

WALL CONSTRUCTION

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

ITEM	DESCRIPTION OF BUILDING ELEMENTS	NUMBER AND TYPE OF FASTENER <sup>a,b,c</sup>	SPACING OF FASTENERS
<b>Roof</b>			
1	Blocking between joists or rafters to top plate, toe nail	3-8d (2 1/2" x 0.113")	—
2	Ceiling joists to plate, toe nail	3-8d (2 1/2" x 0.113")	—
3	Ceiling joists not attached to parallel rafter, laps over partitions, face nail	3-10d	—
4	Collar tie to rafter, face nail or 1 1/4" x 20 gage ridge strap	3-10d (3" x 0.128")	—
5	Rafter or roof truss to plate, toe nail	3-16d box nails (3 1/2" x 0.135") or 3-10d common nails (3" x 0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss <sup>d</sup>
6	Roof rafters to ridge, valley or hip rafters: toe nail face nail	4-16d (3 1/2" x 0.135") 3-16d (3 1/2" x 0.135")	—
<b>Wall</b>			
7	Built-up studs-face nail	10d (3" x 0.128")	24" o.c.
8	Abutting studs at intersecting wall corners, face nail	16d (3 1/2" x 0.135")	12" o.c.
9	Built-up header, two pieces with 1/2" spacer	16d (3 1/2" x 0.135")	16" o.c. along each edge
10	Continued header, two pieces	16d (3 1/2" x 0.135")	16" o.c. along each edge
11	Continuous header to stud, toe nail	4-8d (2 1/2" x 0.113")	—
12	Double studs, face nail	10d (3" x 0.128")	24" o.c.
13	Double top plates, face nail	10d (3" x 0.128")	24" o.c.
14	Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d (3 1/2" x 0.135")	—
15	Sole plate to joist or blocking, face nail	16d (3 1/2" x 0.135")	16" o.c.
16	Sole plate to joist or blocking at braced wall panels	3-16d (3 1/2" x 0.135")	16" o.c.
17	Stud to sole plate, toe nail	3-8d (2 1/2" x 0.113") or 2-16d (3 1/2" x 0.135")	—
18	Top or sole plate to stud, end nail	2-16d (3 1/2" x 0.135")	—
19	Top plates, laps at corners and intersections, face nail	2-10d (3" x 0.128")	—
20	1" brace to each stud and plate, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 3/4"	—
21	1" x 6" sheathing to each bearing, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 3/4"	—
22	1" x 8" sheathing to each bearing, face nail	2-8d (2 1/2" x 0.113") 3 staples 1 3/4"	—
23	Wider than 1" x 8" sheathing to each bearing, face nail	3-8d (2 1/2" x 0.113") 4 staples 1 3/4"	—
<b>Floor</b>			
24	Joist to sill or girder, toe nail	3-8d (2 1/2" x 0.113")	—
25	Rim joist to top plate, toe nail (roof applications also)	8d (2 1/2" x 0.113")	6" o.c.
26	Rim joist or blocking to sill plate, toe nail	8d (2 1/2" x 0.113")	6" o.c.
27	1" x 6" subfloor or less to each joist, face nail	2-8d (2 1/2" x 0.113") 2 staples 1 3/4"	—
28	2" subfloor to joist or girder, blind and face nail	2-16d (3 1/2" x 0.135")	—
29	2" planks (plank & beam - floor & roof)	2-16d (3 1/2" x 0.135")	at each bearing
30	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.
31	Ledger strip supporting joists or rafters	3-16d (3 1/2" x 0.135")	At each joist or rafter

(continued)

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

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER <sup>b, c, e</sup>	SPACING OF FASTENERS	
			Edges (inches) <sup>f</sup>	Intermediate supports <sup>c, g</sup> (inches)
<b>Wood structural panels, subfloor, roof and interior wall sheathing to framing and particleboard wall sheathing to framing</b>				
32	$\frac{3}{8}$ " - $\frac{1}{2}$ "	6d common (2" × 0.113") nail (subfloor wall) <sup>l</sup> 8d common (2½" × 0.131") nail (roof) <sup>l</sup>	6	12 <sup>g</sup>
33	$\frac{19}{32}$ " - 1"	8d common nail (2½" × 0.131")	6	12 <sup>g</sup>
34	1½" - 1¼"	10d common (3" × 0.148") nail or 8d (2½" × 0.131") deformed nail	6	12
<b>Other wall sheathing<sup>h</sup></b>				
35	½" structural cellulosic fiberboard sheathing	½" galvanized roofing nail, ⅞" crown or 1" crown staple 16 ga., 1¼" long	3	6
36	$\frac{25}{32}$ " structural cellulosic fiberboard sheathing	¾" galvanized roofing nail, ⅞" crown or 1" crown staple 16 ga., 1½" long	3	6
37	½" gypsum sheathing <sup>d</sup>	1½" galvanized roofing nail; staple galvanized, 1½" long; 1¼" screws, Type W or S	7	7
38	$\frac{5}{8}$ " gypsum sheathing <sup>d</sup>	¾" galvanized roofing nail; staple galvanized, 1⅝" long; ⅝" screws, Type W or S	7	7
<b>Wood structural panels, combination subfloor underlayment to framing</b>				
39	$\frac{3}{4}$ " and less	6d deformed (2" × 0.120") nail or 8d common (2½" × 0.131") nail	6	12
40	$\frac{7}{8}$ " - 1"	8d common (2½" × 0.131") nail or 8d deformed (2½" × 0.120") nail	6	12
41	1½" - 1¼"	10d common (3" × 0.148") nail or 8d deformed (2½" × 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; 1 Ksi = 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 ⅞-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 (2½" × 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 1396 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.
- j. Where a rafter is fastened to an adjacent parallel ceiling joist in accordance with this schedule, provide two toe nails on one side of the rafter and toe nails from the ceiling joist to top plate in accordance with this schedule. The toe nail on the opposite side of the rafter shall not be required.

WALL CONSTRUCTION

TABLE R602.3(2)  
ALTERNATE ATTACHMENTS TO TABLE R602.3(1)

NOMINAL MATERIAL THICKNESS (inches)	DESCRIPTION <sup>a,b</sup> OF FASTENER AND LENGTH (inches)	SPACING <sup>c</sup> OF FASTENERS	
		Edges (inches)	Intermediate supports (inches)
<b>Wood structural panels subfloor, roof<sup>a</sup> and wall sheathing to framing and particleboard wall sheathing to framing<sup>f</sup></b>			
Up to 1/2	Staple 15 ga. 1 3/4	4	8
	0.097 - 0.099 Nail 2 1/4	3	6
	Staple 16 ga. 1 3/4	3	6
19/32 and 5/8	0.113 Nail 2	3	6
	Staple 15 and 16 ga. 2	4	8
	0.097 - 0.099 Nail 2 1/4	4	8
23/32 and 3/4	Staple 14 ga. 2	4	8
	Staple 15 ga. 1 3/4	3	6
	0.097 - 0.099 Nail 2 1/4	4	8
	Staple 16 ga. 2	4	8
1	Staple 14 ga. 2 1/4	4	8
	0.113 Nail 2 1/4	3	6
	Staple 15 ga. 2 1/4	4	8
	0.097 - 0.099 Nail 2 1/2	4	8
NOMINAL MATERIAL THICKNESS (inches)	DESCRIPTION <sup>a,b</sup> OF FASTENER AND LENGTH (inches)	SPACING <sup>c</sup> OF FASTENERS	
		Edges (inches)	Body of panel <sup>d</sup> (inches)
<b>Floor underlayment; plywood-hardboard-particleboard<sup>f</sup></b>			
<b>Plywood</b>			
1/4 and 5/16	1 1/4 ring or screw shank nail-minimum 12 1/2 ga. (0.099") shank diameter	3	6
	Staple 18 ga., 7/8, 3/16 crown width	2	5
11/32, 3/8, 15/32, and 1/2	1 1/4 ring or screw shank nail-minimum 12 1/2 ga. (0.099") shank diameter	6	8 <sup>e</sup>
19/32, 5/8, 23/32 and 3/4	1 1/2 ring or screw shank nail-minimum 12 1/2 ga. (0.099") shank diameter	6	8
	Staple 16 ga. 1 1/2	6	8
<b>Hardboard<sup>f</sup></b>			
0.200	1 1/2 long ring-grooved underlayment nail	6	6
	4d cement-coated sinker nail	6	6
	Staple 18 ga., 7/8 long (plastic coated)	3	6
<b>Particleboard</b>			
1/4	4d ring-grooved underlayment nail	3	6
	Staple 18 ga., 7/8 long, 3/16 crown	3	6
3/8	6d ring-grooved underlayment nail	6	10
	Staple 16 ga., 1 1/8 long, 3/8 crown	3	6
1/2, 5/8	6d ring-grooved underlayment nail	6	10
	Staple 16 ga., 1 5/8 long, 3/8 crown	3	6

For SI: 1 inch = 25.4 mm.

a. Nail is a general description and may be T-head, modified round head or round head.

b. Staples shall have a minimum crown width of 7/16-inch on diameter except as noted.

c. Nails or staples shall be spaced at not more than 6 inches on center at all supports where spans are 48 inches or greater. Nails or staples shall be spaced at not more than 12 inches on center at intermediate supports for floors.

d. Fasteners shall be placed in a grid pattern throughout the body of the panel.

e. For 5-ply panels, intermediate nails shall be spaced not more than 12 inches on center each way.

f. Hardboard underlayment shall conform to CPA/ANSI A135.4

g. Specified alternate attachments for roof sheathing shall be permitted for windspeeds less than 100 mph. Fasteners attaching wood structural panel roof sheathing to gable end wall framing shall be installed using the spacing listed for panel edges.

**TABLE R602.3(3)**  
**REQUIREMENTS FOR WOOD STRUCTURAL PANEL WALL SHEATHING USED TO RESIST WIND PRESSURES<sup>a, b, c</sup>**

MINIMUM NAIL		MINIMUM WOOD STRUCTURAL PANEL SPAN RATING	MINIMUM NOMINAL PANEL THICKNESS (inches)	MAXIMUM WALL STUD SPACING (inches)	PANEL NAIL SPACING		MAXIMUM WIND SPEED (mph)		
Size	Penetration (inches)				Edges (inches o.c.)	Field (inches o.c.)	Wind exposure category		
							B	C	D
6d Common (2.0" x 0.113")	1.5	24/0	3/8	16	6	12	110	90	85
8d Common (2.5" x 0.131")	1.75	24/16	7/16	16	6	12	130	110	105
				24	6	12	110	90	85

For SI: 1 inch = 25.4 mm, 1 mile per hour = 0.447 m/s.

- a. Panel strength axis parallel or perpendicular to supports. Three-ply plywood sheathing with studs spaced more than 16 inches on center shall be applied with panel strength axis perpendicular to supports.
- b. Table is based on wind pressures acting toward and away from building surfaces per Section R301.2. Lateral bracing requirements shall be in accordance with Section R602.10.
- c. Wood structural panels with span ratings of Wall-16 or Wall-24 shall be permitted as an alternate to panels with a 24/0 span rating. Plywood siding rated 16 o.c. or 24 o.c. shall be permitted as an alternate to panels with a 24/16 span rating. Wall-16 and Plywood siding 16 o.c. shall be used with studs spaced a maximum of 16 inches on center.




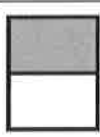
**TABLE R602.3(4)**  
**ALLOWABLE SPANS FOR PARTICLEBOARD WALL SHEATHING<sup>a</sup>**

THICKNESS (inch)	GRADE	STUD SPACING (inches)	
		When siding is nailed to studs	When siding is nailed to sheathing
3/8	M-1 Exterior glue	16	—
1/2	M-2 Exterior glue	16	16

For SI: 1 inch = 25.4 mm.

- a. Wall sheathing not exposed to the weather. If the panels are applied horizontally, the end joints of the panel shall be offset so that four panels corners will not meet. All panel edges must be supported. Leave a 1/16-inch gap between panels and nail no closer than 3/8 inch from panel edges.

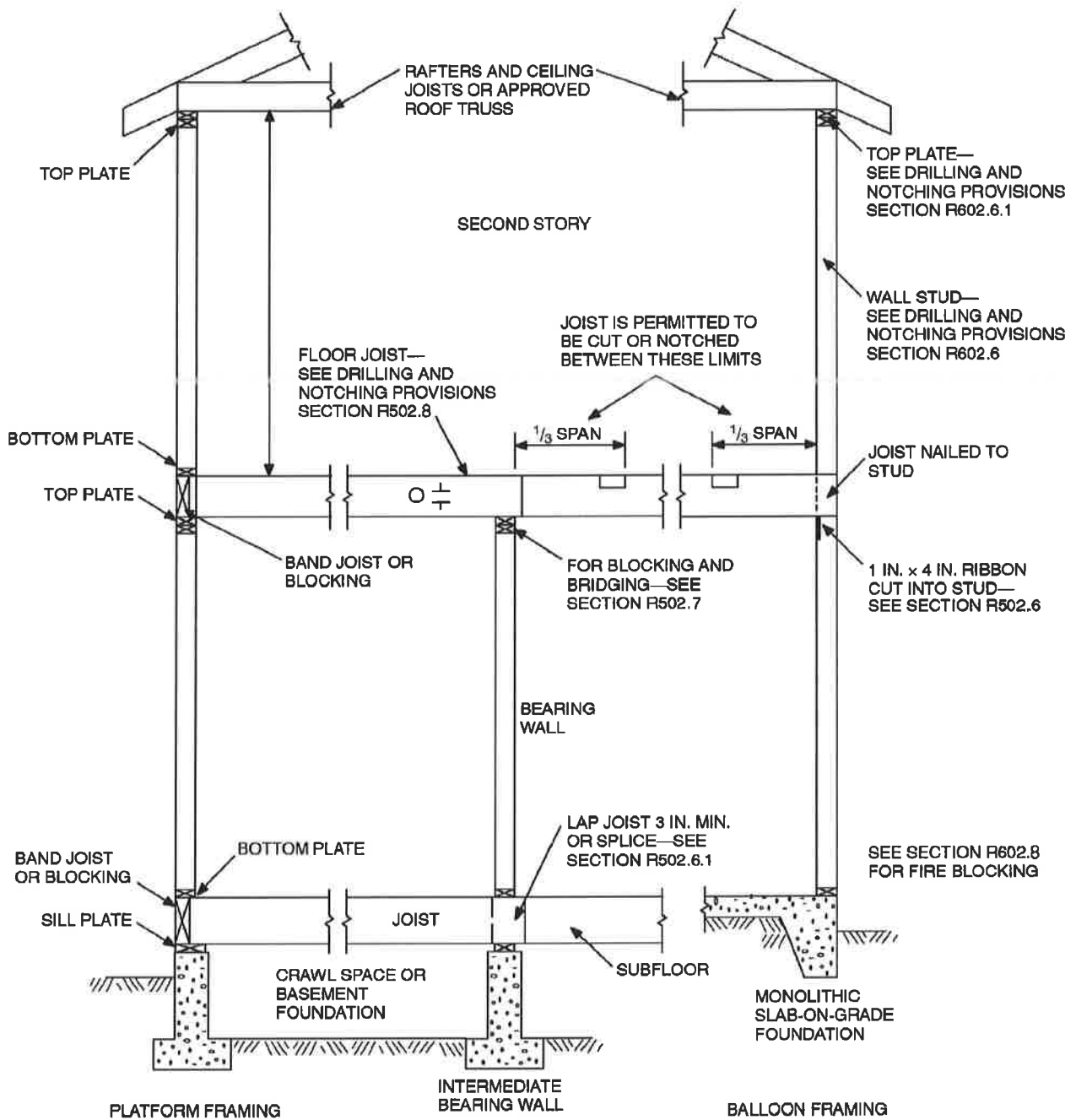
**TABLE R602.3(5)**  
**SIZE, HEIGHT AND SPACING OF WOOD STUDS<sup>a</sup>**

STUD SIZE (inches)	BEARING WALLS					NONBEARING WALLS	
	Laterally unsupported stud height <sup>a</sup> (feet)	Maximum spacing when supporting a roof-ceiling assembly or a habitable attic assembly, only (inches)	Maximum spacing when supporting one floor, plus a roof-ceiling assembly or a habitable attic assembly (inches)	Maximum spacing when supporting two floors, plus a roof-ceiling assembly or a habitable attic assembly (inches)	Maximum spacing when supporting one floor height <sup>a</sup> (feet)	Laterally unsupported stud height <sup>a</sup> (feet)	Maximum spacing (inches)
							
2 x 3 <sup>b</sup>	—	—	—	—	—	10	16
2 x 4	10	24 <sup>c</sup>	16 <sup>c</sup>	—	24	14	24
3 x 4	10	24	24	16	24	14	24
2 x 5	10	24	24	—	24	16	24
2 x 6	10	24	24	16	24	20	24

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 square foot = 0.093 m<sup>2</sup>.

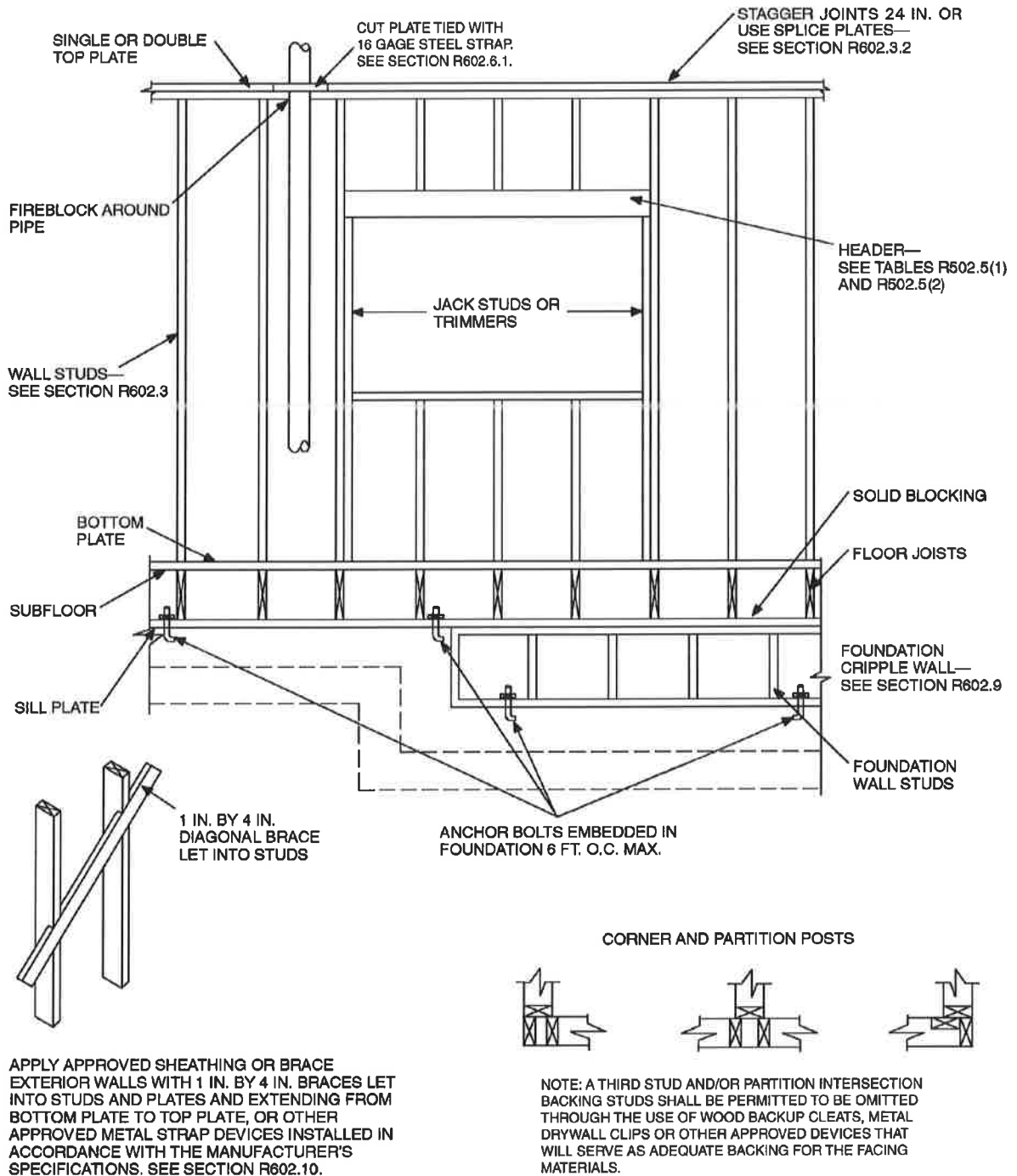
- a. Listed heights are distances between points of lateral support placed perpendicular to the plane of the wall. Increases in unsupported height are permitted where justified by analysis.
- b. Shall not be used in exterior walls.
- c. A habitable attic assembly supported by 2 x 4 studs is limited to a roof span of 32 feet. Where the roof span exceeds 32 feet, the wall studs shall be increased to 2 x 6 or the studs shall be designed in accordance with accepted engineering practice.

WALL CONSTRUCTION



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

FIGURE R602.3(1)  
TYPICAL WALL, FLOOR AND ROOF FRAMING



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

FIGURE R602.3(2)  
FRAMING DETAILS