



City of McCleary

100 S 3rd St.
 McCleary WA, 98557
 Phone: (360) 495-3667
[permits](#)

Deck Construction Handout (IRC 2021)

General Requirements (R507 & R301.5)

Decks must support live loads of 40 psf and dead loads per material weight.

All wood must be naturally durable or pressure-preservative treated.

ITEM	MATERIAL	MINIMUM FINISH/COATING	ALTERNATE FINISH/COATING ^e
Nails and glulam rivets	In accordance with ASTM F1667	Hot-dipped galvanized per ASTM A153	Stainless steel, silicon bronze, or copper
Bolts ^c	In accordance with ASTM A307 (bolts), ASTM A563 (nuts), ASTM F844 (washers)	Hot-dipped galvanized per ASTM A153, Class C (Class D for $\frac{3}{8}$ -inch diameter and less) or mechanically galvanized per ASTM B695, Class 55 or 410 stainless steel	Stainless steel, silicon bronze, or copper
Lag screws ^d (including nuts and washers)			
Metal connectors	Per the manufacturer's specification	ASTM A653 type G185 zinc-coated galvanized steel or post hot-dipped galvanized per ASTM A123, providing a minimum average coating weight of 2.0 oz./ft ² (total both sides)	Stainless steel

a. Equivalent materials, coatings, and finishes shall be permitted.

b. Fasteners and connectors exposed to salt water or located within 300 feet of a saltwater shoreline shall be stainless steel.

c. Holes for bolts shall be drilled a minimum of $\frac{1}{32}$ inch and a maximum of $\frac{1}{16}$ inch larger than the bolt.

d. Lag screws $\frac{1}{2}$ inch and larger shall be predrilled to avoid wood splitting per the National Design Specification (NDS) for Wood Construction.

e. Stainless steel-driven fasteners shall be in accordance with ASTM F1667.

Flashing (R507.2.4)

Flashing shall be corrosion-resistant metal of nominal thickness not less than 0.019 inch (0.48 mm)

Footings & Foundations (R507.3)

Decks shall be supported on concrete footings or other approved structural systems designed to accommodate all loads in accordance with Section R301. Deck footings shall be sized to carry the imposed loads from the deck structure to the ground as shown in Figure R507.3

FIGURE R507.3
DECK POSTS TO DECK FOOTING CONNECTION

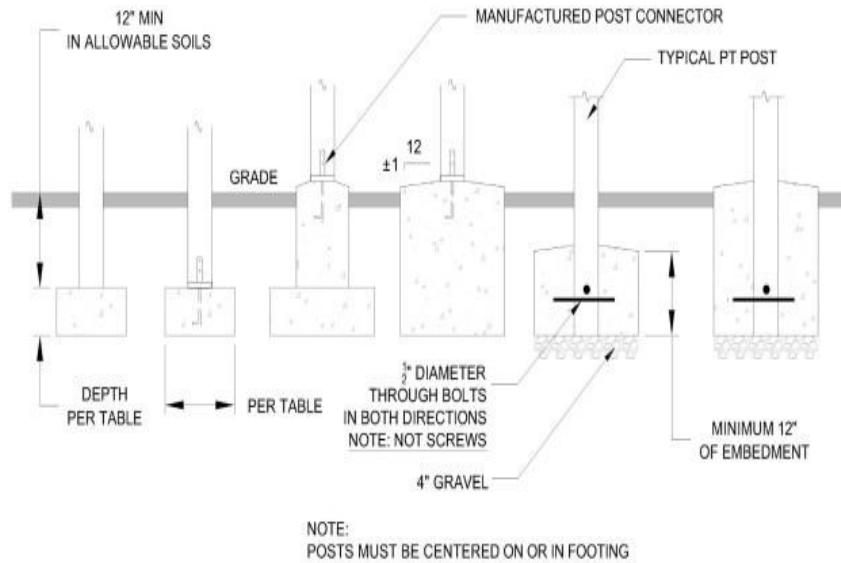


TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS				
Live or Ground Snow Load (psf)	Tributary Area (sq. ft.)	Soil Bearing Capacity		
		1500 psf		
		Side of a square Footing (Inches)	Diameter of a round footing (inches)	Thickness (Inches)
60 Live 70 Ground Snow Load	5	7	8	6
	20	12	14	6
	40	18	20	6
	60	21	24	8
	80	25	28	9
	100	28	31	11
	120	30	34	12
	140	33	37	13
160	35	40	15	
TABLE R507.3.1 MINIMUM FOOTING SIZE FOR DECKS				
Live or Ground Snow Load (psf)	Tributary Area (sq. ft.)	Soil Bearing Capacity		
		1500 psf		
		Side of a square Footing (Inches)	Diameter of a round footing (inches)	Thickness (Inches)
60 Live 70 Ground Snow Load	5	7	8	6
	20	12	14	6
	40	18	20	6
	60	21	24	8
	80	25	28	9
	100	28	31	11
	120	30	34	12
	140	33	37	13
160	35	40	15	

Minimum depth (R507.3.2)

Deck footings shall be placed not less than 12 inches below the undisturbed ground surface.

TABLE R507.4 DECK POST HEIGHT

LOADS (psf)	POST SPECIES	POST SIZE	TRIBUTARY AREA (ft ²)							
			20	40	60	80	100	120	140	160
			MAXIMUM DECK POST HEIGHT (feet-inches)							
60 Live Load, ≤60 Ground Snow Load	Douglas Fir, Hem-fir, SPF	4x4	14-0	10-10	8-7	7-0	5-8	4-1	NP	NP
		4x6	14-0	13-10	11-1	9-5	8-2	7-3	6-4	5-4
		6x6	14-0	14-0	14-0	14-0	14-0	13-3	10-9	6-11
		8x8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0
	Redwood, Western Cedars, Ponderosa Pine, Red Pine	4x4	14-0	10-3	7-0	NP	NP	NP	NP	NP
		4x6	14-0	13-6	10-6	8-4	5-10	NP	NP	NP
		6x6	14-0	14-0	14-0	14-0	11-11	NP	NP	NP
		8x8	14-0	14-0	14-0	14-0	14-0	14-0	14-0	14-0

Deck post to deck footing connection (R507.4.1)

Where posts bear on concrete footings in accordance with [Section R403](#) and [Figure R507.3](#), lateral restraint shall be provided by manufactured connectors or a minimum post embedment of 12 inches (305 mm) in surrounding soils or concrete piers.

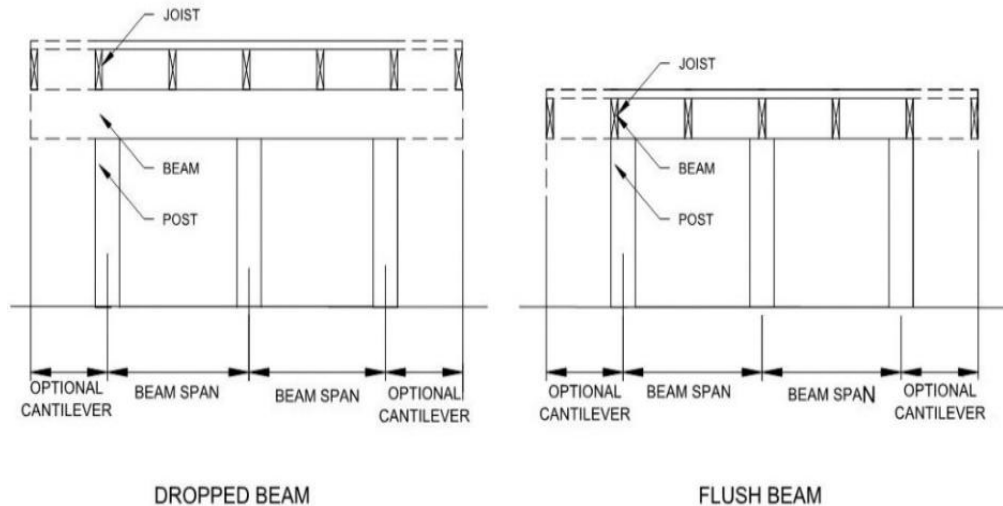


FIGURE R507.5
TYPICAL DECK JOIST SPANS

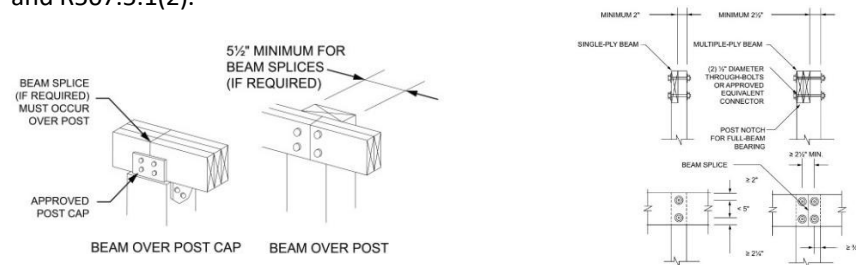
TABLE R507.5 MAXIMUM DECK BEAM SPAN 60 PSF LIVE LOAD

Beam Species ^d	Beam Size ^e	Deck Joist Span ^{a,i} (feet)						
		6	8	10	12	14	16	18
		Maximum Beam Span ^{a,b,f} (feet- inches)						
Douglas fir-larch ^g , Spruce-pine-fir ^g	1-2×6	3-5	2-10	2-5	2-2	2-2	1-10	1-9
	1-2×8	4-7	3-8	3-2	2-10	2-7	2-5	2-4
	1-2×10	5-8	4-9	4-1	3-8	3-4	3-1	2-11
	1-2×12	6-7	5-8	5-0	4-6	4-1	3-10	3-7
	2-2×6	5-2	4-6	4-0	3-5	3-1	2-10	2-7
	2-2×8	6-11	6-0	5-3	4-7	4-1	3-8	3-5
	2-2×10	8-5	7-4	6-6	5-10	5-2	4-9	4-5
	2-2×12	9-10	8-6	7-7	6-11	6-4	5-9	5-4
	3-2×6	6-6	5-7	5-0	4-7	4-2	3-9	3-5
	3-2×8	8-8	7-6	6-8	6-1	5-6	5-0	4-7
	3-2×10	10-7	9-2	8-2	7-6	6-11	6-4	5-10
Redwood ^h , Western Cedars ^h , Ponderosa Pine ^h , Red Pine ^h	1-2×6	3-6	2-11	2-6	2-3	2-0	1-11	1-9
	1-2×8	4-6	3-10	3-3	2-11	2-8	2-6	2-4
	1-2×10	5-6	4-9	4-2	3-9	3-5	3-2	3-0
	1-2×12	6-4	5-6	4-11	4-6	4-2	3-11	3-8
	2-2×6	5-3	4-7	4-1	3-6	3-2	2-11	2-8
	2-2×8	6-8	5-9	5-2	4-8	4-2	3-10	3-6
	2-2×10	8-2	7-1	6-4	5-9	5-4	4-10	4-6
	2-2×12	9-5	8-2	7-4	6-8	6-2	5-9	5-5
	3-2×6	6-4	5-8	5-1	4-8	4-3	3-10	3-6
	3-2×8	8-4	7-3	6-5	5-11	5-5	5-1	4-8
	3-2×10	10-2	8-10	7-11	7-2	6-8	6-3	5-11
3-2×12	11-10	10-3	9-2	8-4	7-9	7-3	6-10	

- a. Interpolation permitted. Extrapolation is not allowed.
- b. Beams supporting a single span of joists with or without a cantilever.
- c. Dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever. Snow load is not assumed to be concurrent with live load.
- d. No. 2 grade, wet service factor included.
- e. Beam depth shall be equal to or greater than the depth intersecting the joist for a flush beam connection.
- f. Beam cantilevers are limited to the adjacent beam's span divided by 4.
- g. Includes incising factor.
- h. Incising factor not included.
- i. Deck joist span as shown in Figure R507.5.
- j. For calculations of effective deck joist span, the actual joist span length shall be multiplied by the joist span factor in accordance with Table R507.5(5)

Deck beam bearing (R507.5.1)

The ends of beams shall have not less than 1 1/2 inches of bearing on wood or metal and not less than 3 inches of bearing on concrete or masonry for the entire width of the beam. Where multiple-span beams bear on intermediate posts, each ply must have full bearing on the post in accordance with Figures R507.5.1(1) and R507.5.1(2).



Deck joists (R507.6)

Maximum allowable spans for wood deck joists, as shown in Figure R507.6, shall be in accordance with Table R507.6. The maximum joist spacing shall be limited by the decking materials in accordance with Table R507.7

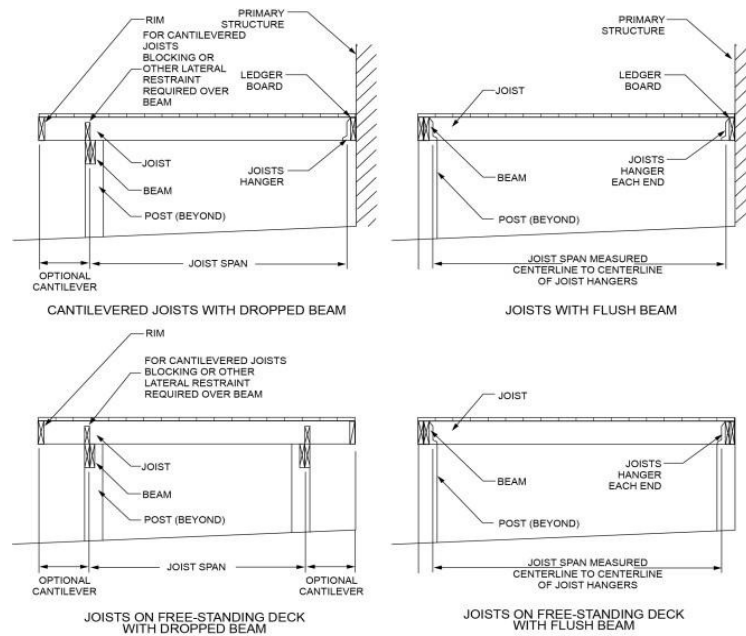


TABLE R507.6 MAXIMUM DECKJOIST SPANS

Load ^a (psf)	Joist Species ^b	Joist Size	Allowable Joist Span ^{b,c} (feet-inches)			Maximum Cantilever ^{f,g} (feet-inches)							
			Joist Spacing (inches)			Adjacent Joist Back Span ^g (feet)							
			12	16	24	4	6	8	10	12	14	16	18
60 Live Load or 70 Ground Snow Load	Douglas fir-larch ^e , Hem-fir ^e , Spruce-pine-fir ^e	2×6	7-11	7-1	5-9	1-0	1-6	NP	NP	NP	NP	NP	NP
		2×8	10-5	9-5	7-8	1-0	1-6	2-0	2-1	NP	NP	NP	NP
		2×10	13-3	11-6	9-5	1-0	1-6	2-0	2-6	2-8	NP	NP	NP
		2×12	15-5	13-4	10-11	1-0	1-6	2-0	2-6	3-0	3-3	NP	NP
	Redwood ^f , Western Cedars ^f , Ponderosa Pine ^f , Red Pine ^f	2×6	7-4	6-8	5-10	1-0	1-4	NP	NP	NP	NP	NP	NP
		2×8	9-8	8-10	7-4	1-0	1-6	1-11	NP	NP	NP	NP	NP
		2×10	12-4	11-0	9-0	1-0	1-6	2-0	2-6	2-6	NP	NP	NP
		2×12	14-9	12-9	10-5	1-0	1-6	2-0	2-6	3-0	3-0	NP	NP

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg, NP = Not permitted.

- Dead load = 10 psf dead load. Snow load is not assumed to be concurrent with live load.
- No. 2 grade, wet service factor included.
- $L/\Delta = 360$ at main span.
- $L/\Delta = 180$ at the cantilever with a 220-pound point load applied to the end.
- Includes incising factor.
- Incising factor not included.
- Interpolation permitted. Extrapolation not permitted.

h. **Deck joist bearing (R507.6.1)**

The ends of joists shall have not less than 1½ inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) of bearing on concrete or masonry over their entire width. Joists bearing on top of a multiple-ply beam or ledger shall be fastened in accordance with Table R602.3(1). Joists bearing on top of a single-ply beam or ledger shall be attached by a mechanical connector. Joist framing into the side of a beam or ledger board shall be supported by approved joist hangers.

Deck joist lateral restraint (R507.6.2)

Joist ends and bearing locations shall be provided with lateral resistance to prevent rotation. Where lateral restraint is provided by joist hangers or blocking between joists, their depth shall equal not less than 60 percent of the joist depth. Where lateral restraint is provided by rim joists, they shall be secured to the end of each joist with not fewer than three 10d nails or three No. 10 x 3-inch-long wood screws.

Decking (R507.7)

Maximum allowable spacing for joists supporting wood decking, excluding stairways, shall be in accordance with Table R507.7. Wood decking shall be attached to each supporting member with not less than two 8d threaded nails or two No. 8 wood screws. Maximum allowable spacing for joists supporting plastic composite decking shall be in accordance with Section R507.2. Other approved decking or fastener systems shall be installed in accordance with the manufacturer’s installation requirements.

DECKING MATERIAL TYPE AND NOMINAL SIZE	MAXIMUM ON-CENTER SPACING	
	Decking perpendicular to the joist	Decking diagonal to joist(a)
1 ¼- inch-thick wood	16 inches	12 inches
2-inch-thick wood	24 inches	16 inches
Plastic composite	In accordance with Section R507.2	In accordance with Section R507.2

Vertical and lateral supports (R507.8)

Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. For decks with cantilevered framing members, connection to exterior walls or other framing members shall be designed and constructed to resist uplift resulting from the full live load specified in Table R301.5 acting on the cantilevered portion of the deck. Where a positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting.

Ledger details (R507.9.1.1)

Deck ledgers shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, pressure-preservative-treated Southern pine, incised pressure-preservative-treated hem-fir, or approved, naturally durable, No. 2 grade or better lumber. Deck ledgers shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

Band joist details (R507.9.1.2)

Band joists supporting a ledger shall be a minimum 2-inch-nominal (51 mm), solid-sawn, spruce-pine-fir or better lumber or a minimum 1-inch (25 mm) nominal engineered wood rim boards in accordance with Section R502.1.7. Band joists shall bear fully on the primary structure capable of supporting all required loads.

Ledger to band joist details (R507.9.1.3)

Fasteners used in deck ledger connections in accordance with Table R507.9.1.3(1) shall be hot-dipped galvanized or stainless steel and shall be installed in accordance with Table R507.9.1.3(2) and Figures R507.9.1.3(1) and R507.9.1.3(2).

TABLE R507.9.1.3(1) DECK LEDGER CONNECTION TO BAND JOIST

Load ^c (psf)	Joist Span ^a (feet)	On-Center Spacing of Fasteners (inches)		
		1/2-inch diameter lag screw with 1/2-inch maximum sheathing	1/2-inch diameter bolt with 1/2-inch maximum sheathing ^e	1/2-inch diameter bolt with 1-inch maximum sheathing
60 Live Load or 70 Ground Snow Load	6	22	36	35
	8	16	31	26
	10	13	25	21
	12	11	20	17
	14	9	17	15
	16	8	15	13
	18	7	13	11

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

- Interpolation permitted. Extrapolation is not permitted.
- Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.
- Dead load = 10 psf. Snow load shall not be assumed to act concurrently with live load.
- The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- Sheathing shall be wood structural panel or solid sawn lumber.
- Sheathing shall be permitted to be wood structural panel, gypsum board, fiberboard, lumber, or foam sheathing. Up to 1/2-inch thickness of stacked washers shall be permitted to substitute for up to 1/2 inch of allowable sheathing thickness when combined with wood structural panel or lumber sheathing.

TABLE R507.9.1.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

Minimum End and Edge Distances and Spacing Between Rows				
	Top Edge	Bottom Edge	Ends	Row Spacing
Ledger^a	2 inches	¾ inch	2 inches	1 5/8 inches ^b
Band Joist^c	¾ inch	2 inches	2 inches	1 5/8 inches ^b

For SI: 1 inch = 25.4 mm

- Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.9.1.3(1).
- Maximum 5 inches.
- For engineered rim joists, the manufacturer's recommendations shall govern.
- The minimum distance from the bottom row of lag screws to the top edge of the ledger shall be in accordance with Figure R507.9.1.3(1).
- The 2 inches may be reduced to ¾ inch when the band joist is directly supported by a mudsill, a header or by double top wall plates.

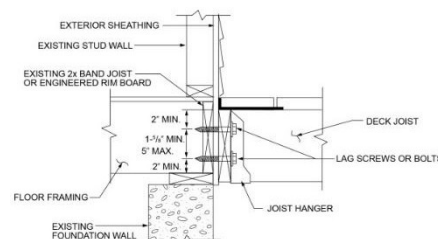
Guards supported by the side of the deck framing (R507.10.1.1)

Where guards are connected to the interior or exterior side of a deck joist or beam, the joist or beam shall be connected to the adjacent joists to prevent rotation of the joist or beam. Connections relying only on fasteners in end grain withdrawal are not permitted.

For SI: 1 inch = 25.4 mm.

FIGURE R507.9.1.3(2)

PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS



Lateral connection (R507.9.2)

Lateral loads shall be transferred to the ground or to a structure capable of transmitting them to the ground. Where the lateral load connection is provided in accordance with Figure R507.9.2(1), hold-down tension devices shall be installed in not less than two locations per deck, within 24 inches (610 mm) of each end of the deck. Each device shall have an allowable stress design capacity of not less than 1,500 pounds (6672 N). Where the lateral load connections are provided in accordance with Figure R507.9.2(2), the hold-down tension devices shall be installed in not less than four locations per deck, and each device shall have an allowable stress design capacity of not less than 750 pounds (3336 N).

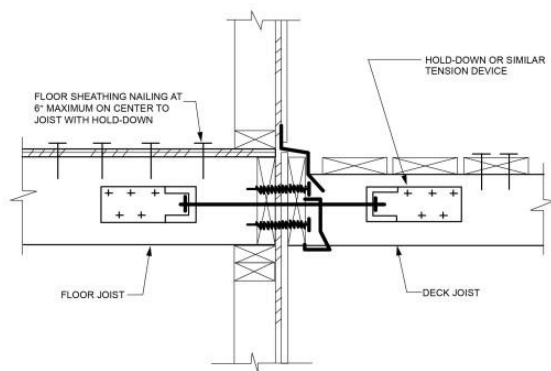
Electrical Requirements (E3902.5 & E4203.3)

At least one GFCI-protected outlet is required on decks larger than 20 sq. ft.

Overhead conductors must be 10 ft minimum above decks.

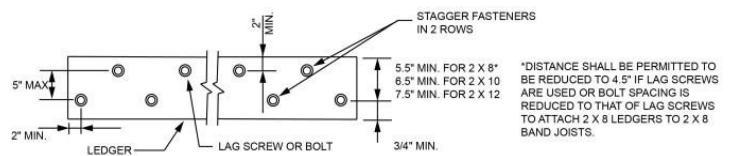
Guards supported on top of deck framing (R507.10.1.2)

Where *guards* are mounted on top of the decking, the *guards* shall be connected to the deck framing or blocking and installed in accordance with the manufacturer's instructions to transfer the *guard* loads to the adjacent joists.



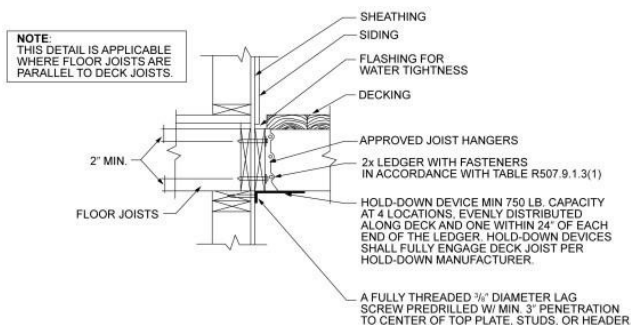
For SI: 1 inch = 25.4 mm.

FIGURE R507.9.2(1) DECK ATTACHMENT FOR LATERAL LOADS



For SI: 1 inch = 25.4 mm.

FIGURE R507.9.1.3(1) PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS



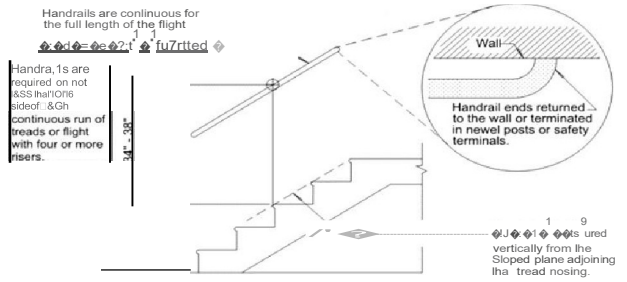
For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm.

FIGURE R507.9.2(2) DECK ATTACHMENT FOR LATERAL LOADS

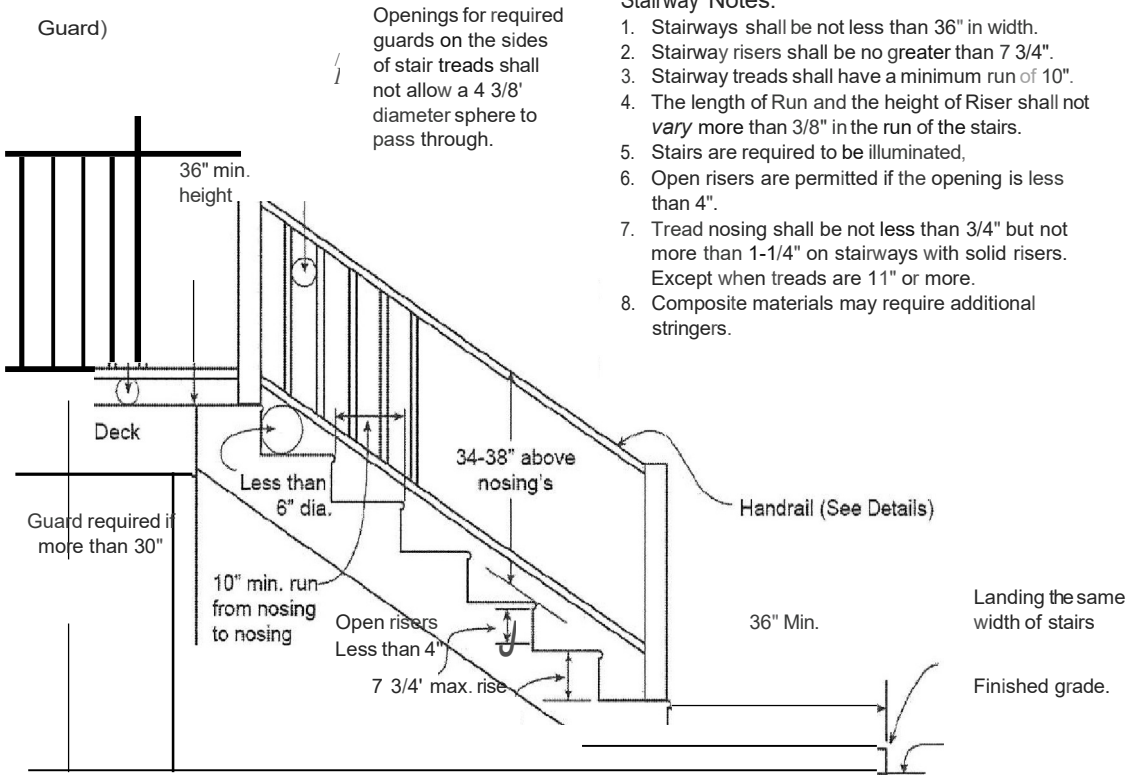
SAFETY GLAZING:

Glazing where the bottom exposed edge of the glazing is less than 36 inches above the plane of the adjacent walking surface of stairways, landings between flights of stairs and ramps shall be considered a hazardous location. [IRC R308.4.6]

Glazing adjacent to the landing at the bottom of a stairway where the glazing is less than 36 inches above the landing and within a 60 inch arc measured from the bottom tread shall be considered a hazardous location. [IRC R308.4.7]



New or existing **Y** Open guards on decks more than 30 inches above grade or floor below shall Light required has members spaced so that a 4-inch-diameter sphere cannot pass through.



Stairway Notes:

1. Stairways shall be not less than 36" in width.
2. Stairway risers shall be no greater than 7 3/4".
3. Stairway treads shall have a minimum run of 10".
4. The length of Run and the height of Riser shall not vary more than 3/8" in the run of the stairs.
5. Stairs are required to be illuminated,
6. Open risers are permitted if the opening is less than 4".
7. Tread nosing shall be not less than 3/4" but not more than 1-1/4" on stairways with solid risers. Except when treads are 11" or more.
8. Composite materials may require additional stringers.