

## Building permits

Required for any deck attached to a structure or any detached deck more than 30 inches above grade.

## Frost footings/foundations

Required for any deck attached to a dwelling, porch or garage that has frost footings. The minimum depth to the base of the footing is 36 inches. Approved pin foundations are acceptable. Pin foundations are not permitted to support screen porches, 3-season porches or other attached habitable spaces.

## Total load

All decks shall be designed to support a total load of 50 pounds per square foot (40 pounds live load plus 10 pounds dead load).

## Guards/guardrails

Required on all decks or stairs more than 30 inches above grade or a lower deck. *See page four for illustration.* **Exception:** On an open stairway, the triangular opening formed by the riser, tread and bottom element of a guardrail must be sized so that a six inch sphere cannot pass through.

The top rail must support a 200 pound lateral load. Infill area must withstand a horizontally applied normal load of 50 pounds on an area equal to one square foot.

## Cantilevers: Overhanging joists and beams

Refer to table on page two for allowable cantilever spans. Beams shall not overhang support posts by more than one foot unless a special design is approved.

## Framing details

Header beams and joists that frame into ledgers or beams shall be supported by approved framing anchors such as joist hangers.

## Flashing

All connections between deck and dwelling shall be weatherproof. Cuts in exterior finish shall be flashed.

## Nails and screws

Use only stainless steel, high strength aluminum or hot-dipped galvanized.

## Wood required

All exposed wood is required to be approved wood with natural resistance to decay (redwood, cedar, etc.) or approved treated wood. This includes posts, beams, joists, decking and railings.

Any composite or plastic decking materials must be approved by Building and Inspection prior to installation.

## Stairs

Minimum width is 36 inches. Maximum rise is 7-3/4 inches, minimum rise is 4 inches. Minimum run is 10 inches. Largest tread width or riser height shall not exceed the smallest by more than 3/8 inch. Maximum 4 inch opening at risers greater than 30 inches above grade. *See Single-Family Stairways/Guards.*

## Illumination

All exterior stairways shall be illuminated at the landing to the stairway. Illumination shall be controlled from inside the dwelling **or** automatically activated.

## Handrails

The top shall be placed not less than 34 inches or more than 38 inches above the nosing of the treads. Stairways having four or more risers shall have at least one handrail with handrail ends returned or terminated in posts. Circular hand grips shall be between 1-1/4 inches to 2 inches in cross-sectional dimension or the shape shall provide an equivalent gripping surface. *See Single-Family Stairways/Guards.*

## Special design note

Some designs may not be appropriate if a screen porch or 3-season porch on the deck platform is a future consideration. Porch and deck setbacks are not the same.

## Inspections

**Footings inspection required before pouring concrete.**

**Framing inspection required prior to decking if joists are less than 24 inches off the ground.**

**Final inspection of completed work required.**

# JOIST SPAN a, e, f

Based on No. 2 or better Southern pine lumber (also known as Southern Yellow Pine)

Design Load = 40 lb/sqft Live Load + 10lb/sqft Dead Load = 50lb/sqft Total Load, Deflection = L/360

Ratio of back span to cantilever span = 2:1 minimum. A full-depth rim joist is required at cantilever end of joist.

ENG = Cantilevered span shall be engineered

## Deck joist maximum span between supports

	12" OC	16" OC	24" OC
2x6	9'-11"	9'-0"	7'-7"
2x8	13'-1"	11'-10"	9'-8"
2x10	16'-2"	14'-0"	11'-5"
2x12	18'-0"	16'-6"	13'-6"

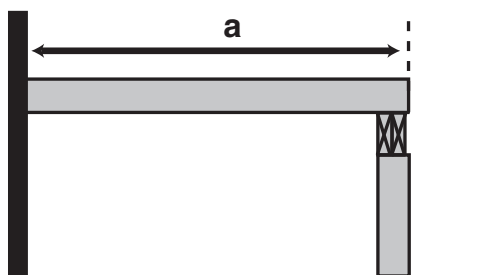
## Deck joist maximum cantilever span

	12" OC	16" OC	24" OC
2x6	24"	24"	ENG
2x8	39"	34"	24"
2x10	57"	49"	40"
2x12	ENG	67"	54"

## Sample calculations for using JOIST SPAN table and BEAM AND FOOTING SIZES table:

### Case I (simple span):

Solution: Refer to tables for joist, beam and footing size requirements.

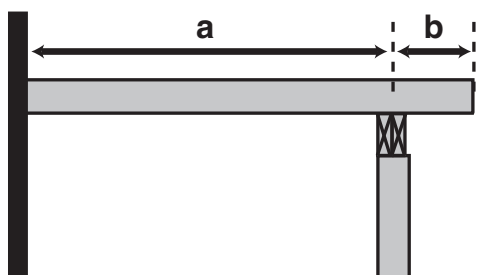


Example: a = 12 feet; Post spacing = 8 feet

Use the **JOIST SPAN** table to find the acceptable joist sizes for a 12 foot span: 2x8s at 12 inches O.C. or 2x10s at 16 inches O.C. are acceptable. Use the **BEAM AND FOOTING SIZES** table and find the 8 foot post spacing column. With a 12 foot deck span, the beam may be three 2x10s. Depending on the type of soil, the footing diameter at the base must be a minimum of 12 inches or 10 inches for the corner post and 17 inches or 14 inches for all intermediate posts.

### Case II (cantilever joists):

Solution: Use "a" to determine joist size and "a" + "2b" to determine beam and footing sizes. The length of "b" is restricted by both the length of "a" and the size of the joists. Refer to the table above for the maximum allowable cantilever length of "b".



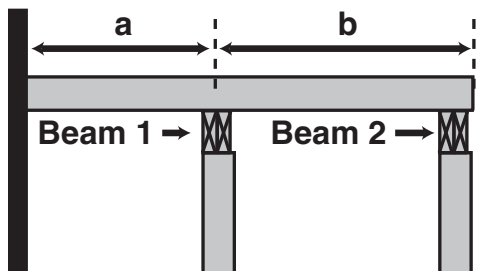
Example: a = 8 feet, b = 2 feet, Post spacing = 10 feet

Refer to the **JOIST SPAN** table. For an 8 foot joist span, 2x6s at 16 inches O.C is acceptable. For sizing the beam, use a joist length of 12 feet (8 feet + 4 feet) and a post spacing of 10 feet. The **BEAM AND FOOTING SIZES** table indicates that the beam may be three 2x12s. Depending on the type of soil, the footing diameter at the base must be a minimum of 15 inches\* or 12 inches\* for the corner post and 20 inches\* or 17 inches\* for all intermediate posts.

\* Note that because of the 2 foot cantilever all footing sizes were increased by 1 inch as required by footnote e at the end of the table.

### Case III (multiple supports):

Solution: Use "a" or "b", whichever is greater, to determine joist size. Use "a" + "b" to determine the size of Beam 1 and the post footing size for the posts supporting Beam 1. Use joist length "b" to determine both the size of Beam 2 and the post footing size for the posts supporting Beam 2.



Example: a = 6 feet, b = 7 feet, Post spacing = 8 feet

Joist size is determined by using the longest span joist (7 feet). The **JOIST SPAN** table indicates that 2x6s at 24" O.C. would be adequate for this span.

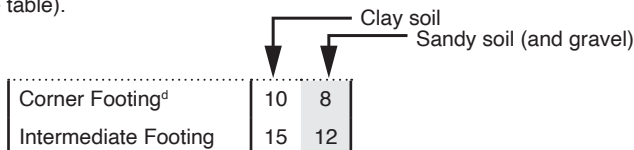
For Beam 1 and footings, use a joist length of 13 feet (6 feet + 7 feet) and a post spacing of 8 feet. The **BEAM AND FOOTING SIZES** table indicates that the beam may be three 2x10s. Depending on the type of soil, the footing diameters for Beam 1 posts shall be 13 inches or 10 inches for the corner (outside) post and 18 inches or 15 inches for all intermediate posts. For Beam 2 and footings use a joist length of 7 feet and post spacing of 8 feet. The beam may be two 2x8s. Depending on the type of soil, the footing diameters for Beam 2 shall be 9 inches or 8 inches for the corner posts, and 13 inches or 11 inches for all intermediate posts.

# BEAM AND FOOTING SIZES <sup>a, e, f</sup>

Based on No. 2 or better Southern pine lumber (also known as Southern Yellow Pine)

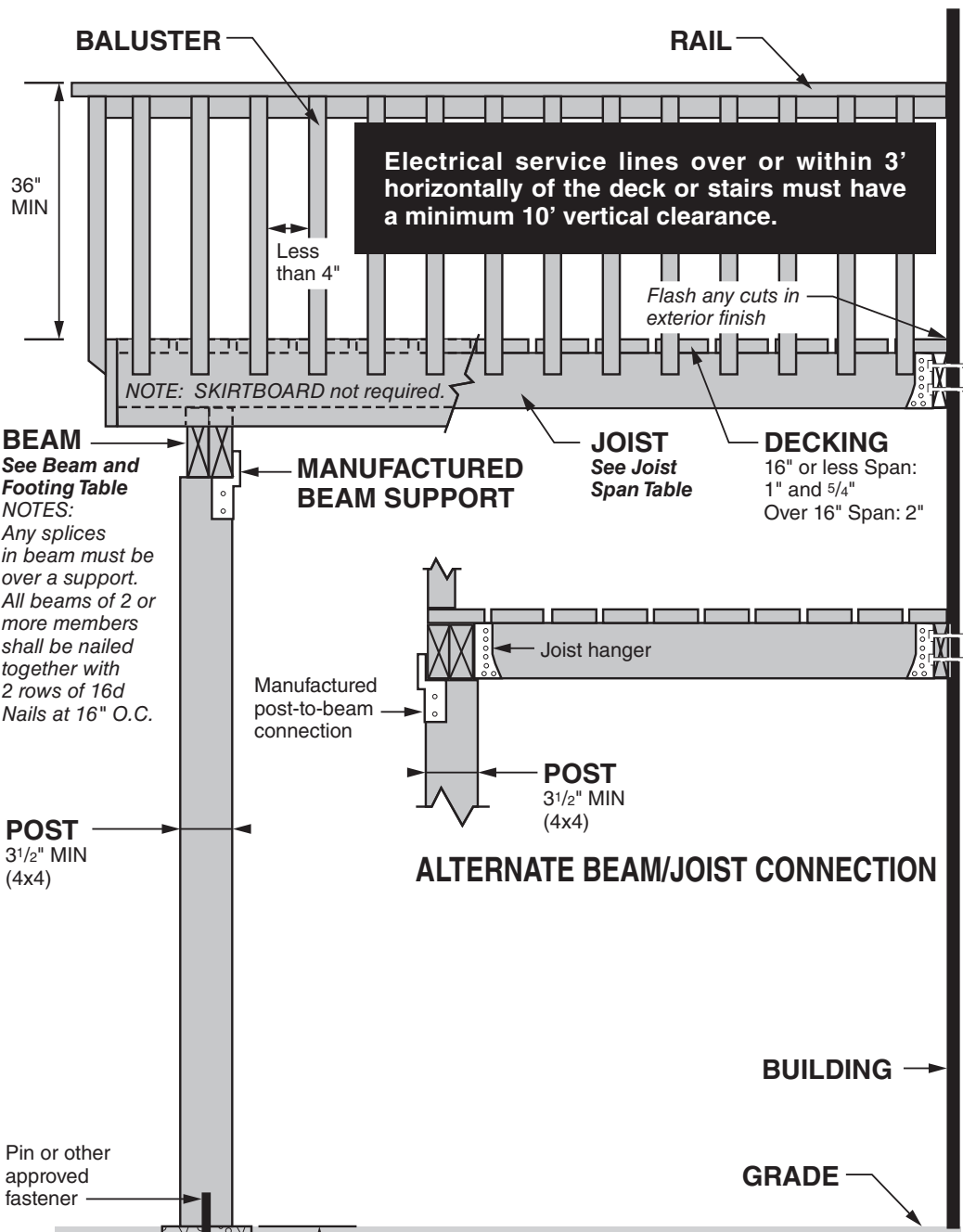
		Post spacing												
		4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'		
Joist Length <sup>g</sup>	6'	Beam Size	2-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10 <sup>b</sup>	2-2x10 <sup>b</sup>	3-2x10 <sup>c</sup>	3-2x10 <sup>c</sup>	3-2x10	3-2x12	
		Corner Footing <sup>d</sup>	8 8	8 8	8 8	8 8	9 8	9 8	10 8	10 8	10 8	10 9	11 9	11 9
		Intermediate Footing <sup>d</sup>	9 8	10 8	10 9	11 9	12 10	13 10	14 11	14 11	14 12	15 12	15 13	16 13
	7'	Beam Size	2-2x6	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10 <sup>b</sup>	2-2x12	3-2x10 <sup>c</sup>	3-2x10	3-2x10	3-2x12	3-2x12
		Corner Footing <sup>d</sup>	8 8	8 8	8 8	9 8	9 8	10 8	10 8	11 9	11 9	11 9	12 10	12 10
		Intermediate Footing <sup>d</sup>	9 8	10 8	11 9	12 10	13 11	14 11	15 12	15 13	15 13	16 13	17 14	17 14
	8'	Beam Size	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10 <sup>b</sup>	2-2x10 <sup>b</sup>	3-2x10 <sup>c</sup>	3-2x10	3-2x10	3-2x12	3-2x12	Eng Bm <sup>h</sup>
		Corner Footing <sup>d</sup>	8 8	8 8	9 8	9 8	10 8	10 8	11 9	12 9	12 9	12 10	13 10	13 11
		Intermediate Footing <sup>d</sup>	10 8	11 9	12 10	13 11	14 11	15 12	16 13	16 13	16 13	17 14	18 15	18 15
	9'	Beam Size	2-2x6	2-2x6	2-2x8	2-2x8	2-2x10 <sup>b</sup>	3-2x8	3-2x10 <sup>c</sup>	3-2x10	3-2x12	3-2x12	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>
		Corner Footing <sup>d</sup>	8 8	8 8	9 8	10 8	10 8	10 9	11 9	12 10	12 10	13 10	13 11	14 11
		Intermediate Footing <sup>d</sup>	10 9	12 10	13 10	14 11	15 12	16 13	17 14	17 14	17 14	18 15	19 15	20 16
	10'	Beam Size	2-2x6	2-2x6	2-2x8	2-2x10 <sup>b</sup>	2-2x10 <sup>b</sup>	3-2x10 <sup>c</sup>	3-2x10	3-2x12	3-2x12	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>
		Corner Footing <sup>d</sup>	8 8	9 8	10 8	10 8	11 9	12 10	12 10	13 11	14 11	14 11	14 12	15 12
		Intermediate Footing <sup>d</sup>	11 9	12 10	14 11	15 12	16 13	17 14	17 14	18 15	18 15	19 16	20 16	21 17
	11'	Beam Size	2-2x6	2-2x6	2-2x8	2-2x10 <sup>b</sup>	2-2x10	3-2x10 <sup>c</sup>	3-2x12	3-2x12	3-2x12	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>
		Corner Footing <sup>d</sup>	8 8	9 8	10 8	11 9	12 9	12 10	13 11	14 11	14 11	14 12	15 12	15 13
		Intermediate Footing <sup>d</sup>	12 9	13 11	14 12	15 13	16 13	17 14	18 15	19 15	20 16	20 16	21 17	22 18
12'	Beam Size	2-2x6	2-2x8	2-2x8	2-2x10 <sup>b</sup>	3-2x10 <sup>c</sup>	3-2x10	3-2x12	3-2x12	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	
	Corner Footing <sup>d</sup>	9 8	10 8	10 9	11 9	12 10	13 10	14 11	14 12	15 12	15 12	15 13	16 13	
	Intermediate Footing <sup>d</sup>	12 10	14 11	15 12	16 13	17 14	18 15	19 16	20 16	21 17	21 17	22 18	23 18	
13'	Beam Size	2-2x6	2-2x8	2-2x10 <sup>b</sup>	2-2x10 <sup>b</sup>	3-2x10 <sup>c</sup>	3-2x12	3-2x12	3-2x12	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	
	Corner Footing <sup>d</sup>	9 8	10 8	11 9	12 10	13 10	13 11	14 12	15 12	15 12	15 13	16 13	17 14	
	Intermediate Footing <sup>d</sup>	13 10	14 12	15 13	17 14	18 15	19 15	20 16	21 17	22 18	22 18	23 19	24 19	
14'	Beam Size	2-2x6	2-2x8	2-2x10	3-2x8	3-2x10 <sup>c</sup>	3-2x12	3-2x12	3-2x12	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	
	Corner Footing <sup>d</sup>	9 8	10 8	11 9	12 10	13 11	14 11	15 12	15 13	16 13	16 13	17 14	17 14	
	Intermediate Footing <sup>d</sup>	13 11	15 12	16 13	17 14	18 15	20 16	21 17	22 18	23 18	23 18	24 19	24 20	
15'	Beam Size	2-2x6	2-2x8	2-2x10 <sup>b</sup>	3-2x10 <sup>c</sup>	3-2x10	3-2x12	3-2x12	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	
	Corner Footing <sup>d</sup>	10 8	11 9	12 10	13 10	14 11	14 12	15 12	16 13	17 14	17 14	17 14	18 15	
	Intermediate Footing <sup>d</sup>	14 11	15 12	17 14	18 15	19 16	20 17	21 17	22 18	23 19	23 19	24 20	25 21	
16'	Beam Size	2-2x6	2-2x8	2-2x10 <sup>b</sup>	3-2x10 <sup>c</sup>	3-2x12	3-2x12	3-2x12	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	
	Corner Footing <sup>d</sup>	10 8	11 9	12 10	13 11	14 11	15 12	16 13	16 13	17 14	17 14	18 15	18 15	
	Intermediate Footing <sup>d</sup>	14 11	16 13	17 14	18 15	20 16	21 17	22 18	23 19	24 20	24 20	25 21	26 21	
17'	Beam Size	2-2x6	2-2x8	2-2x10 <sup>b</sup>	3-2x10 <sup>c</sup>	3-2x12	3-2x12	3-2x12	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	
	Corner Footing <sup>d</sup>	11 9	12 10	13 10	14 11	15 12	16 13	17 13	17 14	18 15	18 15	19 15	19 16	
	Intermediate Footing <sup>d</sup>	15 12	17 13	18 14	19 16	20 17	22 18	23 19	24 20	25 20	25 20	26 21	27 22	
18'	Beam Size	2-2x6	2-2x8	2-2x10 <sup>b</sup>	3-2x10 <sup>c</sup>	3-2x12	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	Eng Bm <sup>h</sup>	
	Corner Footing <sup>d</sup>	11 9	12 10	13 11	14 12	15 12	16 13	17 14	18 14	19 15	19 15	19 16	20 16	
	Intermediate Footing <sup>d</sup>	15 12	17 14	18 15	20 16	21 17	23 18	24 19	25 20	26 21	26 21	27 22	28 23	

- a. All footing sizes are the minimum diameters (in inches) of the footings/ supporting foundations for the support posts. The various footing diameters are listed for two soil types (see example below for use of the table).



- b. 3-2x8 may be substituted for these beams.  
 c. 2-2x12 may be substituted for these beams.  
 d. Minimum diameter of foundation for 6x6 posts is 10".

- e. When joists extend (cantilevers) beyond support beams by 18" or more, add 1" to the footing dimensions shown.  
 f. The following requirements are for use when future construction of a 3-season porch or a screen porch (each with gable-end roofs and either flat or vaulted ceilings) is being considered:  
 1. Increase corner footing size shown by 90%. (multiply size by 1.9)  
 2. Increase center footing size shown by 55%. (multiply size by 1.55)  
 3. Locate all footings at extremities of deck (no cantilevers).  
 4. Beam sizes indicated need not be altered.  
 g. The Joist Length indicated is the clear span between supporting ledgers, beams, etc.  
 h. Engineered Beam required.



## Ledgers

Ledgers shall be the same size as the deck joists (min 2x6.) Install lag screws that penetrate a minimum of 1 1/2" into rim joist or wall studs. (Minimum two 1/2" lag screws every 16". Drill 5/16" hole in rim joist and 1/2" hole in ledger.)

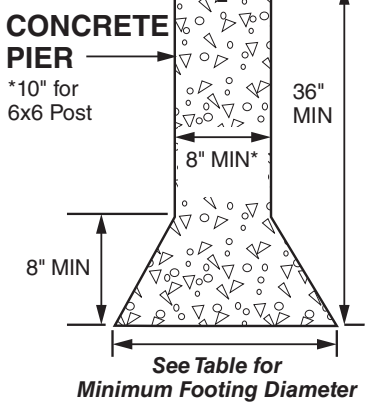
*Note 1: Joist hangers must be correct size for joist size used. Fill all holes with approved joist hanger nails.*

*Note 2: Ledgers (decks) shall not be attached to brick, masonry, stone, hollow masonry or cantilevered portions of building.*

*Note 3: Ledgers that are attached to I-Joists, floor trusses or concrete block shall be reviewed and approved prior to permit issuance.*

*Note 4: Flashing shall be corrosion-resistant metal or approved non-metallic material.*

*Note 5: Lateral resistance devices shall be approved manufactured products.*



### PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS/RIM JOISTS

MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS				
	TOP EDGE	BOTTOM EDGE	ENDS	ROW SPACING
Ledger <sup>a</sup>	2 inches <sup>d</sup>	3/4 inch	2 inches <sup>b</sup>	1 5/8 inches <sup>b</sup>
Band Joist <sup>c</sup>	3/4 inch	2 inches	2 inches <sup>b</sup>	1 5/8 inches <sup>b</sup>

- a. Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger.
- b. Maximum 5".
- c. For engineered rim joists, the manufacturer's recommendations shall govern.
- d. The minimum distance from top row of lag screws or bolts to the top edge of the ledger.

**Placement of lag screws and bolts in ledgers**