March 2023

CITY OF NORTH MANKATO

Decks

Max. riser height-7 ¾" (R311.7.5.1)

Min. tread depth-10" (R311.7.5.2)

Landings required at top and bottom of stairs (R311.7.6)

Notched guardrail post NOT allowed

Graspable handrail required for stairs with 4 or more risers (R311.7.8 & R311.7.8.3)

Spacing between guardrail infill shall be less than 4" (R312.1.3)

Guardrail min. height-36" (R312.1.2)

Risers on stairs NOT permitted to allow 4" sphere to pass through (R311.7.5.1)

Handrail height-34"-38" (R311.7.8.1)

Minimum stairway width=36" (R311.7.1.2)

Beams shall bear on top of posts (Refer to attachment)

Beams shall be positively fastened to posts (no screws) (R502.9)

Artificial light source required at top landing of stairway (R303.8 & R311.7.9)

Positive attachment of ledger board (R507.9.1.1)

Lateral load connection required (R507.9.2)

Posts shall be positively fastened to footing (no screws) (R507.4.1)

Flashing required at top of ledger board (R703.4 subp. 5)

½" minimum lag screw OR bolt with washer installed in accordance to Figure R507.9.1.3(1) for ledger connection (R507.9.1.1)

Lag screws, bolts & washers shall be hot-dipped galvanized, stainless steel, silicon bronze or copper (Table R507.2.3)

All fasteners shall be corrosion resistant (R317.3.1)

Decking material shall be decay-resistant species or preservative-treated wood (R507.2)

Composite material shall be approved by Building Official prior to ordering or purchasing material

Field-cut end, notches, and drilled holes shall be field treated according to AWPA M4 (R317.1.1)

All wood in contact with ground, concrete or embedded in concrete shall be suitable for ground contact use (R317.1.2)

Gopher State One Call Required 2-days prior to digging

Joist hangers SHALL be fastened to ledger with NAILS (no screws)

Wood/plastic composites shall bear a label indicating compliance with ASTM D 7032 (R507.2.2)

Beam cantilever-Max. one-fourth of allowable beam span (R507.5)
Joist cantilever-Max. one-fourth of joist span or Table R507.6, whichever is less (R507.6)

Minimum footing Depth=42” (1303.1600)

APPROVED plans shall be on site at time of inspections

Beams shall be fastened together with 10d(3” x 0.128) nails, 32” o.c. at top & bottom & staggered

SPECIFIC EXTERIOR DECK CODE LANGUAGE CAN BE VIEWED AT THE FOLLOWING WEBSITE ADDRESS, (UNDER CHAPTER R507 EXTERIOR DECKS): https://codes.iccsafe.org/content/MNRC2020/chapter-5-floors

R507.2.1 Placement of lag screws or bolts in deck ledgers and band joists.
The lag screws or bolts in deck ledgers and band joists shall be placed in accordance with Table R507.9.1.3(2) and Figures R507.9.1.3(1) and R507.9.1.3(2).

TABLE 507.2.1 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[d]	$^3/_4$ inch	2 inches[b]	$1^5/_8$ inches[b]
Band Joist[c]	$^3/_4$ inch	2 inches	2 inches[b]	$1^5/_8$ inches[b]

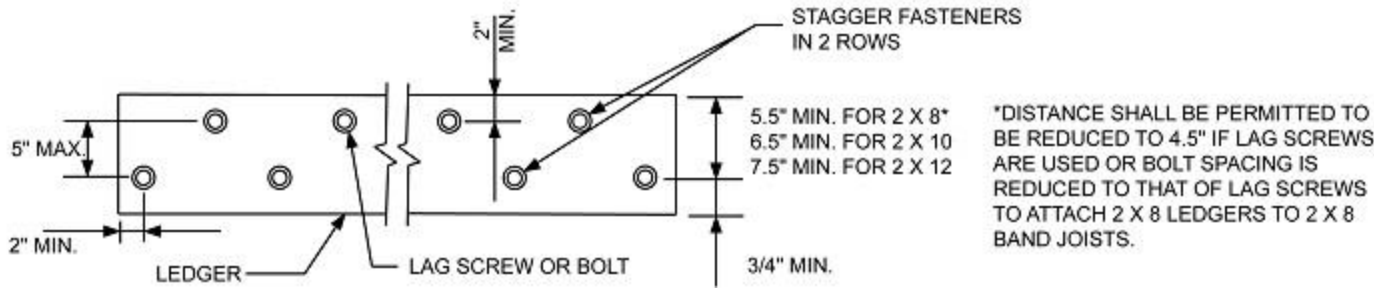
For SI: 1 inch = 25.4 mm.

a. 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).

b. Maximum 5 inches.

c. For engineered rim joists, the manufacturer’s recommendations shall govern.

d. The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure R507.9.1.3(1).

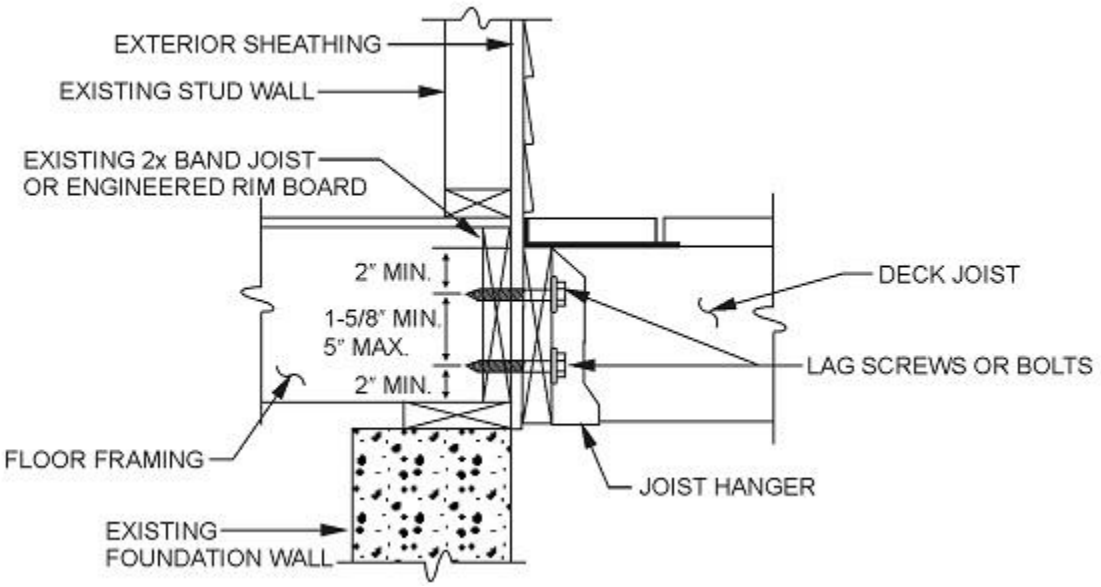


For SI: 1 inch = 25.4 mm.

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

JOIST SPAN	6′ and less	6′1″ to 8′	8′1″ to 10′	10′1″ to 12′	12′1″ to 14′	14′1″ to 16′	16′1″ to 18′
Connection details	**On-center spacing of fasteners[d, e]**						
1/2 inch diameter lag screw with 15/32 inch maximum sheathing[a]	30	23	18	15	13	11	10
1/2 inch diameter bolt with 15/32 inch maximum sheathing	36	36	34	29	24	21	19
1/2 inch diameter bolt with 15/32 inch maximum sheathing and 1/2 inch stacked washers[b, h]	36	36	29	24	21	18	16

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

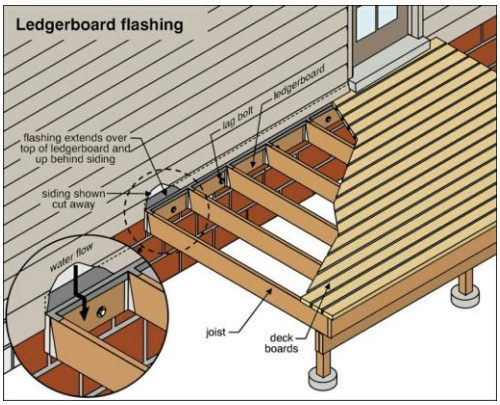


For SI: 1 inch = 25.4 mm.

FIGURE R507.9.1.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS

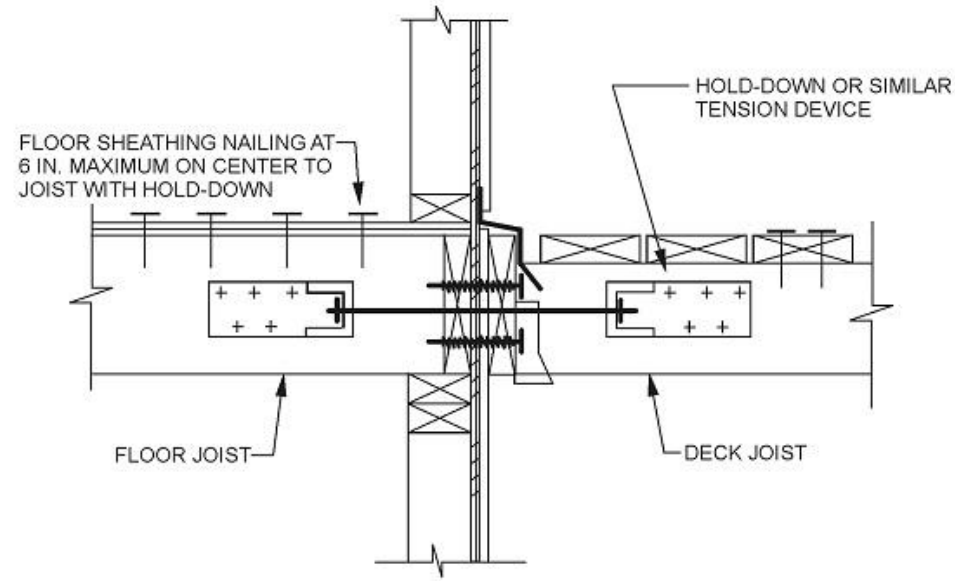
R507.9.1.1-Ledger details

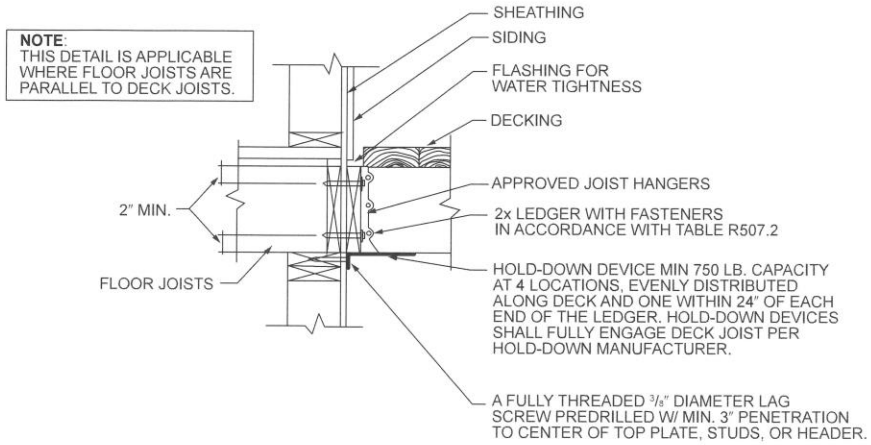
Deck ledgers shall be a minimum 2-inch by 8-inch nominal, pressure-preservative-treated Southern pine, incised pressure-preservative-treated hem-fir, or approved, naturally durable, No. 2 grade or better lumber. Deck ledgers shall not support concentrated loads from beams or girders. Deck ledgers shall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



R507.2.3 Deck lateral load connection.

The lateral load connection required by Section R507.1 shall be permitted to be in accordance with Figure R507.2.3. Where the lateral load connection is provided in accordance with Figure 507.2.3, hold-down tension devices shall be installed in not less than two locations per deck, and each device shall have an allowable stress design capacity of not less than 1500 pounds (6672 N).





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

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

FIGURE 507.2.3 DECK ATTACHMENT FOR LATERAL LOADS ***refer to following diagrams for approved lateral load connection details**

R507.2.2 Wood/plastic composites.

Wood/plastic composites used in exterior deck boards, stair treads, handrails and guardrail systems shall bear a label indicating the required performance levels and demonstrating compliance with the provisions of ASTM D 7032.

R507.2.2.5 Installation of wood/plastic composites.

Wood/plastic composites shall be installed in accordance with the manufacturer's instructions.

LATERAL LOAD CONNECTIONS

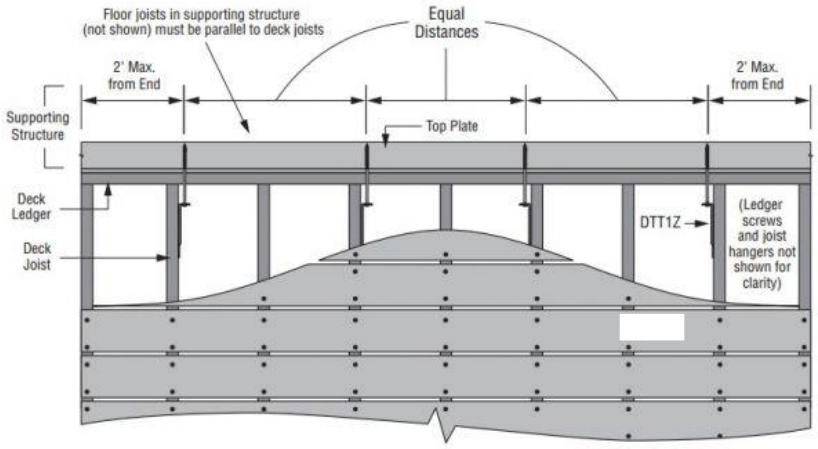


Figure 3 (750 lb. requirement)

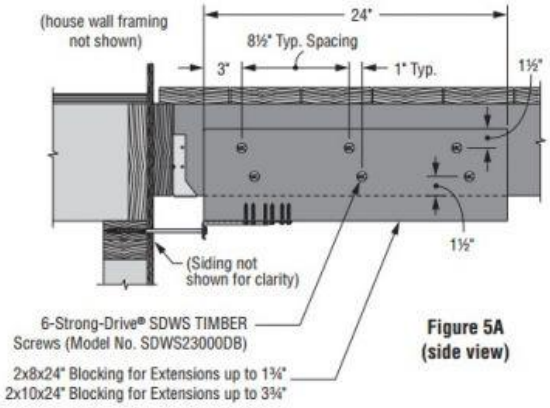


Figure 5A (side view)

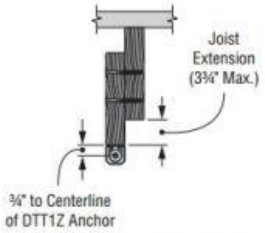


Figure 5B (end view)

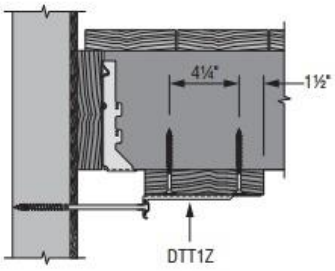


Figure 6A (side view)

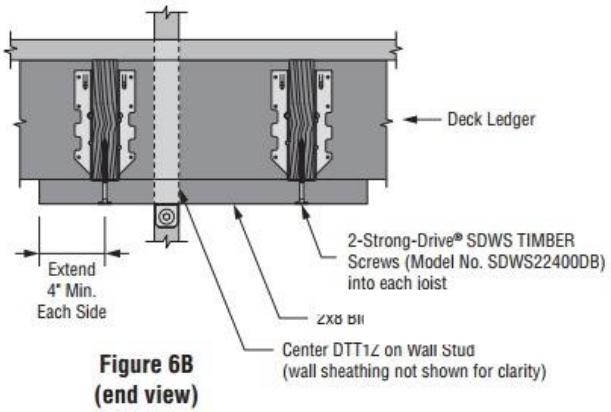
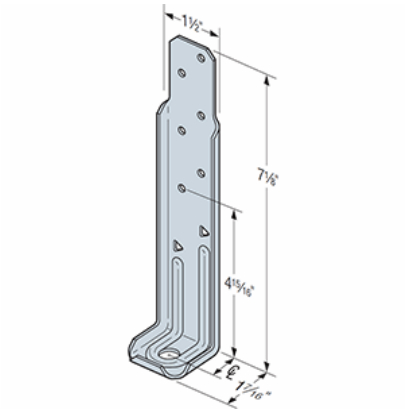
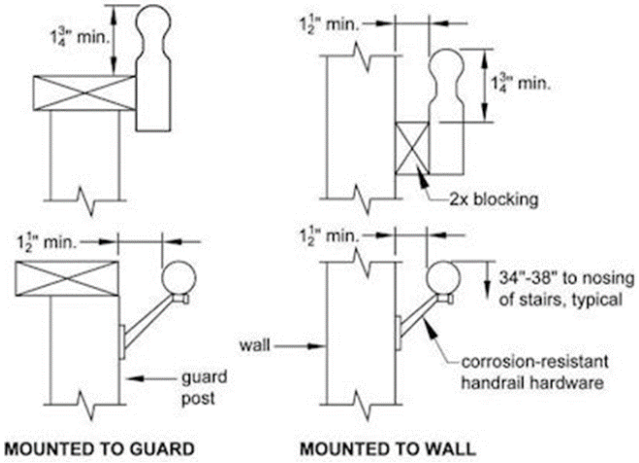
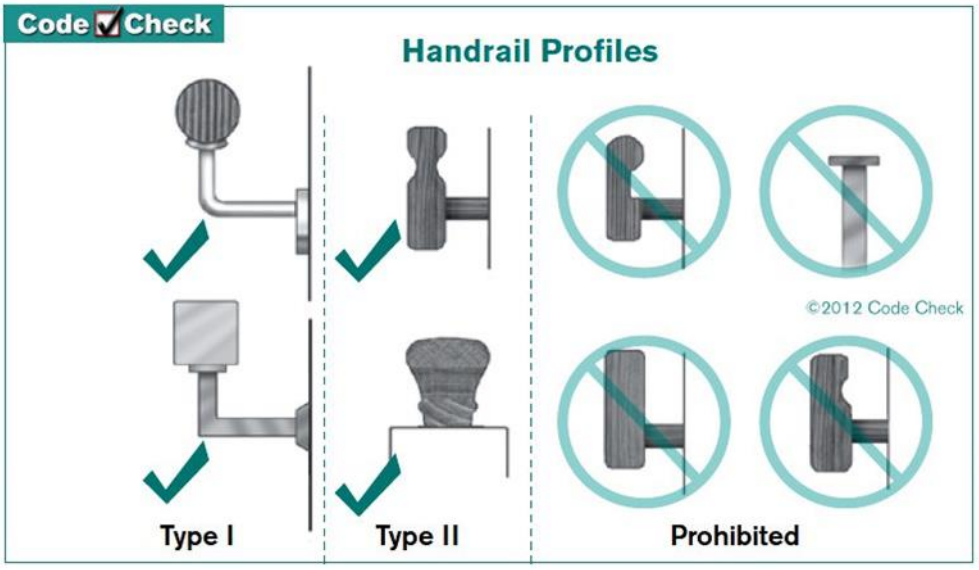


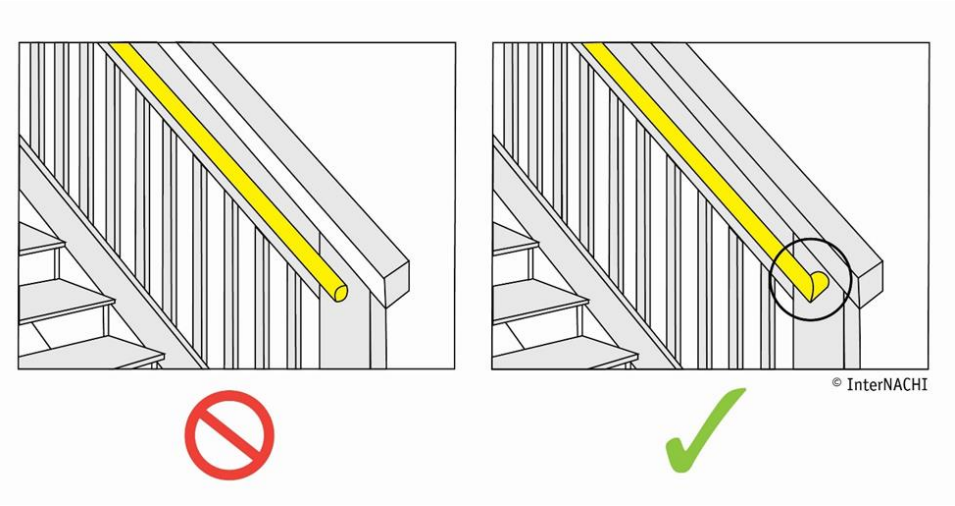
Figure 6B (end view)



Fasten handrails per manufacturer recommendations



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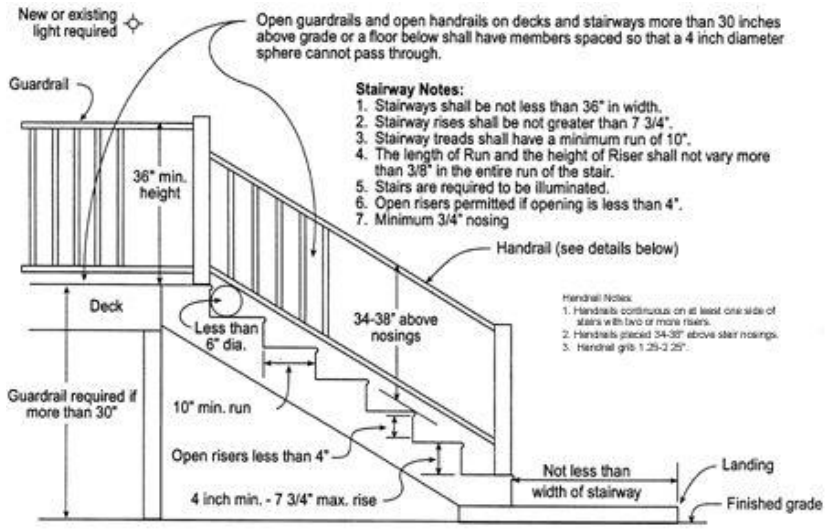
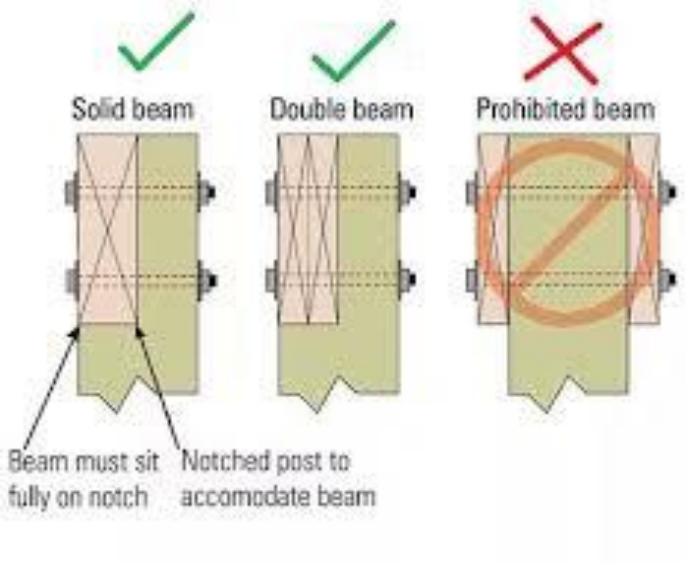
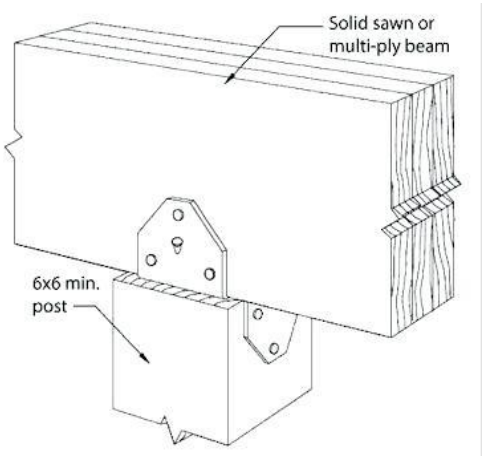
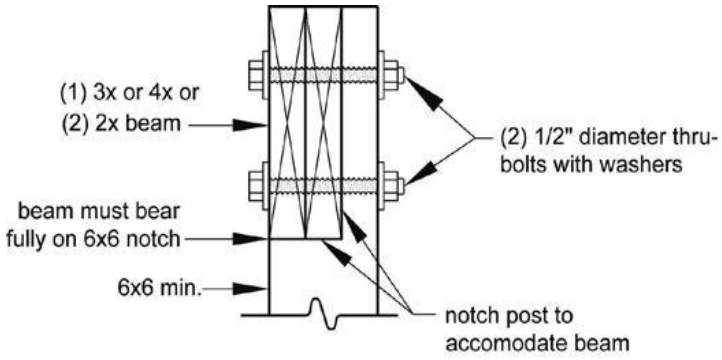
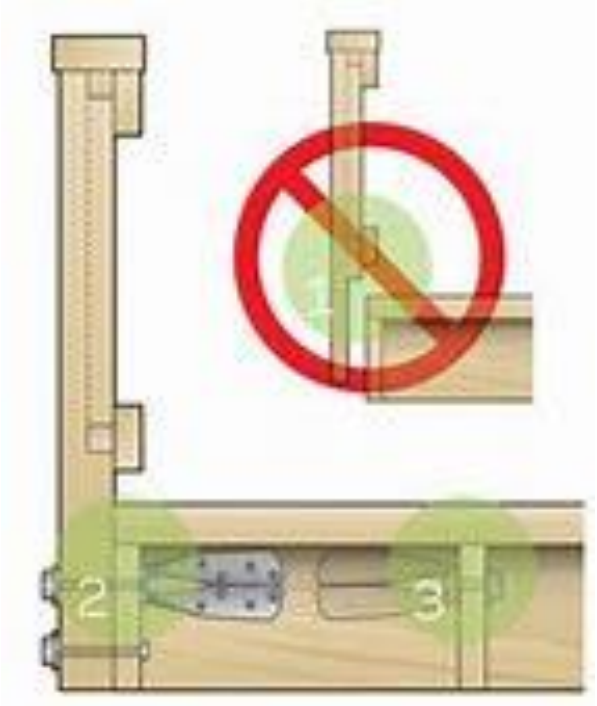

New or existing light required
Open guardrails and open handrails on decks and stairways more than 30 inches above grade or a floor below shall have members spaced so that a 4 inch diameter sphere cannot pass through.
Guardrail
Stairway Notes:
1. Stairways shall be not less than 36" in width.
2. Stairway rises shall be not 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 entire run of the stair.
5. Stairs are required to be illuminated.
6. Open risers permitted if opening is less than 4".
7. Minimum 3/4" nosing
36" min. height
Handrail (see details below)
Deck
Less than 6" dia.
34-38" above nosings
Handrail Notes
1. Handrails continuous on at least one side of stairs with two or more risers.
2. Handrails placed 34-38" above stair nosings.
3. Handrail grip 1.25-2.25".
Guardrail required if more than 30"
10" min. run
Open risers less than 4"
Not less than width of stairway
Landing
4 inch min. - 7 3/4" max. rise
Finished grade


Solid beam
Double beam
Prohibited beam
Beam must sit fully on notch
Notched post to accomodate beam





GUARDRAIL POSTS SHALL NOT BE NOTCHED AT THE BOTTOM



R507.3.1 Footings-minimum size-The minimum size of concrete footings shall be in accordance with Table 507.3.1, based on the tributary area

TYPICAL FOOTING OPTIONS

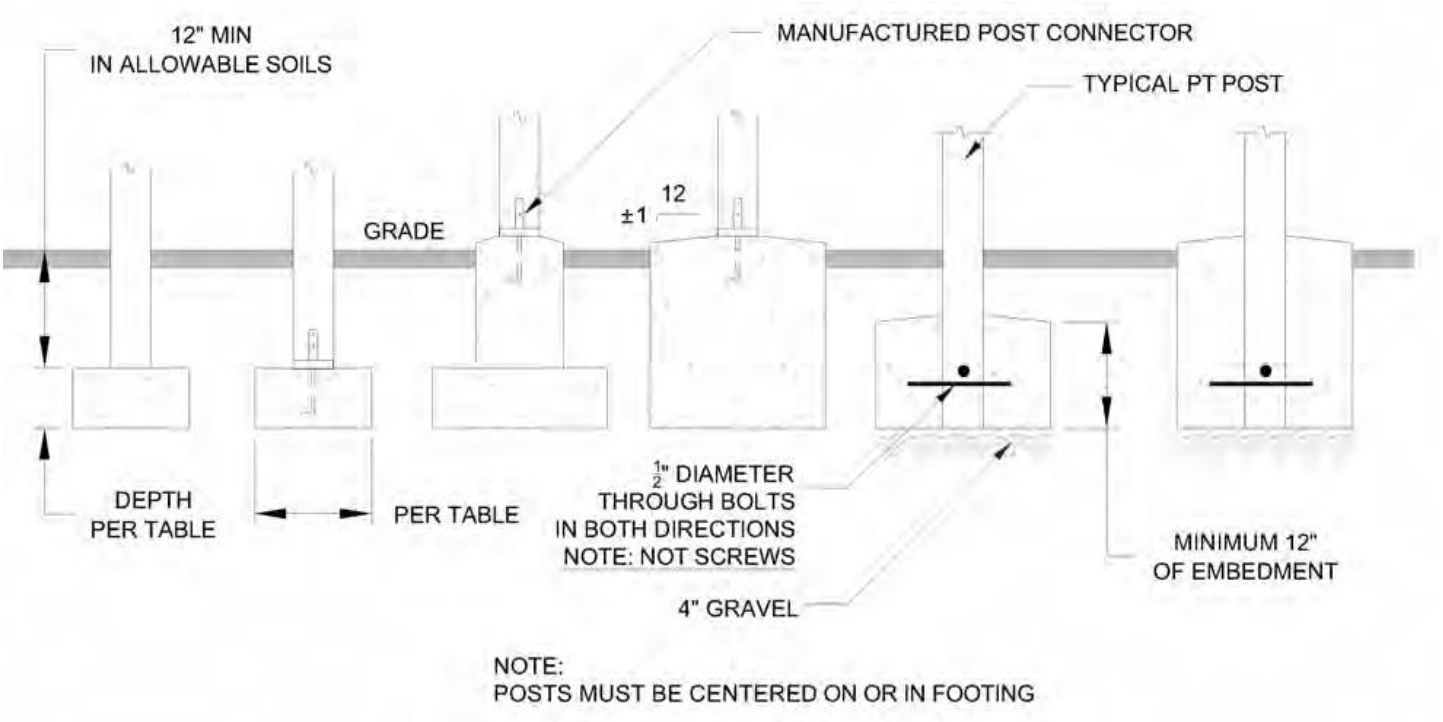


TABLE R507.3.1
MINIMUM FOOTING SIZE FOR DECKS

LIVE LOAD[b] (psf)	TRIBUTARY AREA (sq. ft.)	1500[e]		
		Side of a square footing (inches)	Diameter of a round footing (inches)	Thickness (inches)
40	20	12	14	6
	40	14	16	6
	60	17	19	6
	80	20	22	7
	100	22	25	8
	120	24	27	9
	140	26	29	10
	160	28	31	11

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2, 1 pound per square foot = 0.0479 kPa.

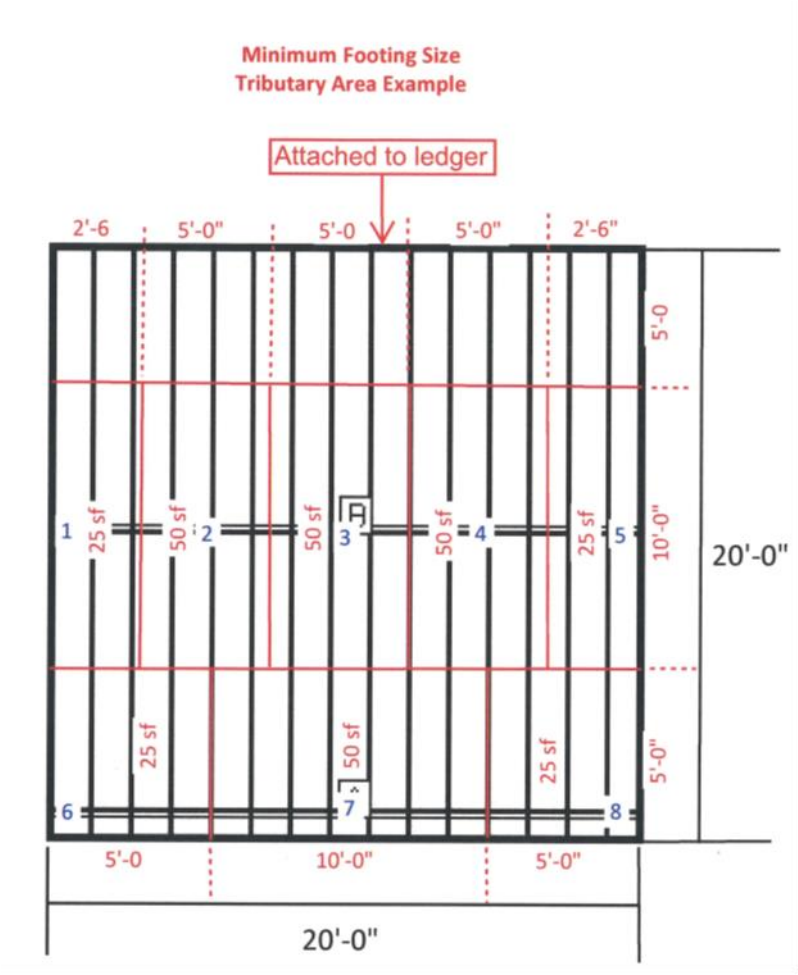
a. Interpolation permitted, extrapolation not permitted.

b. Live load = 40 psf, dead load = 10 psf.

c. Assumes minimum square footing to be 12 inches x 12 inches x 6 inches for 6 x 6 post.

d. If the support is a brick or CMU pier, the footing shall have a minimum 2-inch projection on all sides.

e. Area, in square feet, of deck surface supported by post and footings.



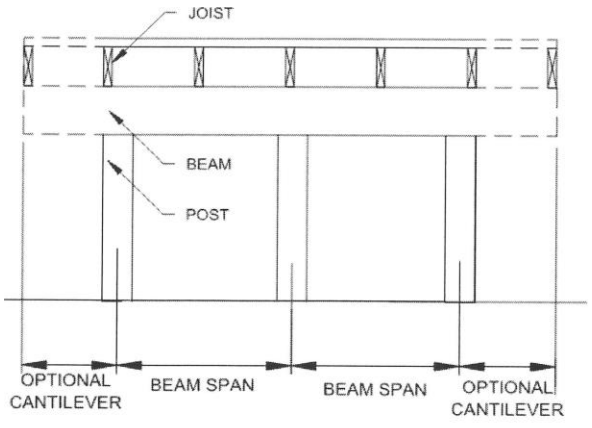
FOOTING LOCATION	TRIBUTARY AREA	REQUIRED FOOTING SIZE FROM TABLE R507.3.1
1	2'-6" X 10'-0"=**25 SF**	14 1/2" diameter footing
2	5'-0" X 10'-0"=**50SF**	17 1/2" diameter footing
3	5'-0" X 10'-0"=**50SF**	17 1/2" diameter footing
4	5'-0" X 10'-0"=**50SF**	17 1/2" diameter footing
5	2'-6" X 10'-0"=**25 SF**	14 1/2" diameter footing
6	5'-0" X 5'-0"=**25 SF**	14 1/2" diameter footing
7	10'-0" X 5'-0"=**50 SF**	17 1/2" diameter footing
8	5'-0" X 5'-0"=**25 SF**	14 1/2" diameter footing

TABLE R507.5
DECK BEAM SPAN LENGTHS[a, b, g] (feet - inches)

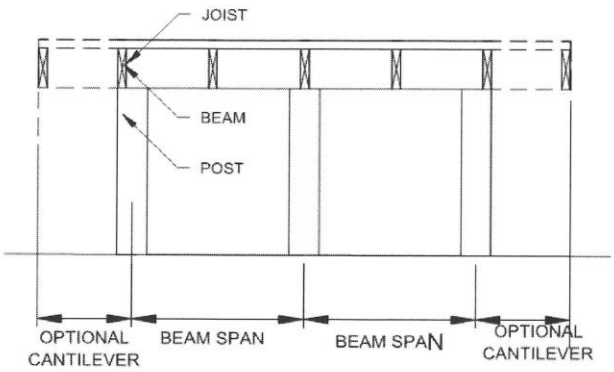
SPECIES[c]	SIZE[d]	DECK JOIST SPAN LESS THAN OR EQUAL TO: (feet)						
		6	8	10	12	14	16	18
Southern pine	1 – 2 × 6	4-11	4-0	3-7	3-3	3-0	2-10	2-8
	1 – 2 × 8	5-11	5-1	4-7	4-2	2-10	3-7	3-5
	1 – 2 × 10	7-0	6-0	5-5	4-11	4-7	4-3	4-0
	1 – 2 × 12	8-3	7-1	6-4	5-10	5-5	5-0	4-9
	2 – 2 × 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2 – 2 × 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2 – 2 × 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2 – 2 × 12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3 – 2 × 6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3 – 2 × 8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3 – 2 × 10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
	3 – 2 × 12	15-3	13-3	11-10	10-9	10-0	9-4	8-10
Douglas fir-larch[e], hem-fir[e], spruce-pine-fir[e], redwood, western cedars, ponderosa pine[f], red pine[f]	3 × 6 or 2 – 2 x 6	5-5	4-8	4-2	3-10	3-6	3-1	2-9
	3 × 8 or 2 – 2 × 8	6-10	5-11	5-4	4-10	4-6	4-1	3-8
	3 × 10 or 2 – 2 × 10	8-4	7-3	6-6	5-11	5-6	5-1	4-8
	3 × 12 or 2 – 2 × 12	9-8	8-5	7-6	6-10	6-4	5-11	5-7
	4 × 6	6-5	5-6	4-11	4-6	4-2	3-11	3-8
	4 × 8	8-5	7-3	6-6	5-11	5-6	5-2	4-10
	4 × 10	9-11	8-7	7-8	7-0	6-6	6-1	5-8
	4 × 12	11-5	9-11	8-10	8-1	7-6	7-0	6-7
	3 – 2 × 6	7-4	6-8	6-0	5-6	5-1	4-9	4-6
	3 – 2 × 8	9-8	8-6	7-7	6-11	6-5	6-0	5-8
	3 – 2 × 10	12-0	10-5	9-4	8-6	7-10	7-4	6-11
	3 – 2 × 12	13-11	12-1	10-9	9-10	9-1	8-6	8-1

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.

a. Live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220-pound point load applied at the end.
b. Beams supporting deck joists from one side only.
c. No. 2 grade, wet service factor.
d. Beam depth shall be greater than or equal to depth of joists with a flush beam condition.
e. Includes incising factor.
f. Northern species. Incising factor not included.
g. Beam cantilevers are limited to the adjacent beam's span divided by 4.



DROPPED BEAM



FLUSH BEAM

R507.6.1 Deck joist bearing. The ends of joists shall have not less than 1½ inches of bearing on wood or metal and not less than 3 inches of bearing on concrete or masonry over its entire width. Joists bearing on top of a multiple-ply beam or ledger shall be toe nailed with 3-10d box or 2-8d common nails. 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.

R507.6.2 Deck joist lateral restraint. 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 (3-inch by 0.128-inch) nails or three No. 10 x 3-inch long wood screws.

TABLE R507.6
DECK JOIST SPANS FOR COMMON LUMBER SPECIES (ft. - in.)

SPECIES[a]	SIZE	ALLOWABLE JOIST SPAN[b] SPACING OF DECK JOISTS (inches)			MAXIMUM CANTILEVER[c, f] SPACING OF DECK JOISTS WITH CANTILEVERS[c] (inches)		
		12	16	24	12	16	24
Southern pine	2 × 6	9-11	9-0	7-7	1-3	1-4	1-6
	2 × 8	13-1	11-10	9-8	2-1	2-3	2-5
	2 × 10	16-2	14-0	11-5	3-4	3-6	2-10
	2 × 12	18-0	16-6	13-6	4-6	4-2	3-4
Douglas fir-larch[d], hem-fir[d] spruce-pine-fir[d],	2 × 6	9-6	8-8	7-2	1-2	1-3	1-5
	2 × 8	12-6	11-1	9-1	1-11	2-1	2-3
	2 × 10	15-8	13-7	11-1	3-1	3-5	2-9
	2 × 12	18-0	15-9	12-10	4-6	3-11	3-3
Redwood, western cedars, ponderosa pine[e], red pine[e]	2 × 6	8-10	8-0	7-0	1-0	1-1	1-2
	2 × 8	11-8	10-7	8-8	1-8	1-10	2-0
	2 × 10	14-11	13-0	10-7	2-8	2-10	2-8
	2 × 12	17-5	15-1	12-4	3-10	3-9	3-1

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.

a. No. 2 grade with wet service factor.

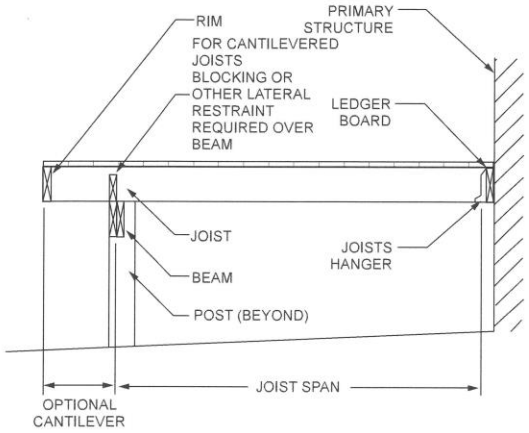
b. Live load = 40 psf, dead load = 10 psf, L/Δ = 360.

c. Live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220-pound point load applied to end.

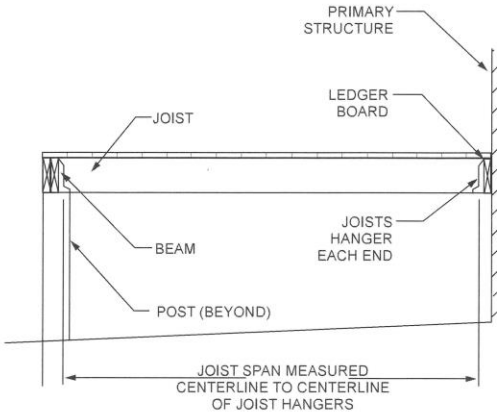
d. Includes incising factor.

e. Northern species with no incising factor.

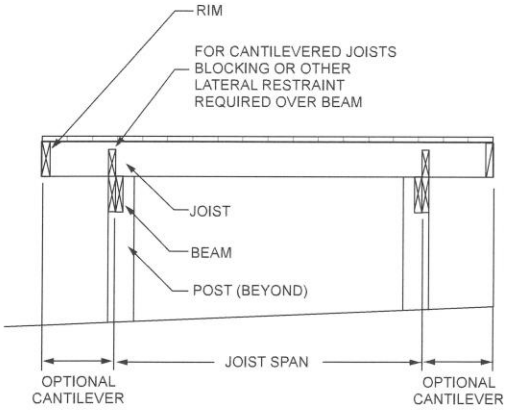
f. Cantilevered spans not exceeding the nominal depth of the joist are permitted.



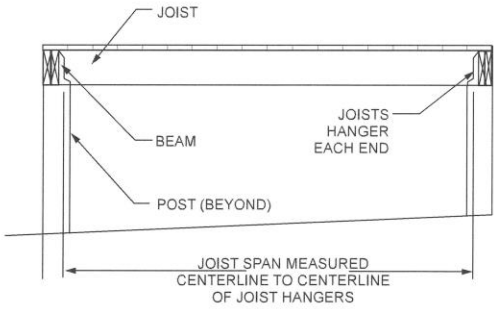
CANTILEVERED JOISTS WITH DROPPED BEAM



JOISTS WITH FLUSH BEAM



JOISTS ON FREE-STANDING DECK WITH DROPPED BEAM



JOISTS ON FREE-STANDING DECK WITH FLUSH BEAM