not allow a sphere 4-3/8 inches to pass through.)

J. Smoke Alarms (R313)

Smoke alarms shall be installed:

1. In each sleeping room.
2. Outside each separate sleeping area in the immediate vicinity of the bedroom.
3. On each additional story of the dwelling.

When more than one smoke alarm is required, the alarm devices shall be interconnected in such a manner that the actuation of one alarm will activate all the alarms in the individual unit.

Smoke alarms shall be installed and listed in accordance with provisions of this Code and NFPA72.

In new construction, the required smoke alarms shall receive their primary power from the building wiring. Smoke alarms shall be permitted to be battery operated when installed in buildings that undergo alterations, repairs or additions regulated by Section R313.2.1.

K. Protection Against Decay (R319).

The following location shall be required to use an approved species and grade of lumber, pressure treated, in the following locations.

1. Wood joists or the bottom of a wood structural floor when closer than 18 inches or wood girders when closer than 12 inches to the exposed ground.
2. All wood framing members that rest on concrete or masonry, exterior foundation walls less than 8 inches to the exposed ground.
3. Sills and sleepers on a concrete or masonry slab that is in direct contact with the ground unless separated from such slab by an impervious moisture barrier.
4. Ends of wood girders entering masonry or concrete walls having a clearance of less than .5 inches on top, sides and ends.
5. Wood siding, sheathing and wall framing on the exterior of a building having a clearance of less than 6 inches from the ground.
6. Wood structural members supporting moisture/permeable floors or roofs that are exposed to the weather.
7. All wood in contact with the ground

L. Protection Against Termites (R320)

Soil under foundations shall be treated for termites and pressure-preservative treated wood shall be used when in contact with the ground.

M. Required footings for carports, covered patios, etc.:

Bearing a light load (Example: light wood frame construction and aluminum/metal carports) – Footings under each column/post shall not be less than 15" X 15" X 12" below grade with a continuous 6" X 6" footing around the exterior perimeter of the slab.

N. Attaching a new slab to the side of an existing slab

1. Bearing – A standard footing 12 inches below grade shall be required adjacent to the existing slab. If the addition will be enclosed as part of the main structure and will be occupied as such, #4 dowels, 3 feet on center, shall be placed in existing slab to secure both slabs together.
2. Non-bearing – A 6 inch deep footing is required adjacent to the existing slab. If this addition will be enclosed as part of the main structure and be occupied as such, #4 dowels, 3 feet on center, shall be in place in the existing slab to secure both slabs together.

O. Pouring new concrete on top of existing concrete slabs (Minimum thickness 2 inches).

1. Dowels shall be placed in existing slab to tie both slabs together (at corners, sides, centers, etc. minimum 8 feet on center).
2. An exterior footing shall be provided when building new structures over an existing concrete slab.

VI. Fireblocking (602.8)

Fireblocking shall be required in wood-frame construction in the following locations:

- 1) In concealed spaces of stud walls and partitions
 - a. Vertically at the ceiling and floor levels
 - b. Horizontally at intervals not exceeding 10 feet
- 2) At all interconnections between concealed vertical and horizontal spaces that occur at soffits, drop ceilings, etc.
- 3) In concealed spaces between stair stringers at the top and bottom of the run.
- 4) Openings around vents, pipes, and ducts at ceiling and floor levels.
- 5) Other areas as provided in the Code.

VII. Fasteners/Connectors and Roof ties (R802.11)

A continuous load path shall be provided to transfer all lateral and vertical loads from the roof, wall, and floor systems to the foundation (WFCM 2.2.2)

1. Lateral Connections (2.2.1)
Adequate connections between roof, ceiling, wall, and floor assemblies shall be provided to transfer lateral forces acting perpendicular to the wall surface.
(Figure 2.2a)
2. Shear Connections (2.2.2)
Adequate connections between roof, ceiling, wall and floor assemblies shall be provided to transfer shear forces acting parallel to the wall surface (Figure 2.2b)
3. Wind Uplift Connections
Adequate connections shall be provided to transfer uplift forces acting away from the roof surface (Figure 2.2.c)

Roof and ceiling construction shall be capable of accommodating all loads imposed and transmitting the resulting load to the supporting structural element (R801.2 and R802.11)

A. Fasteners

Components of exterior wall shall be fastened in accordance with Tables R602.3(1) through R602.3 (4).

**TABLE R602.3(1)
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS**

DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER ^{a,b,c}	SPACING OF FASTENERS
Joist to sill or girder, toe nail	3-8d (2-1/2" x 0.113")	—
1" x 6" subfloor or less to each joist, face nail	2-8d (2-1/2" x 0.113") 2 staples, 1-3/4"	—
2" subfloor to joist or girder, blind and face nail	2-16d (3-1/2" x 0.135")	—
Sole plate to joist or blocking, face nail	16d (3-1/2" x 0.135")	16" o.c.
Top or sole plate to stud, end nail	2-16d (3-1/2" x 0.135")	—
Stud to sole plate, toe nail	3-8d (2-1/2" x 0.113") or 2-16d (3-1/2" x 0.135")	—
Double studs, face nail	10d (3" x 0.128")	24" o.c.
Double top plates, face nail	10d (3" x 0.128")	24" o.c.
Sole plate to joist or blocking at braced wall panels	3-16d (3-1/2" x 0.135")	16" o.c.
Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d (3-1/2" x 0.135")	—
Blocking between joists or rafters to top plate, toe nail	3-8d (2-1/2" x 0.113")	—
Rim joist to top plate, toe nail	8d (2-1/2" x 0.113")	6" o.c.
Top plates, laps at corners and intersections, face nail	2-10d (3" x 0.128")	—
Built-up header, two pieces with 1/2" spacer	16d (3-1/2" x 0.135")	16" o.c. along each edge
Continued header, two pieces	16d (3-1/2" x 0.135")	16" o.c. along each edge
Ceiling joists to plate, toe nail	3-8d (2-1/2" x 0.113")	—
Continuous header to stud, toe nail	4-8d (2-1/2" x 0.113")	—
Ceiling joist, laps over partitions, face nail	3-10d (3" x 0.128")	—
Ceiling joist to parallel rafters, face nail	3-10d (3" x 0.128")	—
Rafter to plate, toe nail	2-16d (3-1/2" x 0.135")	—
1" brace to each stud and plate, face nail	2-8d (2-1/2" x 0.113") 2 staples, 1-3/4"	—
1" x 6" sheathing to each bearing, face nail	2-8d (2-1/2" x 0.113") 2 staples, 1-3/4"	—
1" x 8" sheathing to each bearing, face nail	2-8d (2-1/2" x 0.113") 3 staples, 1-3/4"	—
Wider than 1" x 8" sheathing to each bearing, face nail	3-8d (2-1/2" x 0.113") 4 staples, 1-3/4"	—
Built-up corner studs	10d (3" x 0.128")	24" o.c.
Built-up girders and beams, 2-inch lumber layers	10d (3" x 0.128")	Nail each layer as follows: 32" o.c. at top and bottom and staggered. Two nails at ends and at each splice.
2" planks	2-16d (3-1/2" x 0.135")	At each bearing
Roof rafters to ridge, valley or hip rafters: toe nail	4-16d (3-1/2" x 0.135")	—
face nail	3-16d (3-1/2" x 0.135")	—
Rafter ties to rafters, face nail	3-8d (2-1/2" x 0.113")	—
Collar tie to rafter, face nail, or 1-1/4" x 20 gage ridge strap	3-10d (3" x 0.128")	—

(continued)

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**TABLE R602.3(1)—continued
FASTENER SCHEDULE FOR STRUCTURAL MEMBERS**

DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER ^{b, c, e}	SPACING OF FASTENERS	
		Edges (inches) ^f	Intermediate supports ^{g, h} (inches)
Wood structural panels, subfloor, roof and wall sheathing to framing, and particleboard wall sheathing to framing			
$5/16''$ - $1/2''$	6d common ($2'' \times 0.113''$) nail (subfloor, wall) 8d common ($2 1/2'' \times 0.131''$) nail (roof) ^f	6	12 ^g
$19/32''$ - $1''$	8d common nail ($2 1/2'' \times 0.131''$)	6	12 ^g
$1 1/8''$ - $1 1/4''$	10d common ($3'' \times 0.148''$) nail or 8d ($2 1/2'' \times 0.131''$) deformed nail	6	12
Other wall sheathing^h			
$1/2''$ structural cellulosic fiberboard sheathing	$1 1/2''$ galvanized roofing nail 8d common ($2 1/2'' \times 0.131''$) nail; staple 16 ga., $1 1/2''$ long	3	6
$25/32''$ structural cellulosic fiberboard sheathing	$1 3/4''$ galvanized roofing nail 8d common ($2 1/2'' \times 0.131''$) nail; staple 16 ga., $1 3/4''$ long	3	6
$1/2''$ gypsum sheathing ^d	$1 1/2''$ galvanized roofing nail; 6d common ($2'' \times 0.131''$) nail; staple galvanized $1 1/2''$ long; $1 1/4''$ screws, Type W or S	4	8
$5/8''$ gypsum sheathing ^d	$1 3/8''$ galvanized roofing nail; 8d common ($2 1/2'' \times 0.131''$) nail; staple galvanized $1 3/8''$ long; $1 3/8''$ screws, Type W or S	4	8
Wood structural panels, combination subfloor underlayment to framing			
$3/4''$ and less	6d deformed ($2'' \times 0.120''$) nail or 8d common ($2 1/2'' \times 0.131''$) nail	6	12
$7/8''$ - $1''$	8d common ($2 1/2'' \times 0.131''$) nail or 8d deformed ($2 1/2'' \times 0.120''$) nail	6	12
$1 1/8''$ - $1 1/4''$	10d common ($3'' \times 0.148''$) nail or 8d deformed ($2 1/2'' \times 0.120''$) nail	6	12

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 mile per hour = 0.447 m/s; 1ksi = 6.895 MPa.

- a. All nails are smooth-common, box or deformed shanks except where otherwise stated. Nails used for framing and sheathing connections shall have minimum average bending yield strengths as shown: 80 ksi for shank diameter of 0.192 inch (20d common nail), 90 ksi for shank diameters larger than 0.142 inch but not larger than 0.177 inch, and 100 ksi for shank diameters of 0.142 inch or less.
- b. Staples are 16 gage wire and have a minimum $7/16$ -inch on diameter crown width.
- c. Nails shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater.
- d. Four-foot-by-8-foot or 4-foot-by-9-foot panels shall be applied vertically.
- e. Spacing of fasteners not included in this table shall be based on Table R602.3(2).
- f. For regions having basic wind speed of 110 mph or greater, 8d deformed ($2 1/2'' \times 0.120''$) nails shall be used for attaching plywood and wood structural panel roof sheathing to framing within minimum 48-inch distance from gable end walls, if mean roof height is more than 25 feet, up to 35 feet maximum.
- g. For regions having basic wind speed of 100 mph or less, nails for attaching wood structural panel roof sheathing to gable end wall framing shall be spaced 6 inches on center. When basic wind speed is greater than 100 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.
- h. Gypsum sheathing shall conform to ASTM C 79 and shall be installed in accordance with GA 253. Fiberboard sheathing shall conform to ASTM C 208.
- i. Spacing of fasteners on floor sheathing panel edges applies to panel edges supported by framing members and required blocking and at all floor perimeters only. Spacing of fasteners on roof sheathing panel edges applies to panel edges supported by framing members and required blocking. Blocking of roof or floor sheathing panel edges perpendicular to the framing members need not be provided except as required by other provisions of this code. Floor perimeter shall be supported by framing members or solid blocking.

B. Connectors and Roof Tie downs

Roof assemblies which are subject to wind uplift pressures of 20 psf or greater shall have roof rafters/trusses attached to their supporting wall assemblies by connectors capable of providing the resistance required in Table R802.11. Wind uplift pressures shall be determined using an effective wind area of 100 sq.ft. and Zone 1 in table (R301.2(2) as adjusted for height and exposure per Table R301.2(3).

A continuous load path shall be designed to transmit uplift forces from the rafter/truss ties to the foundation.

Connectors shall be provided to resist wind uplift forces in accordance with Table R802.11

Acceptable Connectors and Minimum Spacing Requirements

- **Structures with a mean roof height less than 40 feet:**

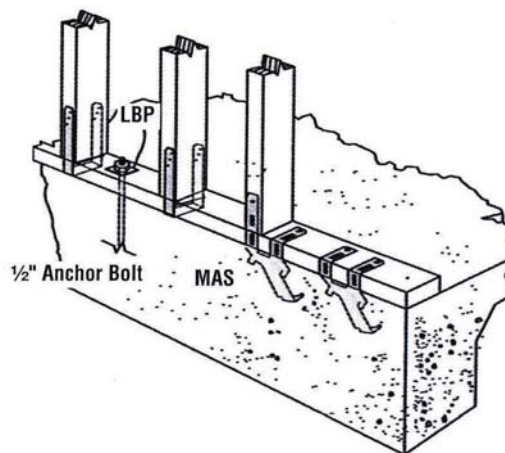
Connectors for stud to bottom plate, top plate to stud, rafters/truss to top plate, and rafter ridge straps may be spaced 48 inches o.c.

- **Structures with a mean roof height 40 foot or greater:**

Connectors and minimum spacing requirements:

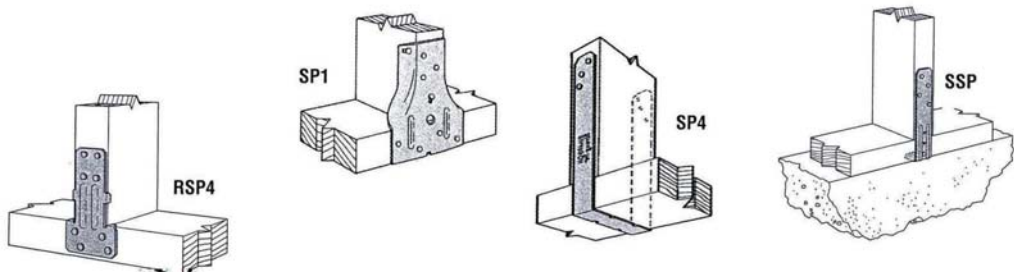
A. Anchor bolts

1. 1/2 inch anchor bolts – a minimum of two anchor bolts per sill plate are required spaced a maximum 6 foot OC and within 12 inches of each corner.
2. Simpson MAS anchors or equivalent – maximum 5 foot OC and within 12 inches of each corner.



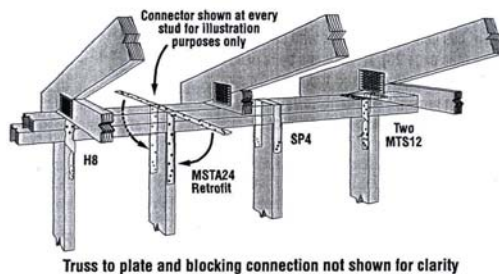
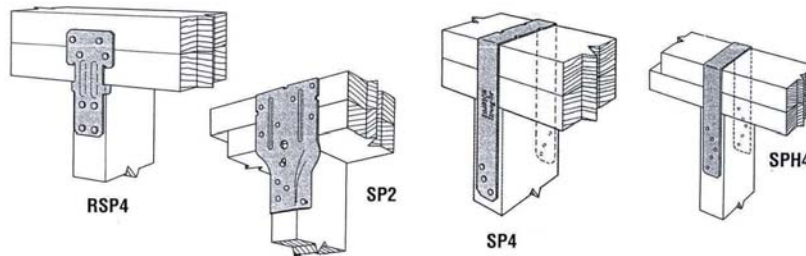
B. Stud to Bottom Plate

16" OC	Simpson RSP4 or equivalent Simpson SSP or equivalent Simpson TSP or equivalent	8 – 8d nails 5 – 10d nails 9 – 10d nails
32" OC	Simpson SP1 or equivalent Simpson SP4/SP6 or equivalent	10 – 10d nails 6 – 10d nails



C. Top plate to Stud

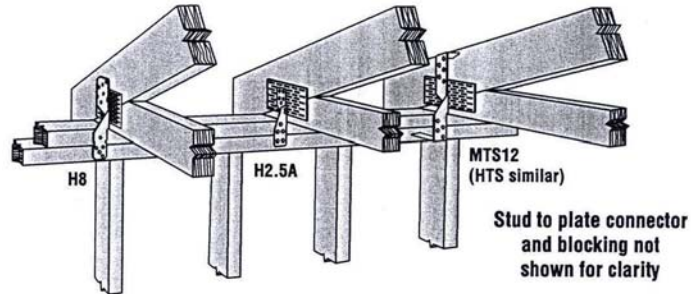
16" OC	Simpson RSP4 or equivalent Simpson SSP or equivalent	8 – 8d nails 5 – 10d nails
32" OC	Simpson SP2 or equivalent Simpson SP4 or equivalent Simpson H8 (rafter span 20' – 36')	12 – 10d nails 6 – 10d nails



NOTE: Top plate to stud connectors not wrapping the top plates shall be installed on the same side of the wall as the rafter to top plate connectors.

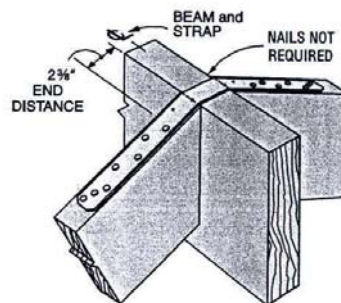
D. Rafters/Truss to Top Plate

16" OC	Simpson H2.5A or equivalent	Rafter span 20' – 40'	10 – 8d Nails
24" OC	Simpson H2.5A or equivalent	Rafter span 20' – 28'	10 – 8d Nails
24" OC	Simpson H8 or equivalent	Rafter span 32' – 40'	10 – 10d Nails
24" OC	Simpson H10 or equivalent		16 – 8d Nails
48" OC	Simpson HTS16 or equivalent		16 – 10d Nails



E. Rafter Ridge Straps

- 1) 16" OC – Roof Pitch 3:12 – 4:12, 20' – 40' span
Simpson LSTA 12 or equivalent
- 16" OC – Roof Pitch 5:12 – 10:12, 20' – 40' span, 10d nails
Simpson LSTA 9 or equivalent, 10d nails
- 2) 24" OC – Roof Pitch 3:12 – 4:12, 20' – 40' span
Simpson MSTA 21 or equivalent
- 24" OC – Roof Pitch 5:12 – 10:12, 20' – 40' span
Simpson LSTA 12 or equivalent, 10d nails

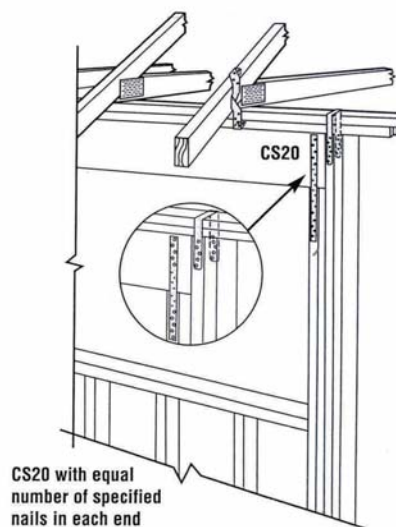


Rafter must line up on each side of ridge board

- Collar ties may be installed as an alternate to ridge straps (4' OC)

F. Header Connection – Simpson CS20 or equivalent

- 3' opening – 6 straps
- 4' opening – 8 straps
- 6' opening – 10 straps
- 8' opening – 14 straps

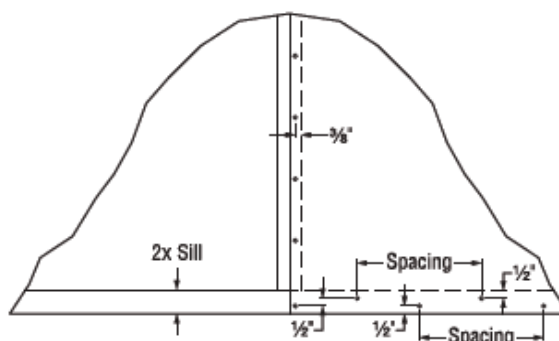


G. Hold downs, stud to bottom plate connections, and top plate to stud connections may be omitted if wood structural panel bracing is provided.

Minimum 15/32" wall sheathing shall be installed vertically onto framing and shall extend from the bottom of the sill plate to the top of the upper double top plate where sheathing is used in lieu of top plate and sill plate connectors. The sheathing shall be fastened to the top and bottom plates with double rows of 8d common nails at 4 inches on center. The minimum stagger spacing of fasteners shall comply with the detail shown below.

Rafter/Truss to top plate connections shall be installed on the same side as the wall sheathing. Where rafter/truss to top plate connectors are installed over the sheathing, full length nails shall be used. Larger diameter anchor bolts, square plate washers with closer spacings are required in this application. A minimum of 5/8 inch diameter anchor bolts with 3"x3"x1/4" washers shall be installed no greater than 16" on center if plate connectors are omitted.

Connectors at openings in walls are always required.



Nailing spacing detail per SSTD10-99

TABLE R502.3.1(1)
FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
 (Residential sleeping areas, live load = 30 psf, L/Δ = 360)^a

JOIST SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
		2x6	2x8	2x10	2x12	2x6	2x8	2x10	2x12
		Maximum floor joist spans							
		(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)
12	Douglas fir-larch SS	12- 6	16- 6	21- 0	25- 7	12- 6	16- 6	21- 0	25- 7
	Douglas fir-larch #1	12- 0	15-10	20- 3	24- 8	12- 0	15- 7	19- 0	22- 0
	Douglas fir-larch #2	11-10	15- 7	19-10	23- 0	11- 6	14- 7	17- 9	20- 7
	Douglas fir-larch #3	9- 8	12- 4	15- 0	17- 5	8- 8	11- 0	13- 5	15- 7
	Hem-fir SS	11-10	15- 7	19-10	24- 2	11-10	15- 7	19-10	24- 2
	Hem-fir #1	11- 7	15- 3	19- 5	23- 7	11- 7	15- 2	18- 6	21- 6
	Hem-fir #2	11- 0	14- 6	18- 6	22- 6	11- 0	14- 4	17- 6	20- 4
	Hem-fir #3	9- 8	12- 4	15- 0	17- 5	8- 8	11- 0	13- 5	15- 7
	Southern pine SS	12- 3	16- 2	20- 8	25- 1	12- 3	16- 2	20- 8	25- 1
	Southern pine #1	12- 0	15-10	20- 3	24- 8	12- 0	15-10	20- 3	24- 8
	Southern pine #2	11-10	15- 7	19-10	24- 2	11-10	15- 7	18- 7	21- 9
	Southern pine #3	10- 5	13- 3	15- 8	18- 8	9- 4	11-11	14- 0	16- 8
	Spruce-pine-fir SS	11- 7	15- 3	19- 5	23- 7	11- 7	15- 3	19- 5	23- 7
	Spruce-pine-fir #1	11- 3	14-11	19- 0	23- 0	11- 3	14- 7	17- 9	20- 7
	Spruce-pine-fir #2	11- 3	14-11	19- 0	23- 0	11- 3	14- 7	17- 9	20- 7
	Spruce-pine-fir #3	9- 8	12- 4	15- 0	17- 5	8- 8	11- 0	13- 5	15- 7
16	Douglas fir-larch SS	11- 4	15- 0	19- 1	23- 3	11- 4	15- 0	19- 1	23- 0
	Douglas fir-larch #1	10-11	14- 5	18- 5	21- 4	10- 8	13- 6	16- 5	19- 1
	Douglas fir-larch #2	10- 9	14- 1	17- 2	19-11	9-11	12- 7	15- 5	17-10
	Douglas fir-larch #3	8- 5	10- 8	13- 0	15- 1	7- 6	9- 6	11- 8	13- 6
	Hem-fir SS	10- 9	14- 2	18- 0	21-11	10- 9	14- 2	18- 0	21-11
	Hem-fir #1	10- 6	13-10	17- 8	20- 9	10- 4	13- 1	16- 0	18- 7
	Hem-fir #2	10- 0	13- 2	16-10	19- 8	9-10	12- 5	15- 2	17- 7
	Hem-fir #3	8- 5	10- 8	13- 0	15- 1	7- 6	9- 6	11- 8	13- 6
	Southern pine SS	11- 2	14- 8	18- 9	22-10	11- 2	14- 8	18- 9	22-10
	Southern pine #1	10-11	14- 5	18- 5	22- 5	10-11	14- 5	17-11	21- 4
	Southern pine #2	10- 9	14- 2	18- 0	21- 1	10- 5	13- 6	16- 1	18-10
	Southern pine #3	9- 0	11- 6	13- 7	16- 2	8- 1	10- 3	12- 2	14- 6
	Spruce-pine-fir SS	10- 6	13-10	17- 8	21- 6	10- 6	13-10	17- 8	21- 4
	Spruce-pine-fir #1	10- 3	13- 6	17- 2	19-11	9-11	12- 7	15- 5	17-10
	Spruce-pine-fir #2	10- 3	13- 6	17- 2	19-11	9-11	12- 7	15- 5	17-10
	Spruce-pine-fir #3	8- 5	10- 8	13- 0	15- 1	7- 6	9- 6	11- 8	13- 6
19.2	Douglas fir-larch SS	10- 8	14- 1	18- 0	21-10	10- 8	14- 1	18- 0	21- 0
	Douglas fir-larch #1	10- 4	13- 7	16- 9	19- 6	9- 8	12- 4	15- 0	17- 5
	Douglas fir-larch #2	10- 1	12-10	15- 8	18- 3	9- 1	11- 6	14- 1	16- 3
	Douglas fir-larch #3	7- 8	9- 9	11-10	13- 9	6-10	8- 8	10- 7	12- 4
	Hem-fir SS	10- 1	13- 4	17- 0	20- 8	10- 1	13- 4	17- 0	20- 7
	Hem-fir #1	9-10	13- 0	16- 4	19- 0	9- 6	12- 0	14- 8	17- 0
	Hem-fir #2	9- 5	12- 5	15- 6	17- 1	8-11	11- 4	13-10	16- 1
	Hem-fir #3	7- 8	9- 9	11- 10	13- 9	6-10	8- 8	10- 7	12- 4
	Southern pine SS	10- 6	13-10	17- 8	21- 6	10- 6	13-10	17- 8	21- 6
	Southern pine #1	10- 4	13- 7	17- 4	21- 1	10- 4	13- 7	16- 4	19- 6
	Southern pine #2	10- 1	13- 4	16- 5	19- 3	9- 6	12- 4	14- 8	17- 2
	Southern pine #3	8- 3	10- 6	12- 5	14- 9	7- 4	9- 5	11- 1	13- 2
	Spruce-pine-fir SS	9- 10	13- 0	16- 7	20- 2	9-10	13- 0	16- 7	19- 6
	Spruce-pine-fir #1	9- 8	12- 9	15- 8	18- 3	9- 1	11- 6	14- 1	16- 3
	Spruce-pine-fir #2	9- 8	12- 9	15- 8	18- 3	9- 1	11- 6	14- 1	16- 3
	Spruce-pine-fir #3	7- 8	9- 9	11-10	13- 9	6-10	8- 8	10- 7	12- 4
24	Douglas fir-larch SS	9-11	13- 1	16- 8	20- 3	9-11	13- 1	16- 2	18- 9
	Douglas fir-larch #1	9- 7	12- 4	15- 0	17- 5	8- 8	11- 0	13- 5	15- 7
	Douglas fir-larch #2	9- 1	11- 6	14- 1	16- 3	8- 1	10- 3	12- 7	14- 7
	Douglas fir-larch #3	6-10	8- 8	10- 7	12- 4	6- 2	7- 9	9- 6	11- 0
	Hem-fir SS	9- 4	12- 4	15- 9	19- 2	9- 4	12- 4	15- 9	18- 5
	Hem-fir #1	9- 2	12- 0	14- 8	17- 0	8- 6	10- 9	13- 1	15- 2
	Hem-fir #2	8- 9	11- 4	13-10	16- 1	8- 0	10- 2	12- 5	14- 4
	Hem-fir #3	6-10	8- 8	10- 7	12- 4	6- 2	7- 9	9- 6	11- 0
	Southern pine SS	9- 9	12-10	16- 5	19-11	9- 9	12-10	16- 5	19-11
	Southern pine #1	9- 7	12- 7	16- 1	19- 6	9- 7	12- 4	14- 7	17- 5
	Southern pine #2	9- 4	12- 4	14- 8	17- 2	8- 6	11- 0	13- 1	15- 5
	Southern pine #3	7- 4	9- 5	11- 1	13- 2	6- 7	8- 5	9-11	11-10
	Spruce-pine-fir SS	9- 2	12- 1	15- 5	18- 9	9- 2	12- 1	15- 0	17- 5
	Spruce-pine-fir #1	8-11	11- 6	14- 1	16- 3	8- 1	10- 3	12- 7	14- 7
	Spruce-pine-fir #2	8-11	11- 6	14- 1	16- 3	8- 1	10- 3	12- 7	14- 7
	Spruce-pine-fir #3	6-10	8- 8	10- 7	12- 4	6- 2	7- 9	9- 6	11- 0

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

NOTE: Check sources for availability of lumber in lengths greater than 20 feet.

a. Dead load limits for townhouses in Seismic Design Category C and all structures in Seismic Design Categories D₀, D₁ and D₂ shall be determined in accordance with Section R301.2.2.2.1.

TABLE R502.3.1(2)
 FLOOR JOIST SPANS FOR COMMON LUMBER SPECIES
 (Residential living areas, live load = 40 psf, L/A = 360)^a

JOIST SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf				DEAD LOAD = 20 psf			
		2x6	2x8	2x10	2x12	2x6	2x8	2x10	2x12
		Maximum floor joist spans							
		(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)	(ft - in.)
12	Douglas fir-larch SS	11-4	15-0	19-1	23-3	11-4	15-0	19-1	23-3
	Douglas fir-larch #1	10-11	14-5	18-5	22-0	10-11	14-2	17-4	20-1
	Douglas fir-larch #2	10-9	14-2	17-9	20-7	10-6	13-3	16-3	18-10
	Douglas fir-larch #3	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3
	Hem-fir SS	10-9	14-2	18-0	21-11	10-9	14-2	18-0	21-11
	Hem-fir #1	10-6	13-10	17-8	21-6	10-6	13-10	16-11	19-7
	Hem-fir #2	10-0	13-2	16-10	20-4	10-0	13-1	16-0	18-6
	Hem-fir #3	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3
	Southern pine SS	11-2	14-8	18-9	22-10	11-2	14-8	18-9	22-10
	Southern pine #1	10-11	14-5	18-5	22-5	10-11	14-5	18-5	22-5
	Southern pine #2	10-9	14-2	18-0	21-9	10-9	14-2	16-11	19-10
	Southern pine #3	9-4	11-11	14-0	16-8	8-6	10-10	12-10	15-3
	Spruce-pine-fir SS	10-6	13-10	17-8	21-6	10-6	13-10	17-8	21-6
	Spruce-pine-fir #1	10-3	13-6	17-3	20-7	10-3	13-3	16-3	18-10
Spruce-pine-fir #2	10-3	13-6	17-3	20-7	10-3	13-3	16-3	18-10	
Spruce-pine-fir #3	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3	
16	Douglas fir-larch SS	10-4	13-7	17-4	21-1	10-4	13-7	17-4	21-0
	Douglas fir-larch #1	9-11	13-1	16-5	19-1	9-8	12-4	15-0	17-5
	Douglas fir-larch #2	9-9	12-7	15-5	17-10	9-1	11-6	14-1	16-3
	Douglas fir-larch #3	7-6	9-6	11-8	13-6	6-10	8-8	10-7	12-4
	Hem-fir SS	9-9	12-10	16-5	19-11	9-9	12-10	16-5	19-11
	Hem-fir #1	9-6	12-7	16-0	18-7	9-6	12-0	14-8	17-0
	Hem-fir #2	9-1	12-0	15-2	17-7	8-11	11-4	13-10	16-1
	Hem-fir #3	7-6	9-6	11-8	13-6	6-10	8-8	10-7	12-4
	Southern pine SS	10-2	13-4	17-0	20-9	10-2	13-4	17-0	20-9
	Southern pine #1	9-11	13-1	16-9	20-4	9-11	13-1	16-4	19-6
	Southern pine #2	9-9	12-10	16-1	18-10	9-6	12-4	14-8	17-2
	Southern pine #3	8-1	10-3	12-2	14-6	7-4	9-5	11-1	13-2
	Spruce-pine-fir SS	9-6	12-7	16-0	19-6	9-6	12-7	16-0	19-6
	Spruce-pine-fir #1	9-4	12-3	15-5	17-10	9-1	11-6	14-1	16-3
Spruce-pine-fir #2	9-4	12-3	15-5	17-10	9-1	11-6	14-1	16-3	
Spruce-pine-fir #3	7-6	9-6	11-8	13-6	6-10	8-8	10-7	12-4	
19.2	Douglas fir-larch SS	9-8	12-10	16-4	19-10	9-8	12-10	16-4	19-2
	Douglas fir-larch #1	9-4	12-4	15-0	17-5	8-10	11-3	13-8	15-11
	Douglas fir-larch #2	9-1	11-6	14-1	16-3	8-3	10-6	12-10	14-10
	Douglas fir-larch #3	6-10	8-8	10-7	12-4	6-3	7-11	9-8	11-3
	Hem-fir SS	9-2	12-1	15-5	18-9	9-2	12-1	15-5	18-9
	Hem-fir #1	9-0	11-10	14-8	17-0	8-8	10-11	13-4	15-6
	Hem-fir #2	8-7	11-3	13-10	16-1	8-2	10-4	12-8	14-8
	Hem-fir #3	6-10	8-8	10-7	12-4	6-3	7-11	9-8	11-3
	Southern pine SS	9-6	12-7	16-0	19-6	9-6	12-7	16-0	19-6
	Southern pine #1	9-4	12-4	15-9	19-2	9-4	12-4	14-11	17-9
	Southern pine #2	9-2	12-1	14-8	17-2	8-8	11-3	13-5	15-8
	Southern pine #3	7-4	9-5	11-1	13-2	6-9	8-7	10-1	12-1
	Spruce-pine-fir SS	9-0	11-10	15-1	18-4	9-0	11-10	15-1	17-9
	Spruce-pine-fir #	8-9	11-6	14-1	16-3	8-3	10-6	12-10	14-10
Spruce-pine-fir #2	8-9	11-6	14-1	16-3	8-3	10-6	12-10	14-10	
Spruce-pine-fir #3	6-10	8-8	10-7	12-4	6-3	7-11	9-8	11-3	
24	Douglas fir-larch SS	9-0	11-11	15-2	18-5	9-0	11-11	14-9	17-1
	Douglas fir-larch #1	8-8	11-0	13-5	15-7	7-11	10-0	12-3	14-3
	Douglas fir-larch #2	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
	Douglas fir-larch #3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1
	Hem-fir SS	8-6	11-3	14-4	17-5	8-6	11-3	14-4	16-10 ^b
	Hem-fir #1	8-4	10-9	13-1	15-2	7-9	9-9	11-11	13-10
	Hem-fir #2	7-11	10-2	12-5	14-4	7-4	9-3	11-4	13-1
	Hem-fir #3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1
	Southern pine SS	8-10	11-8	14-11	18-1	8-10	11-8	14-11	18-1
	Southern pine #1	8-8	11-5	14-7	17-5	8-8	11-3	13-4	15-11
	Southern pine #2	8-6	11-0	13-1	15-5	7-9	10-0	12-0	14-0
	Southern pine #3	6-7	8-5	9-11	11-10	6-0	7-8	9-1	10-9
	Spruce-pine-fir SS	8-4	11-0	14-0	17-0	8-4	11-0	13-8	15-11
	Spruce-pine-fir #1	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4
Spruce-pine-fir #2	8-1	10-3	12-7	14-7	7-5	9-5	11-6	13-4	
Spruce-pine-fir #3	6-2	7-9	9-6	11-0	5-7	7-1	8-8	10-1	

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

NOTE: Check sources for availability of lumber in lengths greater than 20 feet.

a. End bearing length shall be increased to 2 inches.

b. Dead load limits for townhouses in Seismic Design Category C and all structures in Seismic Design Categories D₀, D₁, and D₂ shall be determined in accordance with Section R301.2.2.2.1.

TABLE R802.4(1)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
(Uninhabitable attics without storage, live load = 10 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 5 psf			
		2 x 4	2 x 6	2 x 8	2 x 10
		Maximum ceiling joist spans			
		(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Douglas fir-larch SS	13-2	20-8	Note a	Note a
	Douglas fir-larch #1	12-8	19-11	Note a	Note a
	Douglas fir-larch #2	12-5	19-6	25-8	Note a
	Douglas fir-larch #3	10-10	15-10	20-1	24-6
	Hem-fir SS	12-5	19-6	25-8	Note a
	Hem-fir #1	12-2	19-1	25-2	Note a
	Hem-fir #2	11-7	18-2	24-0	Note a
	Hem-fir #3	10-10	15-10	20-1	24-6
	Southern pine SS	12-11	20-3	Note a	Note a
	Southern pine #1	12-8	19-11	Note a	Note a
	Southern pine #2	12-5	19-6	25-8	Note a
	Southern pine #3	11-6	17-0	21-8	25-7
	Spruce-pine-fir SS	12-2	19-1	25-2	Note a
	Spruce-pine-fir #1	11-10	18-8	24-7	Note a
	Spruce-pine-fir #2	11-10	18-8	24-7	Note a
	Spruce-pine-fir #3	10-10	15-10	20-1	24-6
16	Douglas fir-larch SS	11-11	18-9	24-8	Note a
	Douglas fir-larch #1	11-6	18-1	23-10	Note a
	Douglas fir-larch #2	11-3	17-8	23-0	Note a
	Douglas fir-larch #3	9-5	13-9	17-5	21-3
	Hem-fir SS	11-3	17-8	23-4	Note a
	Hem-fir #1	11-0	17-4	22-10	Note a
	Hem-fir #2	10-6	16-6	21-9	Note a
	Hem-fir #3	9-5	13-9	17-5	21-3
	Southern pine SS	11-9	18-5	24-3	Note a
	Southern pine #1	11-6	18-1	23-1	Note a
	Southern pine #2	11-3	17-8	23-4	Note a
	Southern pine #3	10-0	14-9	18-9	22-2
	Spruce-pine-fir SS	11-0	17-4	22-10	Note a
	Spruce-pine-fir #1	10-9	16-11	22-4	Note a
	Spruce-pine-fir #2	10-9	16-11	22-4	Note a
	Spruce-pine-fir #3	9-5	13-9	17-5	21-3
19.2	Douglas fir-larch SS	11-3	17-8	23-3	Note a
	Douglas fir-larch #1	10-10	17-0	22-5	Note a
	Douglas fir-larch #2	10-7	16-7	21-0	25-8
	Douglas fir-larch #3	8-7	12-6	15-10	19-5
	Hem-fir SS	10-7	16-8	21-11	Note a
	Hem-fir #1	10-4	16-4	21-6	Note a
	Hem-fir #2	9-11	15-7	20-6	25-3
	Hem-fir #3	8-7	12-6	15-10	19-5
	Southern pine SS	11-0	17-4	22-10	Note a
	Southern pine #1	10-10	17-0	22-5	Note a
	Southern pine #2	10-7	16-8	21-11	Note a
	Southern pine #3	9-1	13-6	17-2	20-3
	Spruce-pine-fir SS	10-4	16-4	21-6	Note a
	Spruce-pine-fir #1	10-2	15-11	21-0	25-8
	Spruce-pine-fir #2	10-2	15-11	21-0	25-8
	Spruce-pine-fir #3	8-7	12-6	15-10	19-5

(continued)

TABLE R802.4(1)—continued
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
 (Uninhabitable attics without storage, live load = 10 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 5 psf			
			2 x 4	2 x 6	2 x 8	2 x 10
			Maximum ceiling joist spans			
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
24	Douglas fir-larch	SS	10-5	16-4	21-7	Note a
	Douglas fir-larch	#1	10-0	15-9	20-1	24-6
	Douglas fir-larch	#2	9-10	14-10	18-9	22-11
	Douglas fir-larch	#3	7-8	11-2	14-2	17-4
	Hem-fir	SS	9-10	15-6	20-5	Note a
	Hem-fir	#1	9-8	15-2	19-7	23-11
	Hem-fir	#2	9-2	14-5	18-6	22-7
	Hem-fir	#3	7-8	11-2	14-2	17-4
	Southern pine	SS	10-3	16-1	21-2	Note a
	Southern pine	#1	10-0	15-9	20-10	Note a
	Southern pine	#2	9-10	15-6	20-1	23-11
	Southern pine	#3	8-2	12-0	15-4	18-1
	Spruce-pine-fir	SS	9-8	15-2	19-11	25-5
	Spruce-pine-fir	#1	9-5	14-9	18-9	22-11
	Spruce-pine-fir	#2	9-5	14-9	18-9	22-11
	Spruce-pine-fir	#3	7-8	11-2	14-2	17-4

Check sources for availability of lumber in lengths greater than 20 feet.
 For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.
 a. Span exceeds 26 feet in length.

TABLE R802.4(2)
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
 (Uninhabitable attics with limited storage, live load = 20 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf			
			2 x 4	2 x 6	2 x 8	2 x 10
			Maximum ceiling joist spans			
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Douglas fir-larch	SS	10-5	16-4	21-7	Note a
	Douglas fir-larch	#1	10-0	15-9	20-1	24-6
	Douglas fir-larch	#2	9-10	14-10	18-9	22-11
	Douglas fir-larch	#3	7-8	11-2	14-2	17-4
	Hem-fir	SS	9-10	15-6	20-5	Note a
	Hem-fir	#1	9-8	15-2	19-7	23-11
	Hem-fir	#2	9-2	14-5	18-6	22-7
	Hem-fir	#3	7-8	11-2	14-2	17-4
	Southern pine	SS	10-3	16-1	21-2	Note a
	Southern pine	#1	10-0	15-9	20-10	Note a
	Southern pine	#2	9-10	15-6	20-1	23-11
	Southern pine	#3	8-2	12-0	15-4	18-1
	Spruce-pine-fir	SS	9-8	15-2	19-11	25-5
	Spruce-pine-fir	#1	9-5	14-9	18-9	22-11
	Spruce-pine-fir	#2	9-5	14-9	18-9	22-11
	Spruce-pine-fir	#3	7-8	11-2	14-2	17-4
16	Douglas fir-larch	SS	9-6	14-11	19-7	25-0
	Douglas fir-larch	#1	9-1	13-9	17-5	21-3
	Douglas fir-larch	#2	8-9	12-10	16-3	19-10
	Douglas fir-larch	#3	6-8	9-8	12-4	15-0
	Hem-fir	SS	8-11	14-1	18-6	23-8
	Hem-fir	#1	8-9	13-5	16-10	20-8
	Hem-fir	#2	8-4	12-8	16-0	19-7
	Hem-fir	#3	6-8	9-8	12-4	15-0
	Southern pine	SS	9-4	14-7	19-3	24-7
	Southern pine	#1	9-1	14-4	18-11	23-1
	Southern pine	#2	8-11	13-6	17-5	20-9
	Southern pine	#3	7-1	10-5	13-3	15-8
	Spruce-pine-fir	SS	8-9	13-9	18-1	23-1
	Spruce-pine-fir	#1	8-7	12-10	16-3	19-10
	Spruce-pine-fir	#2	8-7	12-10	16-3	19-10
	Spruce-pine-fir	#3	6-8	9-8	12-4	15-0
19.2	Douglas fir-larch	SS	8-11	14-0	18-5	23-4
	Douglas fir-larch	#1	8-7	12-6	15-10	19-5
	Douglas fir-larch	#2	8-0	11-9	14-10	18-2
	Douglas fir-larch	#3	6-1	8-10	11-3	13-8
	Hem-fir	SS	8-5	13-3	17-5	22-3
	Hem-fir	#1	8-3	12-3	15-6	18-11
	Hem-fir	#2	7-10	11-7	14-8	17-10
	Hem-fir	#3	6-1	8-10	11-3	13-8
	Southern pine	SS	8-9	13-9	18-1	23-1
	Southern pine	#1	8-7	13-6	17-9	21-1
	Southern pine	#2	8-5	12-3	15-10	18-11
	Southern pine	#3	6-5	9-6	12-1	14-4
	Spruce-pine-fir	SS	8-3	12-11	17-1	21-8
	Spruce-pine-fir	#1	8-0	11-9	14-10	18-2
	Spruce-pine-fir	#2	8-0	11-9	14-10	18-2
	Spruce-pine-fir	#3	6-1	8-10	11-3	13-8

(continued)

TABLE R802.4(2)—continued
CEILING JOIST SPANS FOR COMMON LUMBER SPECIES
 (Uninhabitable attics with limited storage, live load = 20 psf, L/Δ = 240)

CEILING JOIST SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf			
		2 x 4	2 x 6	2 x 8	2 x 10
		Maximum Ceiling Joist Spans			
		(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
24	Douglas fir-larch SS	8-3	13-0	17-1	20-11
	Douglas fir-larch #1	7-8	11-2	14-2	17-4
	Douglas fir-larch #2	7-2	10-6	13-3	16-3
	Douglas fir-larch #3	5-5	7-11	10-0	12-3
	Hem-fir SS	7-10	12-3	16-2	20-6
	Hem-fir #1	7-6	10-11	13-10	16-11
	Hem-fir #2	7-1	10-4	13-1	16-0
	Hem-fir #3	5-5	7-11	10-0	12-3
	Southern pine SS	8-1	12-9	16-10	21-6
	Southern pine #1	8-0	12-6	15-10	18-10
	Southern pine #2	7-8	11-0	14-2	16-11
	Southern pine #3	5-9	8-6	10-10	12-10
	Spruce-pine-fir SS	7-8	12-0	15-10	19-5
	Spruce-pine-fir #1	7-2	10-6	13-3	16-3
	Spruce-pine-fir #2	7-2	10-6	13-3	16-3
	Spruce-pine-fir #3	5-5	7-11	10-0	12-3

Check sources for availability of lumber in lengths greater than 20 feet.

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

a. Span exceeds 26 feet in length.

TABLE R802.5.1(1)
RAFTER SPANS FOR COMMON LUMBER SPECIES
 (Roof live load=20 psf, ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf					
		2 x 4	2 x 6	2 x 8	2 x 10	2 x 12	2 x 4	2 x 6	2 x 8	2 x 10	2 x 12	
		Maximum rafter spans*										
		(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Douglas fir-larch	SS	11-6	18-0	23-9	Note b	Note b	11-6	18-0	23-5	Note b	Note b
	Douglas fir-larch	#1	1-1	17-4	22-5	Note b	Note b	10-6	15-4	19-5	23-9	Note b
	Douglas fir-larch	#2	1-10	16-7	21-0	25-8	Note b	9-10	14-4	18-2	22-3	25-9
	Douglas fir-larch	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Hem-fir	SS	10-10	17-0	22-5	Note b	Note b	10-10	17-0	22-5	Note b	Note b
	Hem-fir	#1	10-7	16-8	21-10	Note b	Note b	10-3	14-11	18-11	23-2	Note b
	Hem-fir	#2	10-1	15-11	20-8	25-3	Note b	9-8	14-2	17-11	21-11	25-5
	Hem-fir	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Southern pine	SS	11-3	17-8	23-4	Note b	Note b	11-3	17-8	23-4	Note b	Note b
	Southern pine	#1	11-1	17-4	22-11	Note b	Note b	11-1	17-3	21-9	25-10	Note b
	Southern pine	#2	10-10	17-0	22-5	Note b	Note b	10-6	15-1	19-5	23-2	Note b
	Southern pine	#3	9-1	13-6	17-2	20-3	24-1	7-11	11-8	14-10	17-6	20-11
	Spruce-pine-fir	SS	10-7	16-8	21-11	Note b	Note b	10-7	16-8	21-9	Note b	Note b
	Spruce-pine-fir	#1	10-4	16-3	21-0	25-8	Note b	9-10	14-4	18-2	22-3	25-9
	Spruce-pine-fir	#2	10-4	16-3	21-0	25-8	Note b	9-10	14-4	18-2	22-3	25-9
Spruce-pine-fir	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6	
16	Douglas fir-larch	SS	10-5	16-4	21-7	Note b	Note b	10-5	16-0	20-3	24-9	Note b
	Douglas fir-larch	#1	10-0	15-4	19-5	23-9	Note b	9-1	13-3	16-10	20-7	23-10
	Douglas fir-larch	#2	9-10	14-4	18-2	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Douglas fir-larch	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Hem-fir	SS	9-10	15-6	20-5	Note b	Note b	9-10	15-6	19-11	24-4	Note b
	Hem-fir	#1	9-8	14-11	18-11	23-2	Note b	8-10	12-11	16-5	20-0	23-3
	Hem-fir	#2	9-2	14-2	17-11	21-11	25-5	8-5	12-3	15-6	18-11	22-0
	Hem-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Southern pine	SS	10-3	16-1	21-2	Note b	Note b	10-3	16-1	21-2	Note b	Note b
	Southern pine	#1	10-0	15-9	20-10	25-10	Note b	10-0	15-0	18-10	22-4	Note b
	Southern pine	#2	9-10	15-1	19-5	23-2	Note b	9-1	13-0	16-10	20-1	23-7
	Southern pine	#3	7-11	11-8	14-10	17-6	20-11	6-10	10-1	12-10	15-2	18-1
	Spruce-pine-fir	SS	9-8	15-2	19-11	25-5	Note b	9-8	14-10	18-10	23-0	Note b
	Spruce-pine-fir	#1	9-5	14-4	18-2	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir	#2	9-5	14-4	18-2	22-3	25-9	8-6	12-5	15-9	19-3	22-4
Spruce-pine-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10	
19.2	Douglas fir-larch	SS	9-10	15-5	20-4	25-11	Note b	9-10	14-7	18-6	22-7	Note b
	Douglas fir-larch	#1	9-5	14-0	17-9	21-8	25-2	8-4	12-2	15-4	18-9	21-9
	Douglas fir-larch	#2	8-11	13-1	16-7	20-3	23-6	7-9	11-4	14-4	17-7	20-4
	Douglas fir-larch	#3	6-9	9-11	12-7	15-4	17-9	5-10	8-7	10-10	13-3	15-5
	Hem-fir	SS	9-3	14-7	19-2	24-6	Note b	9-3	14-4	18-2	22-3	25-9
	Hem-fir	#1	9-1	13-8	17-4	21-1	24-6	8-1	11-10	15-0	18-4	21-3
	Hem-fir	#2	8-8	12-11	16-4	20-0	23-2	7-8	11-2	14-2	17-4	20-1
	Hem-fir	#3	6-9	9-11	12-7	15-4	17-9	5-10	8-7	10-10	13-3	15-5
	Southern pine	SS	9-8	15-2	19-11	25-5	Note b	9-8	15-2	19-11	25-5	Note b
	Southern pine	#1	9-5	14-10	19-7	23-7	Note b	9-3	13-8	17-2	20-5	24-4
	Southern pine	#2	9-3	13-9	17-9	21-2	24-10	8-4	11-11	15-4	18-4	21-6
	Southern pine	#3	7-3	10-8	13-7	16-0	19-1	6-3	9-3	11-9	13-10	16-6
	Spruce-pine-fir	SS	9-1	14-3	18-9	23-11	Note b	9-1	13-7	17-2	21-0	24-4
	Spruce-pine-fir	#1	8-10	13-1	16-7	20-3	23-6	7-9	11-4	14-4	17-7	20-4
	Spruce-pine-fir	#2	8-10	13-1	16-7	20-3	23-6	7-9	11-4	14-4	17-7	20-4
Spruce-pine-fir	#3	6-9	9-11	12-7	15-4	17-9	5-10	8-7	10-10	13-3	15-5	

(continued)

TABLE R802.5.1(1)—continued
RAFTER SPANS FOR COMMON LUMBER SPECIES
 (Roof live load=20 psf, ceiling not attached to rafters, L/Δ = 180)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 x 4	2 x 6	2 x 8	2 x 10	2 x 12	2 x 4	2 x 6	2 x 8	2 x 10	2 x 12
			Maximum rafter spans*									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
24	Douglas fir-larch	SS	9-1	14-4	18-10	23-4	Note b	8-11	13-1	16-7	20-3	23-5
	Douglas fir-larch	#1	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Douglas fir-larch	#2	8-0	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Douglas fir-larch	#3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9
	Hem-fir	SS	8-7	13-6	17-10	22-9	Note b	8-7	12-10	16-3	19-10	23-0
	Hem-fir	#1	8-4	12-3	15-6	18-11	21-11	7-3	10-7	13-5	16-4	19-0
	Hem-fir	#2	7-11	11-7	14-8	17-10	20-9	6-10	10-0	12-8	15-6	17-11
	Hem-fir	#3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9
	Southern pine	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	18-6	22-11	Note b
	Southern pine	#1	8-9	13-9	17-9	21-1	25-2	8-3	12-3	15-4	18-3	21-9
	Southern pine	#2	8-7	12-3	15-10	18-11	22-2	7-5	10-8	13-9	16-5	19-3
	Southern pine	#3	6-5	9-6	12-1	14-4	17-1	5-7	8-3	10-6	12-5	14-9
	Spruce-pine-fir	SS	8-5	13-3	17-5	21-8	25-2	8-4	12-2	15-4	18-9	21-9
	Spruce-pine-fir	#1	8-0	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir	#2	8-0	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir	#3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9

Check sources for availability of lumber in lengths greater than 20 feet.

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

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

H_C/H_R	Rafter Span Adjustment Factor
1/3	0.67
1/4	0.76
1/5	0.83
1/6	0.90
1/7.5 or less	1.00

where:

H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

b. Span exceeds 26 feet in length.

TABLE R802.5.1(2)
RAFTER SPANS FOR COMMON LUMBER SPECIES
 (Roof live load=20 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE		DEAD LOAD = 10 psf					DEAD LOAD = 20 psf				
			2 x 4	2 x 6	2 x 8	2 x 10	2 x 12	2 x 4	2 x 6	2 x 8	2 x 10	2 x 12
			Maximum rafter spans ^a									
			(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)
12	Douglas fir-larch	SS	10-5	16-4	21-7	Note b	Note b	10-5	16-4	21-7	Note b	Note b
	Douglas fir-larch	#1	10-0	15-9	20-10	Note b	Note b	10-0	15-4	19-5	23-9	Note b
	Douglas fir-larch	#2	9-10	15-6	20-5	25-8	Note b	9-10	14-4	18-2	22-3	25-9
	Douglas fir-larch	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Hem-fir	SS	9-10	15-6	20-5	Note b	Note b	9-10	15-6	20-5	Note b	Note b
	Hem-fir	#1	9-8	15-2	19-11	25-5	Note b	9-8	14-11	18-11	23-2	Note b
	Hem-fir	#2	9-2	14-5	19-0	24-3	Note b	9-2	14-2	17-11	21-11	25-5
	Hem-fir	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Southern pine	SS	10-3	16-1	21-2	Note b	Note b	10-3	16-1	21-2	Note b	Note b
	Southern pine	#1	10-0	15-9	20-10	Note b	Note b	10-0	15-9	20-10	25-10	Note b
	Southern pine	#2	9-10	15-6	20-5	Note b	Note b	9-10	15-1	19-5	23-2	Note b
	Southern pine	#3	9-1	13-6	17-2	20-3	24-1	7-11	11-8	14-10	17-6	20-11
	Spruce-pine-fir	SS	9-8	15-2	19-11	25-5	Note b	9-8	15-2	19-11	25-5	Note b
	Spruce-pine-fir	#1	9-5	14-9	19-6	24-10	Note b	9-5	14-4	18-2	22-3	25-9
	Spruce-pine-fir	#2	9-5	14-9	19-6	24-10	Note b	9-5	14-4	18-2	22-3	25-9
	Spruce-pine-fir	#3	8-7	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
16	Douglas fir-larch	SS	9-6	14-11	19-7	25-0	Note b	9-6	14-11	19-7	24-9	Note b
	Douglas fir-larch	#1	9-1	14-4	18-11	23-9	Note b	9-1	13-3	16-10	20-7	23-10
	Douglas fir-larch	#2	8-11	14-1	18-2	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Douglas fir-larch	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Hem-fir	SS	8-11	14-1	18-6	23-8	Note b	8-11	14-1	18-6	23-8	Note b
	Hem-fir	#1	8-9	13-9	18-1	23-1	Note b	8-9	12-11	16-5	20-0	23-3
	Hem-fir	#2	8-4	13-1	17-3	21-11	25-5	8-4	12-3	15-6	18-11	22-0
	Hem-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
	Southern pine	SS	9-4	14-7	19-3	24-7	Note b	9-4	14-7	19-3	24-7	Note b
	Southern pine	#1	9-1	14-4	18-11	24-1	Note b	9-1	14-4	18-10	22-4	Note b
	Southern pine	#2	8-11	14-1	18-6	23-2	Note b	8-11	13-0	16-10	20-1	23-7
	Southern pine	#3	7-11	11-8	14-10	17-6	20-11	6-10	10-1	12-10	15-2	18-1
	Spruce-pine-fir	SS	8-9	13-9	18-1	23-1	Note b	8-9	13-9	18-1	23-0	Note b
	Spruce-pine-fir	#1	8-7	13-5	17-9	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir	#2	8-7	13-5	17-9	22-3	25-9	8-6	12-5	15-9	19-3	22-4
	Spruce-pine-fir	#3	7-5	10-10	13-9	16-9	19-6	6-5	9-5	11-11	14-6	16-10
19.2	Douglas fir-larch	SS	8-11	14-0	18-5	23-7	Note b	8-11	14-0	18-5	22-7	Note b
	Douglas fir-larch	#1	8-7	13-6	17-9	21-8	25-2	8-4	12-2	15-4	18-9	21-9
	Douglas fir-larch	#2	8-5	13-1	16-7	20-3	23-6	7-9	11-4	14-4	17-7	20-4
	Douglas fir-larch	#3	6-9	9-11	12-7	15-4	17-9	5-10	8-7	10-10	13-3	15-5
	Hem-fir	SS	8-5	13-3	17-5	22-3	Note b	8-5	13-3	17-5	22-3	25-9
	Hem-fir	#1	8-3	12-11	17-1	21-1	24-6	8-1	11-10	15-0	18-4	21-3
	Hem-fir	#2	7-10	12-4	16-3	20-0	23-2	7-8	11-2	14-2	17-4	20-1
	Hem-fir	#3	6-9	9-11	12-7	15-4	17-9	5-10	8-7	10-10	13-3	15-5
	Southern pine	SS	8-9	13-9	18-1	23-1	Note b	8-9	13-9	18-1	23-1	Note b
	Southern pine	#1	8-7	13-6	17-9	22-8	Note b	8-7	13-6	17-2	20-5	24-4
	Southern pine	#2	8-5	13-3	17-5	21-2	24-10	8-4	11-11	15-4	18-4	21-6
	Southern pine	#3	7-3	10-8	13-7	16-0	19-1	6-3	9-3	11-9	13-10	16-6
	Spruce-pine-fir	SS	8-3	12-11	17-1	21-9	Note b	8-3	12-11	17-1	21-0	24-4
	Spruce-pine-fir	#1	8-1	12-8	16-7	20-3	23-6	7-9	11-4	14-4	17-7	20-4
	Spruce-pine-fir	#2	8-1	12-8	16-7	20-3	23-6	7-9	11-4	14-4	17-7	20-4
	Spruce-pine-fir	#3	6-9	9-11	12-7	15-4	17-9	5-10	8-7	10-10	13-3	15-5

(continued)

TABLE R802.5.1(2)—continued
RAFTER SPANS FOR COMMON LUMBER SPECIES
 (Roof live load=20 psf, ceiling attached to rafters, L/Δ = 240)

RAFTER SPACING (inches)	SPECIES AND GRADE	DEAD LOAD = 10 psf					DEAD LOAD = 20 psf					
		2 x 4	2 x 6	2 x 8	2 x 10	2 x 12	2 x 4	2 x 6	2 x 8	2 x 10	2 x 12	
		Maximum rafter spans*										
		(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	(feet - inches)	
24	Douglas fir-larch	SS	8-3	13-0	17-2	21-10	Note b	8-3	13-0	16-7	20-3	23-5
	Douglas fir-larch	#1	8-0	12-6	15-10	19-5	22-6	7-5	10-10	13-9	16-9	19-6
	Douglas fir-larch	#2	7-10	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Douglas fir-larch	#3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9
	Hem-fir	SS	7-10	12-3	16-2	20-8	25-1	7-10	12-3	16-2	19-10	23-0
	Hem-fir	#1	7-8	12-0	15-6	18-11	21-11	7-3	10-7	13-5	16-4	19-0
	Hem-fir	#2	7-3	11-5	14-8	17-10	20-9	6-10	10-0	12-8	15-6	17-11
	Hem-fir	#3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9
	Southern pine	SS	8-1	12-9	16-10	21-6	Note b	8-1	12-9	16-10	21-6	Note b
	Southern pine	#1	8-0	12-6	16-6	21-1	25-2	8-0	12-3	15-4	18-3	21-9
	Southern pine	#2	7-10	12-3	15-10	18-11	22-2	7-5	10-8	13-9	16-5	19-3
	Southern pine	#3	6-5	9-6	12-1	14-4	17-1	5-7	8-3	10-6	12-5	14-9
	Spruce-pine-fir	SS	7-8	12-0	15-10	20-2	24-7	7-8	12-0	15-4	18-9	21-9
	Spruce-pine-fir	#1	7-6	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir	#2	7-6	11-9	14-10	18-2	21-0	6-11	10-2	12-10	15-8	18-3
	Spruce-pine-fir	#3	6-1	8-10	11-3	13-8	15-11	5-3	7-8	9-9	11-10	13-9

Check sources for availability of lumber in lengths greater than 20 feet.

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

a. The tabulated rafter spans assume that ceiling joists are located at the bottom of the attic space or that some other method of resisting the outward push of the rafters on the bearing walls, such as rafter ties, is provided at that location. When ceiling joists or rafter ties are located higher in the attic space, the rafter spans shall be multiplied by the factors given below:

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where:

H_C = Height of ceiling joists or rafter ties measured vertically above the top of the rafter support walls.

H_R = Height of roof ridge measured vertically above the top of the rafter support walls.

b. Span exceeds 26 feet in length.