

DECKS

Decks. 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. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting. For decks with cantilevered framing members, connections to exterior walls or other framing members shall be designed and constructed to resist uplift resulting from the full live load (specified in Table 2) acting on the cantilevered portion of the deck.

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.

Deck ledger connection to band joist. For decks supporting a total design load of 50 pounds per square foot [40 pounds per square foot live load plus 10 pounds per square foot dead load], the connection between a deck ledger of pressure preservative-treated Southern Pine, incised pressure-preservative-treated lumber, or *approved* decay-resistant species, and a 2-inch nominal lumber band joist bearing on a sill plate or wall plate shall be constructed with 1/2-inch lag screws or bolts with washers in accordance with Table 12 or equivalent. Lag screws, bolts, and washers shall be hot-dipped galvanized or stainless steel.



Table 12
Deck Ledger Connection to Band Joist^{a,b}

(Deck live load = 40 psf, deck dead load = 10 psf, snow load ≤ 40 psf)

CONNECTION DETAILS	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'
	On-center spacing of fasteners						
1/2-inch diameter lag screw with 1/2-inch maximum sheathing ^{c,d}	30	23	18	15	13	11	10
1/2-inch diameter bolt with 1/2-inch maximum sheathing ^d	36	36	34	29	24	21	19
1/2-inch diameter bolt with 1-inch maximum sheathing ^e	36	36	29	24	21	18	16

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

- a. Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.
- b. Snow load shall not be assumed to act concurrently with live load.
- c. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- d. Sheathing shall be wood structural panel or solid sawn lumber.
- e. 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 where combined with wood structural panel or lumber sheathing.

Placement of lag screws or bolts in deck ledgers. The lag screws or bolts in deck ledgers and band joists shall be placed in accordance with Table 13 and the figure addressing placement of lag bolts and screws in ledgers.

Table 13
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).

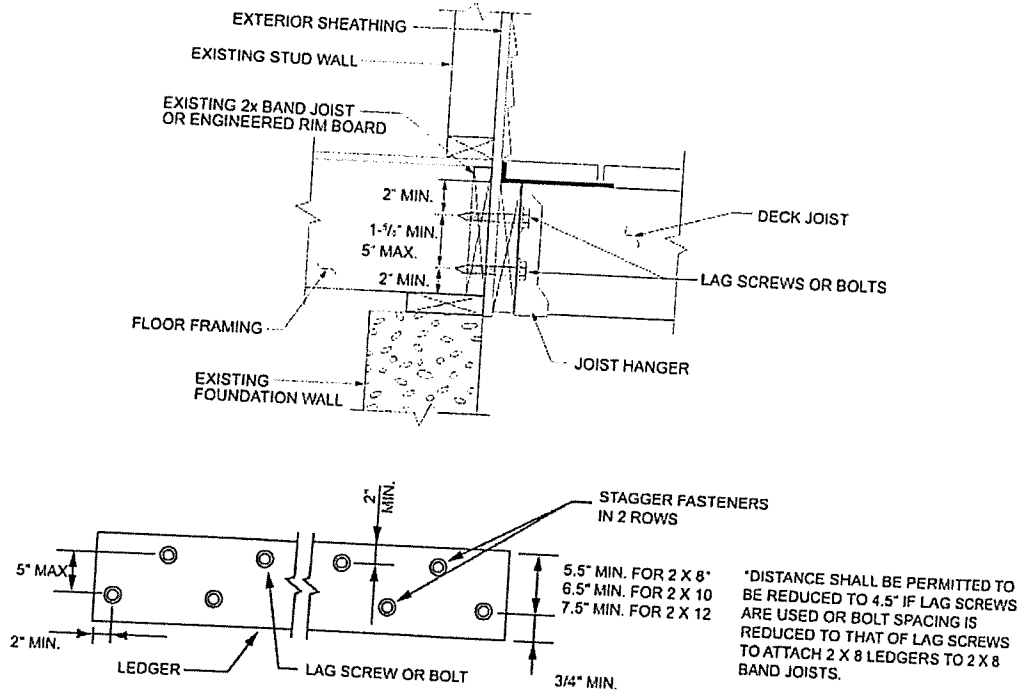


Figure 72
Placement of Lag Screws and Bolts in Ledgers

Alternate deck ledger connections. Deck ledger connections not conforming to Table 12 shall be hot-dipped galvanized or stainless steel and designed in accordance with accepted engineering practice. Girders supporting deck joists shall not be supported on deck ledgers or band joists. Deck ledgers shall not be supported on stone or masonry veneer design capacity of not less than 1,500 pounds.

Decking. Maximum allowable spacing for joists supporting decking shall be in accordance with Table 14. Wood decking shall be attached to each supporting member with not less than (2) 8d threaded nails or (2) No. 8 wood screws.

Table 14
Maximum Joist Spacing for Decking

DECKING MATERIAL TYPE AND NOMINAL SIZE	MAXIMUM ON-CENTER JOIST SPACING	
	Decking perpendicular to joist	Decking diagonal to joist ^a
1 1/4-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

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.01745 rad.
 a. Maximum angle of 45 degrees from perpendicular for wood deck boards.

Deck joists. Maximum allowable spans for wood deck joists shall be in accordance with Table 15. Deck joists shall be permitted to cantilevered in accordance with Table 16 not greater than one-fourth of the actual, adjacent joist span.

Table 15
Deck Joist Spans for Common Lumber Species

SPECIES ^a	SIZE	ALLOWABLE JOIST SPAN ^b			MAXIMUM CANTILEVER ^c		
		SPACING OF DECK JOISTS (inches)			SPACING OF DECK JOISTS WITH CANTILEVERS ^e (inches)		
		12	16	24	12	16	24
Southern pine	2 x 6	9-11	9-0	7-7	1-3	1-4	1-6
	2 x 8	13-1	11-10	9-8	2-1	2-3	2-5
	2 x 10	16-2	14-0	11-5	3-4	3-6	2-10
	2 x 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 x 6	9-6	8-8	7-2	1-2	1-3	1-5
	2 x 8	12-6	11-1	9-1	1-11	2-1	2-3
	2 x 10	15-8	13-7	11-1	3-1	3-5	2-9
	2 x 12	18-0	15-9	12-10	4-6	3-11	3-3
Redwood, western cedars, ponderosa pine ^e , red pine ^e	2 x 6	8-10	8-0	7-0	1-0	1-1	1-2
	2 x 8	11-8	10-7	8-8	1-8	1-10	2-0
	2 x 10	14-11	13-0	10-7	2-8	2-10	2-8
	2 x 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. Ground snow load, live load = 40 psf, dead load = 10 psf, $L/\Delta = 360$.
- c. Ground snow load, live load = 40 psf, dead load = 10 psf, $L/\Delta = 360$ at main span, $L/\Delta = 180$ 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.

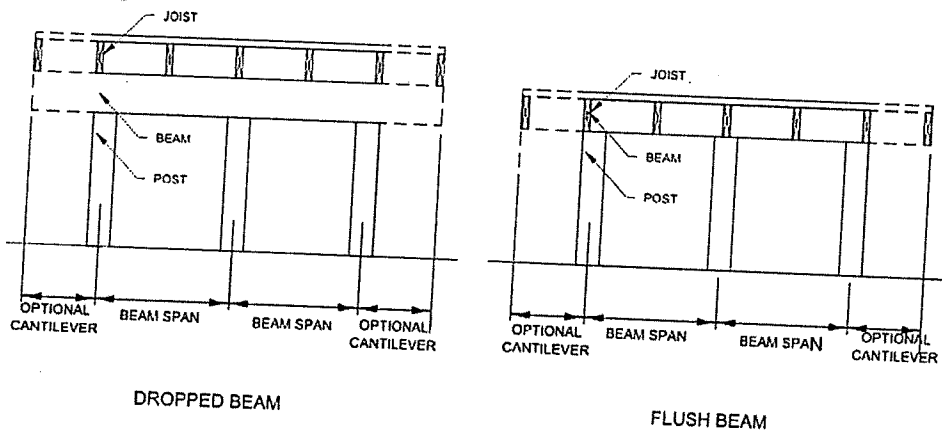


Figure 73
Typical Deck Joist Spans

Cantilevers. For a cantilevered deck joist, the ratio of the backspan to cantilever shall be not greater than one-fourth of the actual, adjacent span. Connections capable of resisting uplift forces shall be provided at the backspan support. Allowable cantilevered joist lengths are in accordance with Table 15.

To simplify, for every foot of cantilever, a minimum of three feet must be on the opposite side of the bearing point.

Table 16
Cantilever Spans for Floor Joists Supporting Exterior Balcony

Member Size	Spacing	Maximum Cantilever Span
		Ground Snow 40 psf
2 x 8	12"	40"
2 x 8	16"	35"
2 x 10	12"	59"
2 x 10	16"	51"
2 x 10	24"	41"
2 x 12	16"	69"
2 x 12	24"	56"

Deck Beams. Maximum allowable spans for wood deck beams shall be in accordance with Table 17. Beam plies shall be fastened with two rows of 10d nails minimum at 16 inches on center along each edge. Beams shall be permitted to cantilever at each end up to one-fourth of the actual beam span. Splices of multi-span beams shall be located at interior post locations.

Table 17
Deck Beam Span Lengths^{a,b,g} (feet—inches)

SPECIES ^e	SIZE ^d	DECK JOIST SPAN WITH LOAD GOING TOWARDS BEAM LINE LESS THAN OR EQUAL TO: (feet)						
		6	8	10	12	14	16	18
Southern pine	1-2 x 6	4-11	4-0	3-7	3-3	3-0	2-10	2-8
	1-2 x 8	5-11	5-1	4-7	4-2	2-10	3-7	3-5
	1-2 x 10	7-0	6-0	5-5	4-11	4-7	4-3	4-0
	1-2 x 12	8-3	7-1	6-4	5-10	5-5	5-0	4-9
	2-2 x 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2-2 x 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2-2 x 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2-2 x 12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3-2 x 6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3-2 x 8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3-2 x 10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
Douglas fir-larch ^f , hem-fir ^f , spruce-pine-fir ^f , redwood, western cedars, ponderosa pine ^f , red pine ^f	3 x 6 or 2-2 x 6	5-5	4-8	4-2	3-10	3-6	3-1	2-9
	3 x 8 or 2-2 x 8	6-10	5-11	5-4	4-10	4-6	4-1	3-8
	3 x 10 or 2-2 x 10	8-4	7-3	6-6	5-11	5-6	5-1	4-8
	3 x 12 or 2-2 x 12	9-8	8-5	7-6	6-10	6-4	5-11	5-7
	4 x 6	6-5	5-6	4-11	4-6	4-2	3-11	3-8
	4 x 8	8-5	7-3	6-6	5-11	5-6	5-2	4-10
	4 x 10	9-11	8-7	7-8	7-0	6-6	6-1	5-8
	4 x 12	11-5	9-11	8-10	8-1	7-6	7-0	6-7
	3-2 x 6	7-4	6-8	6-0	5-6	5-1	4-9	4-6
	3-2 x 8	9-8	8-6	7-7	6-11	6-5	6-0	5-8
	3-2 x 10	12-0	10-5	9-4	8-6	7-10	7-4	6-11
	3-2 x 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. Ground snow load, live load = 40 psf, dead load = 10 psf, L/A = 360 at main span, L/A = 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.

Deck post to deck beam. Deck beams shall be attached to deck posts in accordance with one of the following figures or by other equivalent means capable to resist lateral displacement. Manufactured post-to-beam connectors shall be sized for the post and beam sizes. All bolts shall have washers under the head and nut.

Exception: Where deck beams bear directly on footings.

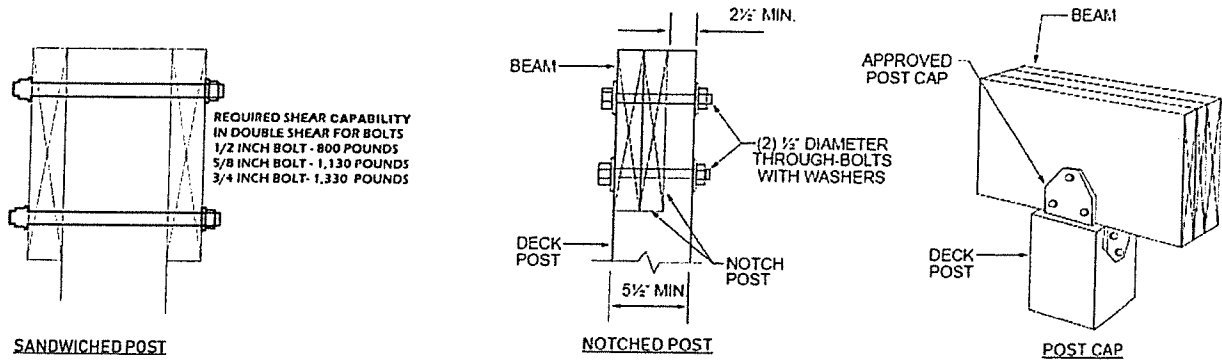


Figure 74
Deck Beam to Deck Post

Deck posts. For single-level wood-framed decks with beams sized in accordance with Table 16, deck post size shall be in accordance with Table 18.

Table 18
Deck Post Height^a

DECK POST SIZE	MAXIMUM HEIGHT ^{a, b} (feet-inches)
4 × 4	6-9 ^c
4 × 6	8
6 × 6	14
8 × 8	14

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

- a. Measured to the underside of the beam.
- b. Based on 40 psf live load.
- c. The maximum permitted height is 8 feet for one-ply and two-ply beams. The maximum permitted height for three-ply beams on post cap is 6 feet 9 inches.

Deck post to deck footing. Attached deck posts shall bear on footings in accordance with the following figure. Posts shall be restrained to prevent lateral displacement at the bottom support. Such lateral restraint shall be provided by manufactured connectors installed in accordance with the manufacturer's instructions or a minimum post embedment of 12 inches in surrounding soils or concrete piers. Decks that are attached to the dwelling unit shall have frost depth footing not less than 42 inches in depth.

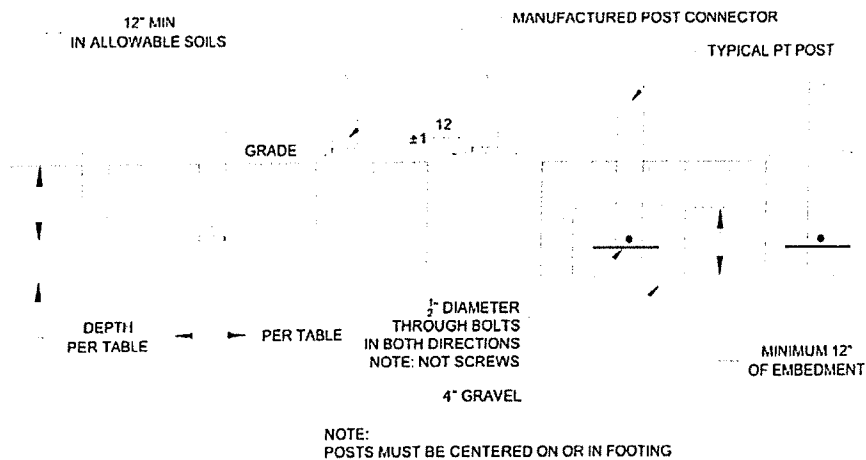


Figure 75

Pier bearing capacity. Pier size shall be based on Table 19.

Table 19
Pier Bearing Capacity

PIER SIZE	BEARING CAPACITY
6 INCH ROUND	600 POUNDS
8 INCH ROUND	1,050 POUNDS
10 INCH ROUND	1,650 POUNDS
12 INCH ROUND	2,340 POUNDS
14 INCH ROUND	3,200 POUNDS
16 INCH ROUND	4,180 POUNDS
18 INCH ROUND	5,300 POUNDS
24 INCH ROUND	9,420 POUNDS

WOOD WALL FRAMING

Requirements. Wall construction shall be capable of accommodating all loads imposed and of transmitting the resulting loads to the supporting structural elements.

Sawn lumber. Sawn lumber shall be identified by a grade mark of an accredited lumber grading or inspection agency and have design values certified by an accreditation body that complies with DOC PS 20. In lieu of a grade mark, a certification of inspection issued by a lumber grading or inspection agency meeting the requirements of this section shall be accepted.

Grade. Studs shall be a minimum No. 3, standard or stud grade lumber.

Exception: Bearing studs not supporting floors and nonbearing studs shall be permitted to be utility grade lumber.

Design and construction. Exterior walls of wood frame construction shall be designed and constructed in accordance with the provisions of this chapter and Figures 76 and 77, or in accordance with AWC NDS.