



# Minimum Residential Wood Construction Specifications

These are minimum specifications established by the California Building Code and do not supersede any more restrictive specifications shown on the approved plans. Code sections listed below refer to the 2013 edition of the California Residential Code (CRC), as adopted by the City of Vista.

## I FOUNDATION AND UNDERFLOOR

1. **Concrete Strength.** Concrete for footing must have a minimum compressive strength of 2500 PSI at 28 days [CRC Table R402.2]
2. **Wood Supported by Exterior Foundation Walls.** Wood framing members, including wood sheathing, that rest on exterior foundation walls and are less than 8 inches (203 mm) from exposed earth shall be of naturally durable or preservative-treated wood. [CRC R317]
3. **Concrete Slabs.** Slabs on grade must be at least 3 ½" thick. [CBC Section 1907] Provide a 6 mm vapor barrier over 4" of ½" or larger aggregate. CGBSC 4.505
4. **Treated Wood.** All foundation plates or sills and sleepers or concrete or masonry which is in direct contact with earth must be pressure-treated wood conforming to requirements of the applicable AWWPA Standard U1 and M4. Wood joists closer than 18" or wood girders or supports closer than 12" to the ground, must be pressure treated. [CRC R317]
5. **Foundation Plates or Sills.** Wood plates or sills shall be bolted to the foundation or foundation wall. Steel bolts with a minimum nominal diameter of ½ inch (16mm) shall be used in Seismic Design Category D. Bolts shall be embedded at least 7 inches (178 mm) into the concrete and shall be spaced not more than 6 feet (1829 mm) apart. There shall be a minimum of two bolts per piece with one bolt located not more than 12 inches (305 mm) or less than 4 inches from each end of the piece. A properly sized nut and a 3" square, .299" thick washer shall be tightened on each bolt to the plate. Foundation plates and sills shall be the kind of wood specified in section CRC R403.1.6.
6. **Underfloor Ventilation.** Underfloor areas shall be ventilated by an approved mechanical means or by openings into the underfloor area walls. Such openings shall have a net area of not less than 1 square foot for each 150 square feet (0.067) m<sup>2</sup> for each 10 m<sup>2</sup>) of under floor area. Openings shall be located within 3' of corners and shall provide cross ventilation. The required area of such openings shall be approximately equally distributed along the length of at least two opposite sides. They shall be covered with corrosion resistant wire mesh openings of 1/8 inch (3.2mm) in dimension. [CRC R408.1]

7. **Underfloor Access.** Underfloor areas must be provided with an unobstructed crawl hole not less than 18" x 24". Openings must be effectively screened or covered. [CRC R408.4]

## II. WOOD FRAMING

1. **Lumber.** All joists, rafters, beams, and posts 2" to 4" thick must be No. 3 Grade Douglas Fir-Larch or better. All posts and beams 5" and thicker must be No. 1 Grade Douglas Fir-Larch or better.
2. **Wall Bracing.** Every exterior wood stud wall and main cross partitions must be braced at each end and at least at every 25 feet of length in accordance with CRC R602.10.1 and Table R602.10.1.3.
3. **Lateral Support.** Floor joists more than 10" in depth and spanning more than 8 feet must be supported laterally by bridging or solid blocking at intervals not exceeding 8 feet [CRC R502.7.1]
4. **Blocking.** Provide blocking at ends and at supports of floor joists and for rafters at exterior walls. [CRC R502.7]
5. **Roof Blocking.** Provide 2" full depth solid blocking at ridge line and at exterior walls on trussed roofs and where rafters / ceiling joists exceed 5:1 ratio add bridging if 12" deep at 8'oc. CRC R802.8
6. **Double Joists.** Floor joists must be doubled under bearing partitions running parallel with the joists. [CBC Section 2308.8.4]
7. **Rafter Purlin Braces.** Purlin braces shall be not less than 45 degrees to the horizontal. CRC R802.5.1
8. **Rafter Ties.** Rafter ties must be spaced not more than 4 feet on center where rafters and ceiling joists are not parallel. CRC 802.3
9. **Clearance.** Provide ½" minimum clearance between top plate of interior nonbearing partitions and bottom chord of trusses.
10. **Top Plate.** Provide double top plate with minimum 24" lap splice with 8-16 d each side. Table R602.3.2 CRC
11. **Nailing.** Nailing will be in compliance with CRC Table R602.3.(1). A copy of this table is attached.
12. **Fire Stops.** Fire stops must be provided for walls at ceiling, floor levels and concealed spaces at 10' o.c. horizontally. CRC R302.11

13. **Studs.** In one or two story buildings, studs for exterior walls and interior bearing walls must be not less than 2' x 4" at 16" o.c. Studs for interior non bearing partitions may be 2" x 3" at 16 o.c. Studs must be #2 "stud grade" Douglas Fir-larch or better. Studs for bearing walls must not exceed Table R602.3.1 CRC and Table 2308.9.1 CRC
14. **Laminated Wood.** An AITC Certificate of Conformance for glued laminated wood members must be given to the Building Inspector prior to their installation.

### III GENERAL MATERIAL SPECIFICATIONS

1. **Mortar Mix.** Mortar to be used for construction of masonry walls, foundation walls and retaining walls must be 1800 psi minimum type M or S and may consist of:
  - 1 part Portland Cement
  - 3 ½ parts sand
  - ¼ part hydrated lime or lime puttyPlastic cement may be used with 1 part plastic cement to 2 ¼ to 3 parts sand.
2. **Grout Mix.** The mix for the grout may be:
  - 1 part Portland Cement
  - 3 parts sand
  - 1/10 part hydrated lime or lime putty
  - 1 to 2 parts pea gravel (3/8" maximum)Water may be added to pouring consistency without segregation of grout constituents. The use of plastic cement is not allowed for grout. [CBC 2103.12]
3. **Masonry.** The masonry units must comply with ASTM Spec. C90 for hollow unit concrete blocks. [CBC Section 2103.1]
4. **Reinforcing Steel.** The reinforcing steel used in construction of reinforced masonry or concrete structures must be deformed and comply with ASTM Spec. A615, Grade 40. [CRC Section R404.1.2.3.7]
5. **Structural Steel.** Steel used as structural shapes such as wide flange sections, channels, plates and angles must comply with ASTM Specifications.

### IV. ROOFING AND WEATHERPROOFING

1. **Wood Siding.** All wood siding must be placed over an approved, weather resistive barrier. [R703 CRC]
2. **Flashing Around Openings.** Every opening in any exterior wall must be flashed with sheet metal or waterproof building paper. [CBC Section 1405.4]
3. **Roof Covering.** Composition shingle roofs must not be installed on a roof having a pitch of less than 4 inches to 12 inches with one layer of 15 sq. ft. felt. The shingles may be placed on a roof with a slope 2:12 if 2 layers of felt are used and the shingles

are sealed or self sealing. Tile roofs must not be installed on a roof having a pitch of less than 2 ½ inches to 12 inches. Mineral surfaced, built-up roofing must not be installed on a roof having a pitch of more than 3 inches to 12 inches. Wood roofs are not allowed

4. **Weep Screed.** A weep screed must be provided for all weather-exposed exterior stud walls finished on the exterior with stucco at the foundation plate line. The screed shall be a minimum 4" above grade or 2" above pavement. [R703.6.2.1 CRC]
5. **Basement Walls.** Basement foundation walls below grade must be damp-proofed on the outside. [R406 CRC]

## V. GENERAL

1. **Attic Access.** Attic areas shall provide a clear height of over 30" high and must be accessible by an opening not less than 20" x 30". With a furnace in the attic, the opening must not be less than 30" x 30" or 22" x 36". [CBC 1209.2]
2. **Attic Ventilation.** Attic ventilation shall be as per section. [CBC Section 1203]
3. **Shower Enclosures.** Shower walls must be finished to a height of 6' above the drain inlet with a smooth, hard, non-absorbent surface. R307 CRC
4. **Electric Meter Enclosure.** Contact San Diego Gas & Electric Company, customer Extension Planning Department for meter location. All wiring must comply with the 2013 California Electric Code.
6. **Smoke and Carbon Monoxide Detectors in New construction.** In new construction, required smoke detectors and carbon monoxide detectors shall receive their primary power from the building wiring when such wiring is served from a commercial source and shall be equipped with a battery backup. The detector shall emit a signal when the batteries are low. Wiring shall be permanent and without a disconnecting switch other than those required for over current protection. Smoke and carbon monoxide detectors may be solely battery operated when installed in existing buildings; or in buildings without commercial power; or in buildings which undergo alterations, repairs or additions regulated by CRC Section R314 / R315 CRC.

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 (2½" × 0.113")	—
2	Ceiling joists to plate, toe nail	3-8d (2½" × 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 1¼" × 20 gage ridge strap	3-10d (3" × 0.128")	—
5	Rafter or roof truss to plate, toe nail	3-16d box nails (3½" × 0.135") or 3-10d common nails (3" × 0.148")	2 toe nails on one side and 1 toe nail on opposite side of each rafter or truss <sup>1</sup>
6	Roof rafters to ridge, valley or hip rafters: toe nail face nail	4-16d (3½" × 0.135") 3-16d (3½" × 0.135")	—
<b>Wall</b>			
7	Built-up studs-face nail	10d (3" × 0.128")	24" o.c.
8	Abutting studs at intersecting wall corners, face nail	16d (3½" × 0.135")	12" o.c.
9	Built-up header, two pieces with ½" spacer	16d (3½" × 0.135")	16" o.c. along each edge
10	Continued header, two pieces	16d (3½" × 0.135")	16" o.c. along each edge
11	Continuous header to stud, toe nail	4-8d (2½" × 0.113")	—
12	Double studs, face nail	10d (3" × 0.128")	24" o.c.
13	Double top plates, face nail	10d (3" × 0.128")	24" o.c.
14	Double top plates, minimum 24-inch offset of end joints, face nail in lapped area	8-16d (3½" × 0.135")	—
15	Sole plate to joist or blocking, face nail	16d (3½" × 0.135")	16" o.c.
16	Sole plate to joist or blocking at braced wall panels	3-16d (3½" × 0.135")	16" o.c.
17	Stud to sole plate, toe nail	3-8d (2½" × 0.113") or 2-16d (3½" × 0.135")	—
18	Top or sole plate to stud, end nail	2-16d (3½" × 0.135")	—
19	Top plates, laps at corners and intersections, face nail	2-10d (3" × 0.128")	—
20	1" brace to each stud and plate, face nail	2-8d (2½" × 0.113") 2 staples 1¾"	—
21	1" × 6" sheathing to each bearing, face nail	2-8d (2½" × 0.113") 2 staples 1¾"	—
22	1" × 8" sheathing to each bearing, face nail	2-8d (2½" × 0.113") 3 staples 1¾"	—
23	Wider than 1" × 8" sheathing to each bearing, face nail	3-8d (2½" × 0.113") 4 staples 1¾"	—
<b>Floor</b>			
24	Joist to sill or girder, toe nail	3-8d (2½" × 0.113")	—
25	Rim joist to top plate, toe nail (roof applications also)	8d (2½" × 0.113")	6" o.c.
26	Rim joist or blocking to sill plate, toe nail	8d (2½" × 0.113")	6" o.c.
27	1" × 6" subfloor or less to each joist, face nail	2-8d (2½" × 0.113") 2 staples 1¾"	—
28	2" subfloor to joist or girder, blind and face nail	2-16d (3½" × 0.135")	—
29	2" planks (plank & beam - floor & roof)	2-16d (3½" × 0.135")	at each bearing
30	Built-up girders and beams, 2-inch lumber layers	10d (3" × 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 (3½" × 0.135")	At each joist or rafter

(continued)

WALL CONSTRUCTION

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

ITEM	DESCRIPTION OF BUILDING MATERIALS	DESCRIPTION OF FASTENER <sup>a, c, e</sup>	SPACING OF FASTENERS	
			Edges (inches) <sup>f</sup>	Intermediate supports <sup>a, 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" x 0.113") nail (subfloor, wall) <sup>j</sup> 8d common ( $2\frac{1}{2}$ " x 0.131") nail (roof) <sup>f</sup>	6	12 <sup>g</sup>
33	$\frac{19}{32}$ " - 1"	8d common nail ( $2\frac{1}{2}$ " x 0.131")	6	12 <sup>g</sup>
34	$1\frac{1}{8}$ " - $1\frac{1}{4}$ "	10d common (3" x 0.148") nail or 8d ( $2\frac{1}{2}$ " x 0.131") deformed nail	6	12
<b>Other wall sheathing<sup>h</sup></b>				
35	$\frac{1}{2}$ " structural cellulosic fiberboard sheathing	$1\frac{1}{2}$ " galvanized roofing nail, $\frac{7}{16}$ " crown or 1" crown staple 16 ga., $1\frac{1}{4}$ " long	3	6
36	$\frac{25}{32}$ " structural cellulosic fiberboard sheathing	$1\frac{3}{4}$ " galvanized roofing nail, $\frac{7}{16}$ " crown or 1" crown staple 16 ga., $1\frac{1}{2}$ " long	3	6
37	$\frac{1}{2}$ " gypsum sheathing <sup>d</sup>	$1\frac{1}{2}$ " galvanized roofing nail; staple galvanized, $1\frac{1}{2}$ " long; $1\frac{1}{4}$ " screws, Type W or S	7	7
38	$\frac{5}{8}$ " gypsum sheathing <sup>d</sup>	$1\frac{3}{4}$ " galvanized roofing nail; staple galvanized, $1\frac{5}{8}$ " long; $1\frac{5}{8}$ " screws, Type W or S	7	7
<b>Wood structural panels, combination subfloor underlayment to framing</b>				
39	$\frac{3}{4}$ " and less	6d deformed (2" x 0.120") nail or 8d common ( $2\frac{1}{2}$ " x 0.131") nail	6	12
40	$\frac{7}{8}$ " - 1"	8d common ( $2\frac{1}{2}$ " x 0.131") nail or 8d deformed ( $2\frac{1}{2}$ " x 0.120") nail	6	12
41	$1\frac{1}{8}$ " - $1\frac{1}{4}$ "	10d common (3" x 0.148") nail or 8d deformed ( $2\frac{1}{2}$ " x 0.120") nail	6	12

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  $\frac{7}{16}$ -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 ( $2\frac{1}{2}$ " 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.