



COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT

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Deck, Porch, Landing, Stair, and Guardrail Requirements

For One and Two Family Residences & Townhomes not exceeding 3 Stories

Purpose: To better serve the public, The County of Santa Cruz has simplified the permit requirements to construct or replace a deck. We have discontinued requiring building plans and plan check for these projects, and instead are now issuing “over the counter” permits with this handout to assist in the construction of your deck. The following information is for reference purposes only. More detailed information regarding the construction of decks can be found in the California Residential code. If you have questions regarding the construction and/or replacement of a deck, please consult your area building inspector.

Permits Required: Permits are required for all decks that are attached to a building, regardless of the height of the deck above grade, and unattached decks which are being used as a required landing at an exterior door. All decks over 18 inches above grade require a site plan and zoning review to determine setback requirements. Decks less than 30 inches above grade do not require building plans, however, construction must comply with all California Residential Code requirements and this handout. Decks greater than 30 inches above grade (at any point) require plans, decks 12 ft or more above grade require plans that have been stamped by a structural or civil engineer.

1. Deck Foundation Requirements.

- A. All footings shall bear on solid ground and shall be placed at least 12 inches below the undisturbed ground surface. (See Figure 1 and Table 1 for size and spacing.) Pre-manufactured post anchors shall be galvanized.

2. Deck Framing Requirements.

- A. Deck framing shall be positively anchored to the primary structure for both vertical and lateral loads. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. Where the positive connection to the primary structure cannot be provided, decks shall be self-supporting. Wood and wood based products exposed to weather must be protected from decay.

- B. The ledger shall be attached as set forth in CRC Table R502.2.2.1 with ½-inch minimum lag screws or bolts with washers, all hot-dip galvanized or stainless steel. Lag screws shall be placed 2" in from the bottom and top and 2"-5" from the ends of the deck ledger and shall be staggered. The tip of the lag screw shall fully extend beyond the inside face of the band joist. (See Figure 2 and Table 2.)
- C. Deck framing shall have positive tension tie connections with floor framing. Hold-down tension devices shall be installed in not less than 2 locations per deck, and each device shall have an allowable design capacity of not less than 1500 pounds. (See Figure 3.)
- D. Deck ledgers shall be flashed to prevent water from contacting the house band/rim joist.
- E. Deck ledger shall be a minimum 2x8 pressure treated No 2 (or better) grade lumber. (See Table 2, footnote 5.)
- F. The maximum distance between the face of the ledger and the face of the band joist shall not exceed 1 inch.
- G. Ledger connections not conforming to the above requirements shall be designed in accordance with accepted engineering practice.
- H. Deck framing (e.g., joists, beams, posts, decking etc.) shall be of approved naturally durable or pressure-preservative-treated wood.

3. Stairway Requirements

- A. Stairways shall not be less than 36 inches in clear width above the handrails. Handrail projections are limited to not more than 4.5 inches on either side of the stairway. (See Figure 5.)
- B. Headroom shall not be less than 6 feet 8 inches measured vertically from the sloped line adjoining the tread nosing's.
- C. Riser height shall not exceed 7¾ inches. The greatest riser height within any flight of stairs shall not exceed the smallest by more than 3/8". (See Figure 4.)
- D. Tread depth (measured between the nosing's) shall be at least 10 inches. The largest tread depth within any flight of stairs shall not exceed the smallest by more than 3/8". (See Figure 4.)
- E. Nosing's not less than 0.75" but not more than 1.25" shall be provided on stairways with solid risers if the tread depth is less than 11". The radius of curvature at the nosing shall be no greater than 9/16 inch. (See Figure 4.)

- F. Open risers are permitted, provided that the opening between treads does not permit the passage of a 4-inch diameter sphere. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches or less. (CRC Sec.R311.7.5.1). (See Figure 4.)

4. Handrail Requirements

- A. Handrails shall be provided on at least one side of each continuous flight of stair with four or more risers.
- B. The top of handrails shall be 34 to 38 inches above the tread nosing's
- C. Handrails shall be graspable and shall be of one of the following types:
 - i. Type I. Handrails with a circular cross-section of not less than 1-1/4" nor greater than 2" in diameter. If the handrail is not circular, it shall have a perimeter dimension of at least 4 inches and not greater than 6 1/4 inches with a maximum cross section dimension of 2 1/4 inches. Edges shall have a minimum radius of 0.01 inch. (See Figure 11&12.)
 - ii. Type II. Handrails with a perimeter greater than 6 1/4 inches shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of 3/4 inch measured vertically from the tallest portion of the profile and achieve a depth of at least 5/16 inch within 7/8 inches below the widest portion of the profile. This required depth shall continue for at least 3/8 inch to a level that is not less than 1-3/4 inches below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1-1/4 inches to a maximum of 2-3/4 inches. Edges shall have a minimum radius of 0.01 inch. (See Figure 11&12.)
- D. Handrails ends shall be returned or shall terminate in newel posts or safety terminals. Handrails adjacent to a wall shall have a space of not less than 1-1/2 inch between the wall and the handrails.

5. Guardrail Requirements

- A. Guards shall be located along open sides of decks, porches, landings, stairs that are located more than 30 inches (measured vertically to the floor or grade below) at any point within 36 inches horizontally to the edge of the open side. (See Figure 6.)
- B. Guards shall be not less than 42 inches high measured vertically above the walking surface, adjacent fixed seating, or the line connecting the leading edges of the treads. (See Figure 6.)

Exceptions:

- i. Guards on the open sides of stairs shall have a height not less than 34 inches measured vertically from a line connecting the leading edges of the treads.
- ii. Where the top of the guard also serves as a handrail on the open sides of stairs, the top of the guard shall not be less than 34 inches and not more than 38 inches measured vertically from a line connecting the leading edges of the treads. (See Figure 5.)

- C. Guards shall not have openings from the walking surface to the required guard height which allow passage of a sphere 4 inches in diameter.

Exceptions:

- i. The triangular openings at the open side of a stair, formed by the riser, tread and bottom rail of a guard, shall not allow passage of a sphere 6 inches in diameter. (See Figure 9.)
- ii. Guards on the open sides of stairs shall not have openings which allow passage of a sphere 4-3/8 inches in diameter.

- D. Guardrails and handrails shall be capable to withstand a single concentrated load of 200 lbs applied in any direction at any point along the top of the rail.

- E. Guardrail in-fill components, balusters and panel fillers shall be capable to withstand a horizontally applied normal load of 50 lbs on an area equal to 1 sq. ft. This load need not be assumed to act concurrently with any other live load requirement.

6. Landing Requirements:

- A. Exterior doors shall be provided with landings. The width of each landing shall be not less than the door served. Every landing shall have a minimum dimension of 36 inches measured in the direction of travel. Exterior landings are permitted to have a slope not exceeding $\frac{1}{4}$ unit vertical in 12 units horizontal (2%).
- B. Exterior landings at the required egress door shall not be more than 1½ inches lower than the top of the threshold for the out-swinging door and not more than 7¾ inches below the top of the threshold for the in-swinging door.
- C. Doors *other* than the required egress door shall be provided with landings not more than 7¾ inches below the top of the threshold

Exception: A landing is not required where a stairway of two or fewer risers is located on the exterior side of the door, provided the door does not swing over the stairway.

- D. Exterior doors and stairways shall be provided with an artificial light source located in the immediate vicinity of the top landing of the stairway. Lighting shall be controlled from inside the dwelling unit, unless the lighting is continuously illuminated or automatically controlled.

7. Special Requirements for decks built in Fire Hazard Severity Zones.

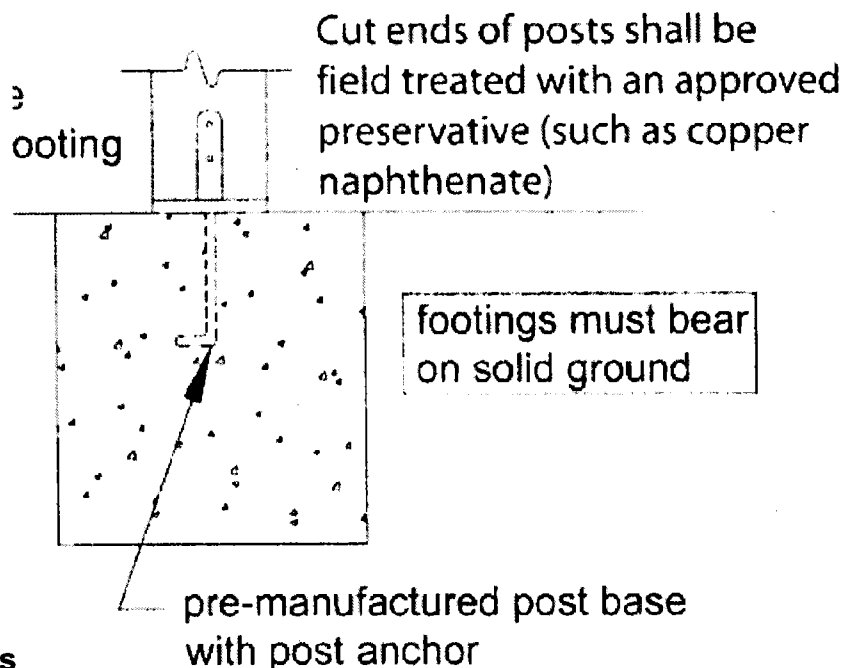
- A. All new decks or all decks repaired or replaced to homes built in a "Fire Hazard Severity Zone" within state responsibility areas or any Wildland-Urban Interface Fire Area shall comply with the requirements found in 2013 CBC, chapter 7A.

8. Smoke Detectors: When a permit is required for alterations, repairs or additions, smoke detectors shall be installed:

- (a) in each sleeping room, (b) outside each separate sleeping area in the immediate vicinity of the bedrooms, (c) on each story of the dwelling, including basements but not including crawl spaces and uninhabitable attics. (CRC Sec.R314).

9. Carbon Monoxide Alarms: When a permit is required for alterations, repairs or additions, existing dwellings that have attached garages or fuel burning appliances shall be provided with a carbon monoxide alarm in the following locations: (a) outside of the dwelling unit sleeping area in the immediate vicinity of the bedroom(s); (b) on every level of a dwelling unit including basements. (CRC Sec.R315).

Figure 1, Concrete



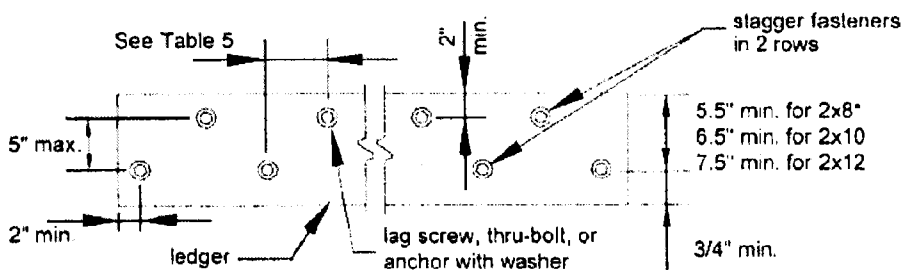
Footings

Table 1, Concrete Footings

Beam Span, L _B	Joist Span L _J	Round Footing Diameter	Square Footing Dimension	Footing Thickness ²
6'	<10'	15"	13"	6"
	<14'	17"	15"	6"
	<18'	20"	18"	7"
8'	<10'	17"	15"	6"
	<14'	20"	18"	8"
	<18'	23"	21"	9"
10'	<10'	19"	17"	7"
	<14'	22"	20"	9"
	<18'	25"	23"	10"
12'	<10'	21"	19"	8"
	<14'	24"	22"	10"
	<18'	28"	26"	11"
14'	<10'	22"	20"	9"
	<14'	26"	24"	11"
	<18'	30"	28"	12"
16'	<10'	24"	22"	9"
	<14'	28"	26"	12"
	<18'	32"	30"	13"
18'	<10'	25"	23"	10"
	<14'	30"	28"	12"
	<18'	34"	32"	14"

1. Assumes 1,500 psf soil bearing capacity.
2. Assumes 2,500 psi compressive strength of concrete.

Figure 2, Placement of Lag Screws in Ledgers



See Figure 14 for rim joist fastener spacing

*Distance can be reduced to 4.5" if lag screws are used or bolt spacing is reduced to that of lag screws to attach 2x8 ledgers to 2x8 band joists (1/2" stacked washers not permitted)

Table 2, Fastener Spacing in Deck Ledgers(Deck Live Load = 40 psf, Deck Dead Load = 10 psf)^{3,6}

Joist Span	Rim Board or Band Joist	6'-0" and less	6'-1" to 8'-0"	8'-1" to 10'-0"	10'-1" to 12'-0"	12'-1" to 14'-0"	14'-1" to 16'-0"	16'-1" to 18'-0"
Connection Details		On-Center Spacing of Fasteners^{4,5}						
$\frac{1}{2}$ " diameter lag screw with $\frac{15}{32}$ " maximum sheathing ¹	1" EWP ⁶	24"	18"	14"	12"	10"	9"	8"
	1- $\frac{1}{8}$ " EWP ⁶	28"	21"	16"	14"	12"	10"	9"
	1- $\frac{1}{2}$ " Lumber ^{7,9}	30"	23"	18"	15"	13"	11"	10"
$\frac{1}{2}$ " diameter bolt with $\frac{15}{32}$ " maximum sheathing	1" EWP ⁶	24"	18"	14"	12"	10"	9"	8"
	1- $\frac{1}{8}$ " EWP ⁶	28"	21"	16"	14"	12"	10"	9"
	1- $\frac{1}{2}$ " Lumber ^{7,9}	36"	36"	34"	29"	24"	21"	19"
$\frac{1}{2}$ " diameter bolt with $\frac{15}{32}$ " maximum sheathing and $\frac{1}{2}$ " stacked washers ^{2,8}	1" EWP ⁶	24"	18"	14"	12"	10"	9"	8"
	1- $\frac{1}{8}$ " EWP ⁶	28"	21"	16"	14"	12"	10"	9"
	1- $\frac{1}{2}$ " Lumber ^{7,9}	36"	36"	29"	24"	21"	18"	16"

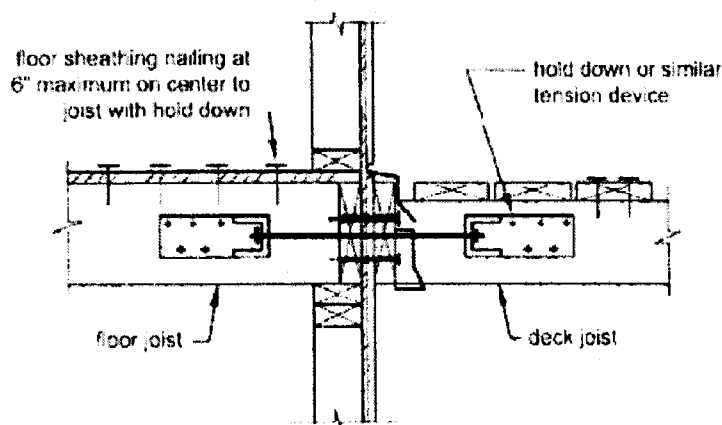
¹ The tip of the lag screw shall fully extend beyond the inside face of the band joist.² The maximum gap between the face of the ledger board and face of the wall sheathing shall be $\frac{1}{2}$ ".³ Ledgers shall be flashed or caulked to prevent water from contacting the house band joist (see Figures 14, 15, and 16).⁴ Lag screws and bolts shall be staggered per Figure 19.⁵ Deck ledgers shall be minimum 2x8 pressure-preservative-treated No.2 grade lumber, or other approved materials as established by standard engineering practice.⁶ When solid-sawn pressure-preservative-treated deck ledgers are attached to engineered wood products (minimum 1" thick wood structural panel band joist or structural composite lumber including laminated veneer lumber), the ledger attachment shall be designed in accordance with accepted engineering practice. Tabulated values based on 300 lbs and 350 lbs for 1" and 1- $\frac{1}{4}$ " EWP rim board, respectively.⁷ A minimum 1"x9 $\frac{1}{2}$ " Douglas fir-larch laminated veneer lumber rim board shall be permitted in lieu of the 2" nominal band joist.⁸ Wood structural panel sheathing, gypsum board sheathing, or foam sheathing not exceeding one inch thickness shall be permitted. The maximum distance between the face of the ledger board and the face of the band joist shall be one inch.⁹ Fastener spacing also applies to southern pine, Douglas fir-larch, and hem-fir band joists.**Figure 3, Hold down tension devices**

Table 3, Deck Joist Spans

Species	Size	Joist Spacing (o.c.)					
		Without Overhangs ¹			With Overhangs up to $L_j/4$ ²		
		12"	16"	24"	12"	16"	24"
Southern Pine	2x8	13' - 8"	12' - 5"	10' - 2"	10' - 9"	10' - 9"	10' - 2"
	2x10	17' - 5"	15' - 10"	13' - 1"	15' - 6"	15' - 6"	13' - 1"
	2x12	18' - 0"	18' - 0"	15' - 5"	18' - 0"	18' - 0"	15' - 5"
Douglas Fir- Larch, Hem-Fir, SPF ³	2x8	12' - 6"	11' - 1"	9' - 1"	9' - 5"	9' - 5"	9' - 1"
	2x10	15' - 8"	13' - 7"	11' - 1"	13' - 7"	13' - 7"	11' - 1"
	2x12	18' - 0"	15' - 9"	12' - 10"	18' - 0"	15' - 9"	12' - 10"
Redwood, Western Cedars, Ponderosa Pine ⁴ , Red Pine ⁴	2x8	11' - 8"	10' - 7"	8' - 8"	8' - 6"	8' - 6"	8' - 6"
	2x10	14' - 11"	13' - 0"	10' - 7"	12' - 3"	12' - 3"	10' - 7"
	2x12	17' - 5"	15' - 1"	12' - 4"	16' - 5"	15' - 1"	12' - 4"

1. Assumes 40 psf live load, 10 psf dead load, L/360 deflection, No. 2 grade, and wet service conditions.

See Figure 1B.

2. Assumes 40 psf live load, 10 psf dead load, L/180 cantilever deflection with 220 lb point load, No. 2 grade, and wet service conditions. See Figure 1A and Figure 2.

3. Incising assumed for refractory species including Douglas fir-larch, hem-fir, and spruce-pine-fir.

4. Design values based on northern species with no incising assumed.

Table 4, Girder Spans

Species	Size ⁴	Joist Spans (L_j) Less Than or Equal to:						
		6'	8'	10'	12'	14'	16'	18'
Southern Pine	2-2x6	7' - 1"	5' - 2"	5' - 6"	5' - 0"	4' - 8"	4' - 4"	4' - 1"
	2-2x8	9' - 2"	7' - 11"	7' - 1"	6' - 6"	6' - 0"	5' - 7"	5' - 3"
	2-2x10	11' - 10"	10' - 3"	9' - 2"	8' - 5"	7' - 9"	7' - 3"	6' - 10"
	2-2x12	13' - 11"	12' - 0"	10' - 9"	9' - 10"	9' - 1"	8' - 6"	8' - 0"
	3-2x6	8' - 7"	7' - 8"	6' - 11"	6' - 3"	5' - 10"	5' - 5"	5' - 2"
	3-2x8	11' - 4"	9' - 11"	8' - 11"	8' - 1"	7' - 6"	7' - 0"	6' - 7"
	3-2x10	14' - 5"	12' - 10"	11' - 6"	10' - 6"	9' - 9"	9' - 1"	8' - 7"
	3-2x12	17' - 5"	15' - 1"	13' - 6"	12' - 4"	11' - 5"	10' - 8"	10' - 1"
Douglas Fir- Larch ² , Hem-Fir ² , SPF ² , Redwood, Western Cedars, Ponderosa Pine ³ , Red Pine ³	3x6 or 2-2x6	5' - 5"	4' - 8"	4' - 2"	3' - 10"	3' - 6"	3' - 1"	2' - 9"
	3x8 or 2-2x8	6' - 10"	5' - 11"	5' - 4"	4' - 10"	4' - 6"	4' - 1"	3' - 8"
	3x10 or 2-2x10	8' - 4"	7' - 3"	6' - 6"	5' - 11"	5' - 6"	5' - 1"	4' - 8"
	3x12 or 2-2x12	9' - 8"	8' - 5"	7' - 6"	6' - 10"	6' - 4"	5' - 11"	5' - 7"
	4x6	6' - 5"	5' - 6"	4' - 11"	4' - 6"	4' - 2"	3' - 11"	3' - 8"
	4x8	8' - 5"	7' - 3"	6' - 6"	5' - 11"	5' - 6"	5' - 2"	4' - 10"
	4x10	9' - 11"	8' - 7"	7' - 8"	7' - 0"	6' - 6"	6' - 1"	5' - 8"
	4x12	11' - 5"	9' - 11"	8' - 10"	8' - 1"	7' - 6"	7' - 0"	6' - 7"
Ponderosa Pine ³ , Red Pine ³	3-2x6	7' - 4"	6' - 8"	6' - 0"	5' - 6"	5' - 1"	4' - 9"	4' - 6"
	3-2x8	9' - 8"	8' - 6"	7' - 7"	6' - 11"	6' - 5"	6' - 0"	5' - 8"
	3-2x10	12' - 0"	10' - 5"	9' - 4"	8' - 6"	7' - 10"	7' - 4"	6' - 11"
	3-2x12	13' - 11"	12' - 1"	10' - 9"	9' - 10"	9' - 1"	8' - 6"	8' - 1"

1. Assumes 40 psf live load, 10 psf dead load, L/360 simple span beam deflection limit, L/180 cantilever deflection limit, No. 2 grade, and wet service conditions.

2. Incising assumed for refractory species including Douglas fir-larch, hem-fir, and spruce-pine-fir.

3. Design values based on northern species with no incising assumed.

4. Beam depth must be equal to or greater than joist depth if joist hangers are used (see Figure 6, Option 3).

Figure 4, stair details

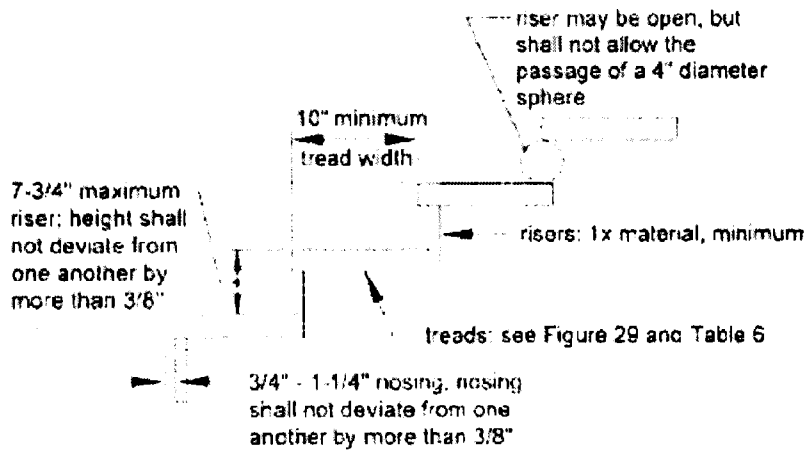


Figure 5, stair requirements

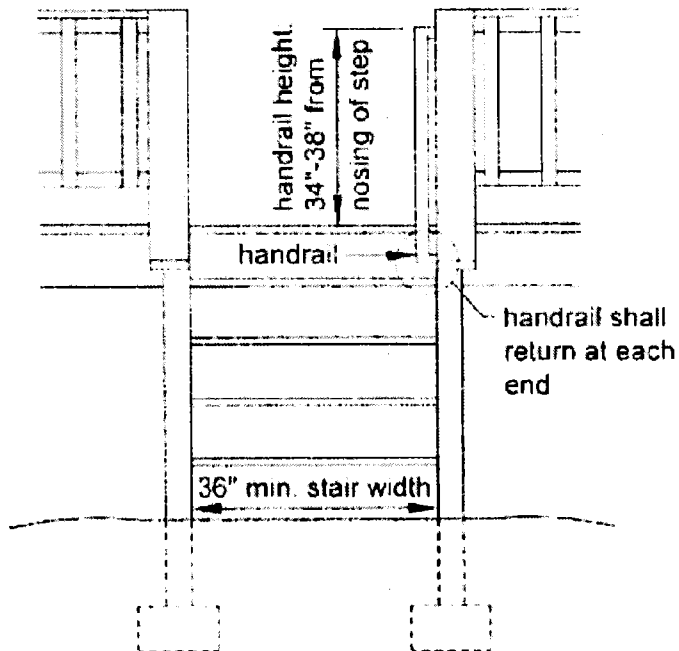
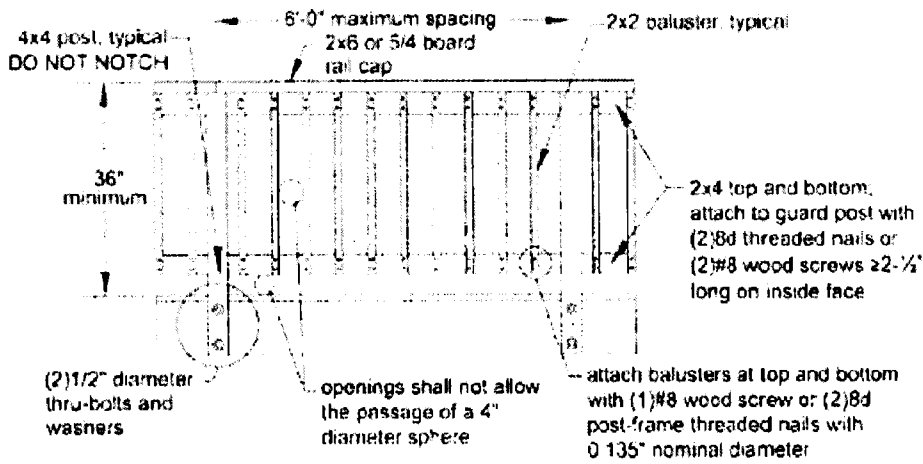


Figure 6, Guardrail details



American Forest & Paper Association

Figure 7, Guardrail post to outside joist example

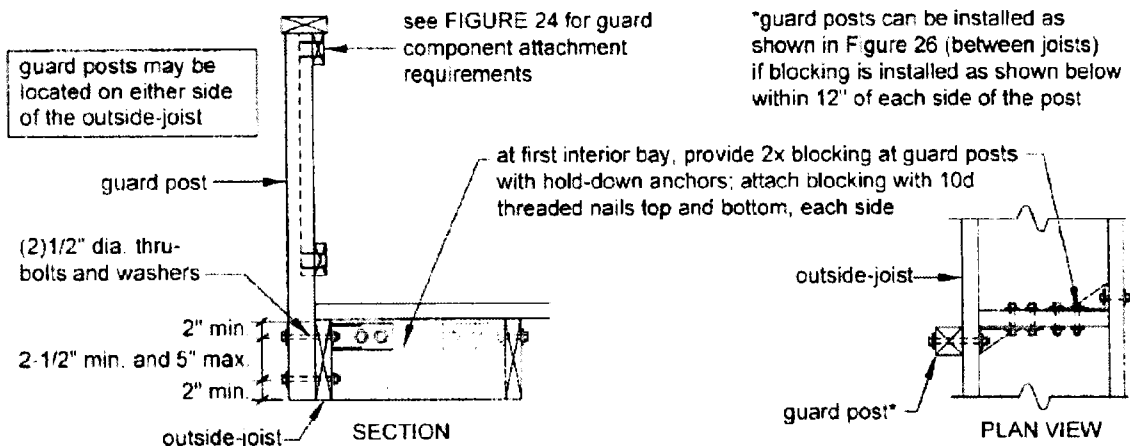


Figure 8, Guardrail post to rim joist example

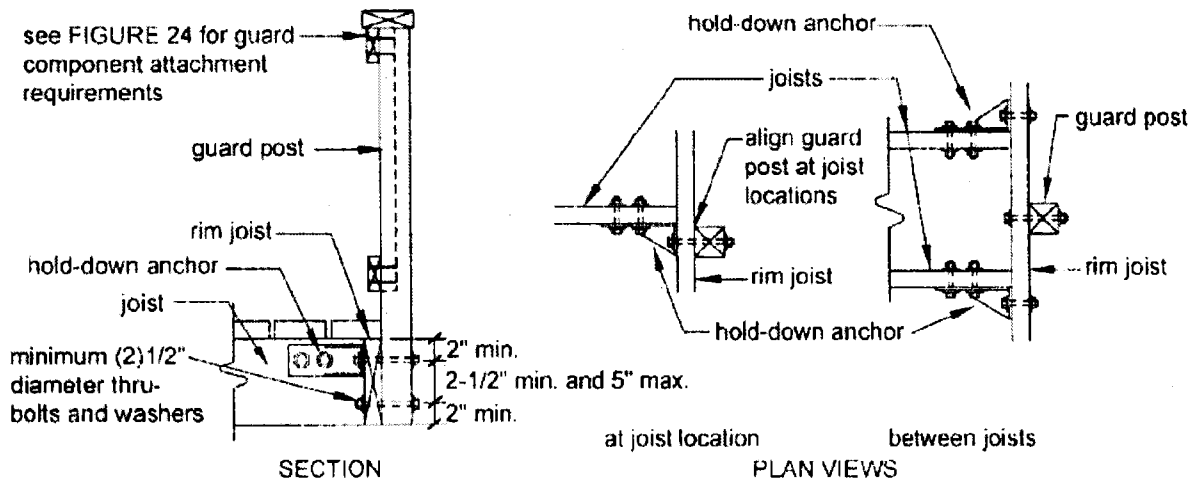


Figure 9, Stair Guard requirements

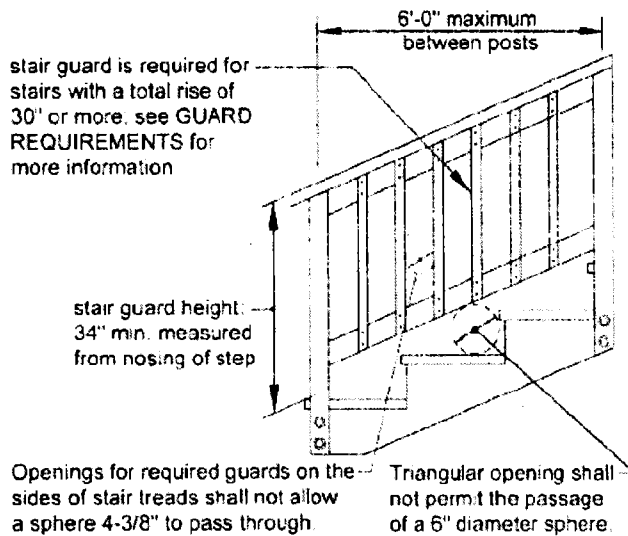


Figure 10, Stringer attachment

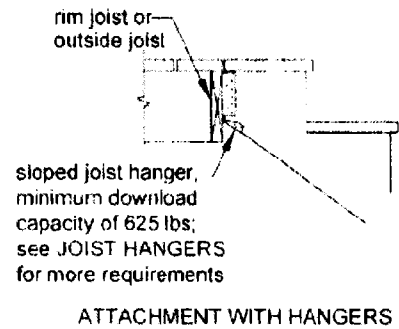


Figure 11, Handrail mounting examples

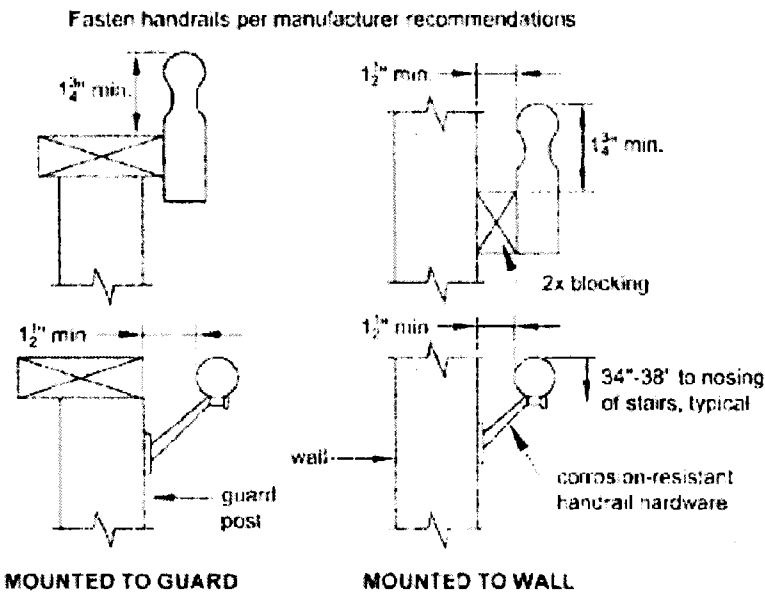


Figure 12, Handrail grip sizes

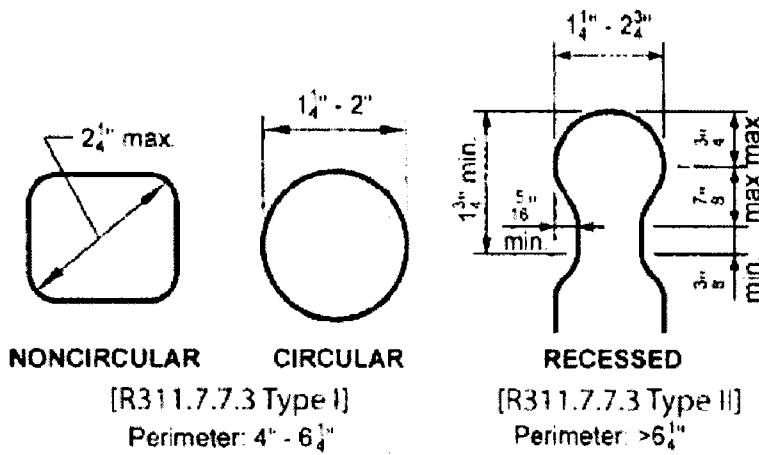


Figure 13, Typical deck framing plan

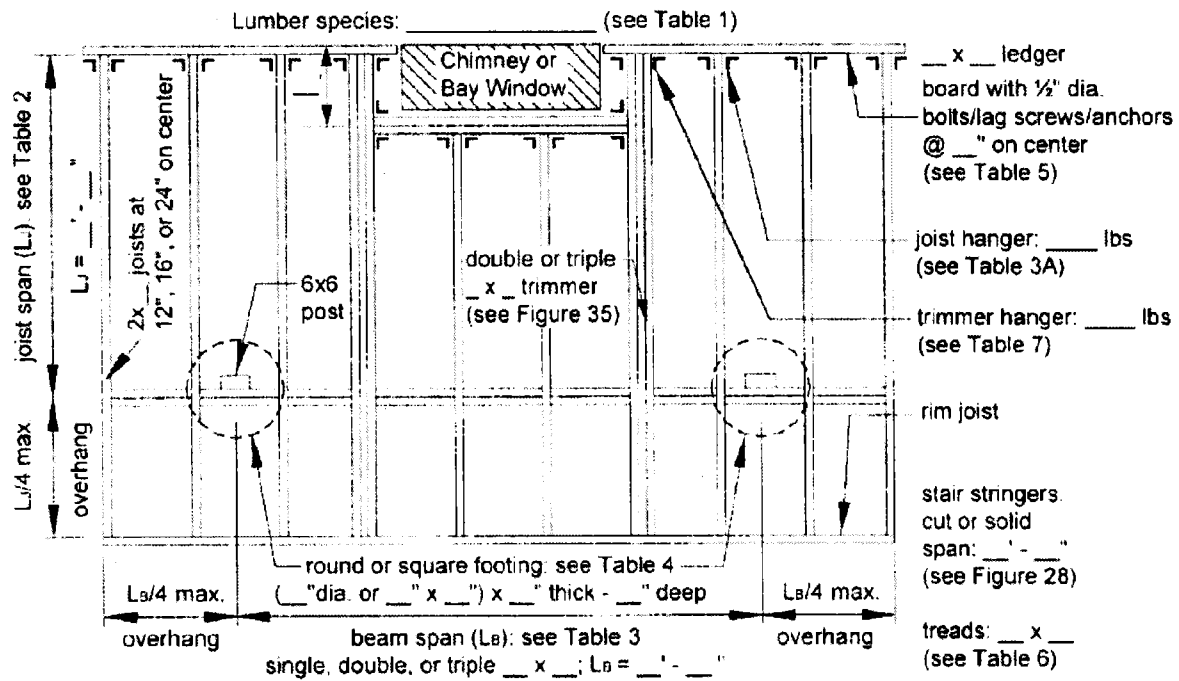


Figure 14, Joist Hanger requirements

(Joist hangers must be hot dipped galvanized or ZMax)

JOIST HANGERS

Joist hangers, as shown in Figure 7, shall each have a minimum download capacity in accordance with Table 3A. The joist hanger shall be selected from an approved manufacturer's product data based on the dimensions of the joist or header it is carrying. Joist hangers shall be galvanized or stainless steel (see MINIMUM REQUIREMENTS).

Use joist hangers with inside flanges when clearances to the edge of the beam or ledger board dictate. Do not use clip angles or brackets to support joists.

Figure 7: Typical Joist Hangers

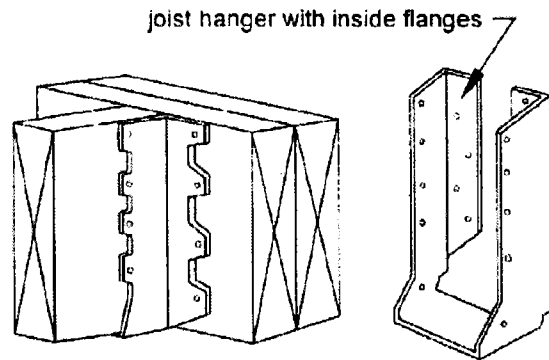


Table 3A: Joist Hanger Download Capacity

Joist Size	Minimum Capacity, lbs
2x8	600
2x10	700
2x12	800