

EXTERIOR WALL FASTENER SCHEDULE

REVISION DATE: JANUARY 2017

Design and construction (2012 IRC Section R602.3): Exterior walls of wood frame construction shall be designed and constructed in accordance with the provisions of this chapter and **Figures R602.3(1) and R602.3(2)** or in accordance with American Forest & Paper Association’s National Design Standard. Components of exterior walls shall be fastened in accordance with **Tables R602.3(1) through R602.3(4)**. Wall sheathing shall be fastened directly to framing members and, when placed on the exterior side of an exterior wall, shall be capable of resisting the wind pressures listed in Table R301.2(2) adjusted for height and exposure using Table R301.2(3). Wood structural panel sheathing used for exterior walls shall conform to DOC PS 1, DOC PS 2 or, when manufactured in Canada, CSA O437 or CSA O325. All panels shall be identified for grade, bond classification, and Performance Category by a grade mark or certificate of inspection issued by an approved agency and shall conform to the requirements of Table R602.3(3). Wall sheathing used only for exterior wall covering purposes shall comply with Section R703.

Studs shall be continuous from support at the sole plate to a support at the top plate to resist loads perpendicular to the wall. The support shall be a foundation or floor, ceiling or roof diaphragm or shall be designed in accordance with accepted engineering practice.

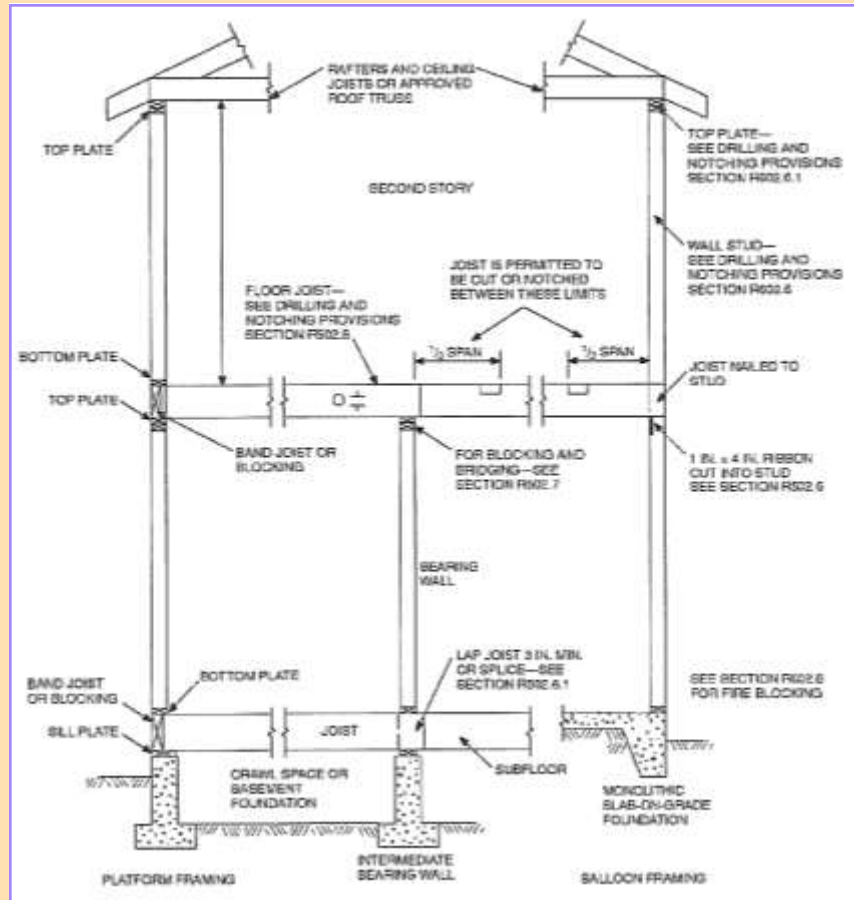


Figure R602.3(1) - Typical Wall, Floor and Roof Framing

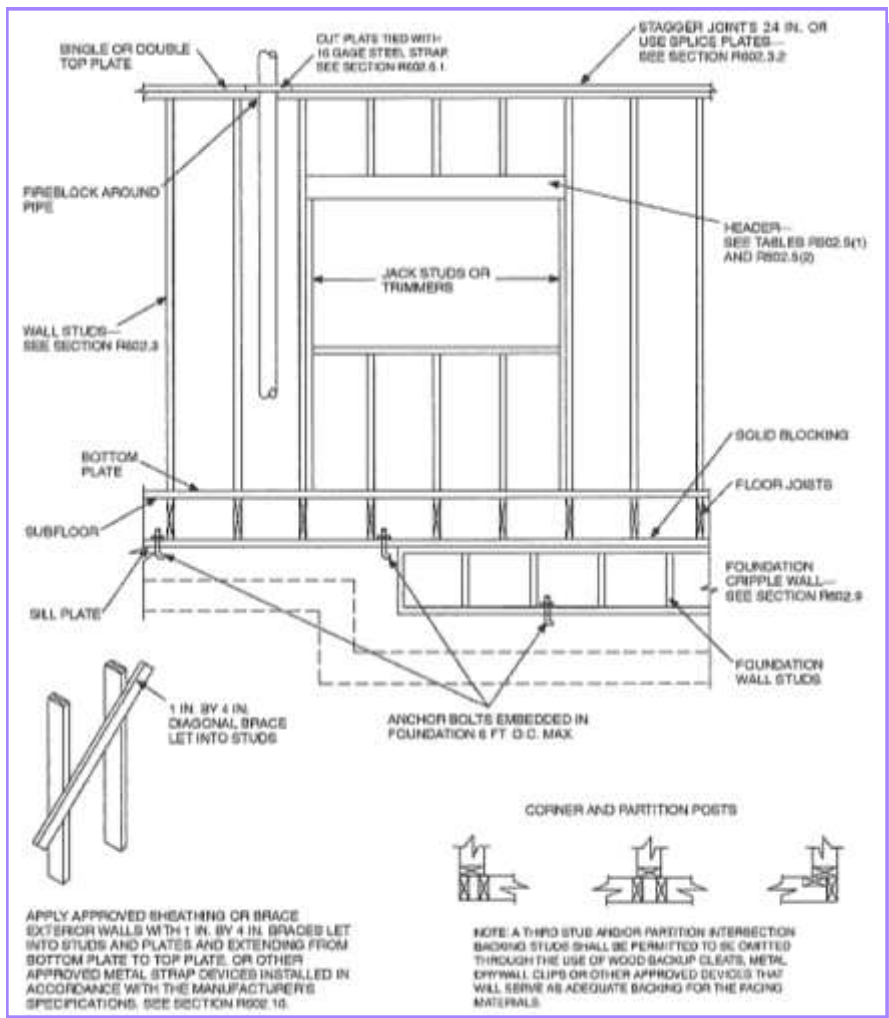


Figure R602.3(2) - Framing Details

Figures R602.3(1) and (2) in conjunction with the minimum nailing requirements of Table R602.3(1) and (2) provide typical wall framing details for construction of exterior walls.

All exterior wall coverings must be capable of resisting the wind pressures of 90 mph.



Table R602.3 (1) - Fastener Schedule for Structural Members		
Description of Building Elements	Number and Type of Fastener ^{a,b,c}	Spacing of Fasteners
ROOF		
Blocking between joists or rafters to top plate, toe nail	3-8d (2 ¹ / ₂ " x 0.113")	---
Ceiling joists to plate, toe nail	3-8d (2 ¹ / ₂ " x 0.113")	---
Ceiling joists not attached to parallel rafter, laps over partitions, face nail	3-10d (3" x 0.128")	---
Collar tie to rafter, face nail or 1 ¹ / ₄ x 20 gauge ridge strap	3-10d (3" x 0.128")	---
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 ¹
Roof rafters to ridge, valley or hip rafters, toe nail or face nail	4-16d (3 ¹ / ₂ " x 0.135") 3-16d (3 ¹ / ₂ " x 0.135")	---
WALL		
Built-up studs, face nail	10d (3" x 0.128")	24" O.C.
Abutting studs at intersecting wall corners, face nail	16d (3 ¹ / ₂ " x 0.135")	12" O.C.
Built-up header, two pieces with ¹ / ₈ " spacer	16d" x 0.135")	16" O.C. along each edge
Continuous header, two pieces	16d" x 0.135")	16" O.C. along each edge
Continuous header to stud, toe nail	4-8d (2 ¹ / ₂ " x 0.113")	---
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.
Double top plates, minimum 24" offset of end joints, face nail in lapped area	8-16d (3 ¹ / ₂ " x 0.135")	---
Sole plate to joist or blocking, face nail	16d" x 0.135")	16" O.C.
Sole plate to joist or blocking at braced wall panels	3-16d (3 ¹ / ₂ " x 0.135")	16" O.C.
Stud to sole plate, toe nail	3-8d (2 ¹ / ₂ " x 0.113") or 2-16d (3 ¹ / ₂ " x 0.135")	---
Top or sole plate to stud, end nail	2-16d (3 ¹ / ₂ " x 0.135")	---
Top plates, laps at corners and intersections, face nail	2-10d (3" x 0.128")	---
1" brace to each stud and plate, end 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 "	---
FLOOR		
Joist to sill or girder, toe nail	3-8d (2 ¹ / ₂ " x 0.113")	---
Rim joist to top plate, toe nail (roof applications also)	8d (2 ¹ / ₂ " x 0.113")	6" O.C.
Rim joist or blocking to sill plate, toe nail	8d (2 ¹ / ₂ " x 0.113")	6" O.C.
1 x 6" subfloor or less to each joist, toe 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")	---
2" planks (plank and beam – floor & roof)	2-16d (3 ¹ / ₂ " x 0.135")	At each bearing
Built-up girders and beams, 2" 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
Ledger strip supporting joists or rafters	3-16d (3 ¹ / ₂ " x 0.135")	At each joist or rafter

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DESCRIPTION OF BUILDING ELEMENTS	Description of Fastener ^{b,c,e}	Spacing of Fasteners	
		Edges (inches) ⁱ	Intermediate Supports ^{c,e} (inches)
WOOD STRUCTURAL PANELS, SUBFLOOR, ROOF AND INTERIOR WALL SHEATHING TO FRAMING AND PARTICLEBOARD WALL SHEATHING TO FRAMING			
$\frac{3}{8}$ " – $\frac{1}{2}$ "	6d common (2" x 0.113") nail (subfloor wall) ^j 8d common (2 $\frac{1}{2}$ " x 0.131") nail (roof) ^f	6	12 ^g
$\frac{19}{32}$ " – 1"	8d common nail (2 $\frac{1}{2}$ " x 0.113")	6	12 ^g
$1\frac{1}{8}$ " – $1\frac{1}{4}$ "	10d common (3" x 0.128") nail or 8d (2 $\frac{1}{2}$ " x 0.131") deformed nail	6	12
OTHER WALL SHEATHING^h			
$\frac{1}{2}$ " structural cellulosic fiberboard sheathing	$\frac{1}{2}$ " galvanized roofing nail, $\frac{7}{16}$ " crown or 1" crown staple 16 gauge, 1 $\frac{1}{4}$ " long	3	6
$\frac{25}{32}$ " structural cellulosic fiberboard sheathing	1 $\frac{3}{4}$ " galvanized roofing nail, $\frac{7}{16}$ " crown or 1" crown staple 16 gauge, 1 $\frac{1}{2}$ " long	3	6
$\frac{1}{2}$ " gypsum sheathing ^d	1 $\frac{1}{2}$ " galvanized roofing nail; staple galvanized, 1 $\frac{1}{2}$ " long; 1 $\frac{1}{4}$ " screws, type W or S	7	7
$\frac{5}{8}$ " gypsum sheathing ^d	1 $\frac{3}{4}$ " galvanized roofing nail; staple galvanized, 1 $\frac{5}{8}$ " long; 1 $\frac{5}{8}$ " screws, type W or S	7	7
WOOD STRUCTURAL PANELS, COMBINATION SUBFLOOR UNDERLAYMENT TO FRAMING			
$\frac{3}{4}$ " and less	6d deformed (2" x 0.120") nail or 8d common (2 $\frac{1}{2}$ " x 0.131") nail	6	12
$\frac{7}{8}$ " – 1"	8d common (2" x 0.120") nail or 8d deformed (2 $\frac{1}{2}$ " x 0.131") nail	6	12
$1\frac{1}{8}$ " – $1\frac{1}{4}$ "	10d common (3" x 0.148") nail or 8d deformed (2 $\frac{1}{2}$ " x 0.120") nail	6	12

- 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 gauge 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. 4 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 $\frac{1}{2}$ " x 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.

Table R602.3 (2) - Alternate Attachments to Table R602.3 (1)

Nominal Material Thickness (inches)	Description ^{a,b} of Fastener and Length (inches)	Spacing of Fasteners ^c	
		Edges (inches)	Intermediate Supports (inches)
WOOD STRUCTURAL PANELS SUBFLOOR, ROOF^g, AND WALL SHEATHING TO FRAMING AND PARTICLEBOARD WALL SHEATHING TO FRAMING^f			
Up to 1/2	Staple 15 gauge 1 3/4"	4	8
	0.097 – 0.099 Nail 2 1/4"	3	6
	Staple 16 gauge 1 3/4"	3	6
19/32 and 5/16	0.113 Nail 2"	3	6
	Staple 15 and 16 gauge 2"	4	8
	0.097 – 0.099 Nail 2 1/4"	4	8
23/32 and 3/4	Staple 14 gauge 2"	4	8
	Staple 15 gauge 1 3/4"	3	6
	0.097 – 0.099 Nail 2 1/4"	4	8
	Staple 16 gauge 2"	4	8
1	Staple 14 gauge 2 1/4"	4	8
	0.113 Nail 2 1/4"	3	6
	Staple 15 gauge 2 1/4"	4	8
	0.097 – 0.099 Nail 2 1/2"	4	8
FLOOR UNDERLAYMENT; PLYWOOD, HARDBOARD AND PARTICLEBOARD^f			
PLYWOOD			
1/4 and 5/16	1 1/4 ring or screw shank nail-minimum 12 1/2 gauge (0.099") shank diameter	3	6
	Staple 18 gauge, 7/16, 3/16 crown width	2	5
	1 1/4 ring or screw shank nail-minimum 12 1/2 gauge (0.099") shank diameter	6	8 ^e
11/32, 3/8, 15/32 and 1/2	1 1/2 ring or screw shank nail-minimum 12 1/2 gauge (0.099") shank diameter	6	8
	Staple 16 gauge 1 1/2	6	8
HARDBOARD^f			
0.200	1 1/2 long ring-grooved underlayment nail	6	6
	4d cement-coated sinker nail	6	6
	Staple 18 gauge, 7/8 long (plastic coated)	3	6
PARTICLEBOARD			
1/4	4d ring grooved underlayment nail	3	6
	Staple 18 gauge, 7/8 long, 3/16 crown	3	6
3/8	6d ring grooved underlayment nail	6	10
	Staple 16 gauge, 1 1/8 long, 3/8 crown	3	6
1/2, 5/8	6d ring grooved underlayment nail	6	10
	Staple 16 gauge, 1 5/8 long, 3/8 crown	3	6

- Nail is a general description and may be T-head, modified round head or round head.
- Staples shall have a minimum crown width of 7/16 inch on diameter except as noted.
- 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.
- Fasteners shall be placed in a grid pattern throughout the body of the panel.
- For 5-ply panels, intermediate nails shall be spaced not more than 12 inches on center each way.
- Hardboard underlayment shall conform to CPA/ANSI A135.4
- 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^{a, b, c}

Minimum Nail		Minimum Wood Structural Panel Span Rating	Minimum Nominal Panel Thickness	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	1.5	24/0	3/8	16	6	12	110	90	85
8d Common	1.75	24/16	7/16	16	6	12	130	110	105
				24	6	12	110	90	85

- 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 24/6 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^a

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

- a. Wall sheathing not exposed to 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.

CITY OF REPUBLIC

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The City of Republic is located in Greene County in the southwest corner of the State of Missouri approximately ten miles from the City of Springfield, forty-five miles from Branson, and within a two-hour drive to the states of Oklahoma, Kansas, and Arkansas.

Republic began its existence in 1871 and soon thrived due in large part to the Frisco Railroad, which ran through town. Early accounts of the City indicate the existence of grain elevators within the City, a blacksmith shop and livery stable, as well as a tomato factory and cheese factory. A flourmill was built in 1890 and soon became the largest in the Middle West and carried the slogan "The World is our Field." It is unknown how the City achieved the name "Republic" but it is believed the first postmaster may have named the town. During 1904 and 1905, iron ore was mined and shipped from Republic's limekiln located south of town. Due to the fertile, gentle rolling land of this area, Republic became known as one of the major fruit producers in the Midwest, producing apples, peaches, grapes, strawberries, and tomatoes. As was common in southwest Missouri, many early citizens worked as strawberry pickers and shipped the fruit by railcar every season.

The City of Republic is fortunate to have a broad economic base. The City has several retail shops, grocery stores, factories, etc. Republic is a great place for locating a business due to the strong residential base, which provides a large pool of qualified, available work force. Republic is a pleasant place to work without the difficulties of traffic jams and limited parking. The City has no earnings tax and has ample quality office and retail space available. The City's close proximity to Springfield makes it desirable for many.

The City of Republic has an excellent school system that believes all students should be able to manage change, become lifelong learners, and participate in the democratic process. The City has been fortunate enough to strive toward a progressive future while at the same time keeping some of its traditional characteristics. While the City has seen extensive growth over the last few years, city officials are anticipating a steady, continued increase in its development.

COMMUNITY DEVELOPMENT DEPARTMENT

