

## **Building Permits**

Required for any deck attached to a structure or any detached deck.

## **Frost Footings**

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 48".

## **Live Load**

All decks shall be designed to support a live load of 40 pounds per square foot.

## **Guardrails**

Required on all decks more than 24 inches above grade. Rail must be 36 inches minimum in height. Open guardrails and stair railings must have intermediate rails or an ornamental pattern that a four-inch sphere cannot pass through.

## **Cantilevers: "Overhanging Joists and Beams"**

Joists should not overhang beams by more than two feet, nor should beams overhang posts by more than one foot unless a special design is approved.

## **Flashing**

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

## **Framing Details**

Header beams more than six feet and joists over 12 feet long that frame into ledgers or beams shall be supported by approved framing anchors such as joist hangers.

## **Nails and Screws**

Use only stainless steel, high strength aluminum or hot-dipped galvanized. Approved nails must be used on joist hangers as per manufacturer's specs.

## **Wood Required**

All exposed wood used in the construction of decks is required to be of approved wood of natural resistance to decay (redwood, cedar, etc.) or approved treated wood. This includes posts, beams, joists, decking and railings. When redwood and cedar are proposed, it must be verified as heartwood.

## **Stairs**

Minimum width is 36 inches. Maximum rise is 8 inches, minimum rise is 4 inches. Minimum run is 9 inches. Largest tread width or riser height shall not exceed the smallest by more than 3/16 *inch*. Nominal 2" material required for exterior stair construction.

## **Handrails**

The top shall be placed not less than 30 inches or more than 38 inches above the nosing of the treads. Stairways having four or more risers shall have at least one handrail. Handrail ends shall be returned or terminated in posts. The handgrips shall not be less than 1 1/2 inches or more than 2 inches in cross-sectional dimension or the shape shall provide an equivalent gripping surface. The handgrip shall have a smooth surface with no sharp corners.

## **Special Design Note**

Some deck designs may not be appropriate should the placement of a screen porch or 3-season porch on the deck platform be a future consideration. Setbacks for porches are not the same as setbacks for decks.

**Inspection of footings is required before backfilling post or placement of concrete.**

## **Construction Inspection required:**

- **Prior to decking and after if deck is less than 2 feet from grade.**
- **After completion if deck is more than 2 feet from grade.**

**\* All decks must meet setback requirements for your zoning district. \***

# Joist Span

Based on No.2 or better wood grades.

(Design Load = 40#LL + 10#DL, Deflection= L1360)

|      | Ponderosa Pine |       |       | Southern Pine |       |       | Western Cedar |       |       |
|------|----------------|-------|-------|---------------|-------|-------|---------------|-------|-------|
|      | 12"OC          | 16"OC | 24"OC | 12"OC         | 16"OC | 24"OC | 12"OC         | 16"OC | 24"OC |
| 2x6  | 9-2            | 8-4   | 7-0   | 10-9          | 9-9   | 8-6   | 9-2           | 8-4   | 7-3   |
| 2x8  | 12-1           | 10-10 | 8-10  | 14-2          | 12-10 | 11-0  | 12-1          | 11-0  | 9-2   |
| 2x10 | 15-4           | 13-3  | 10-10 | 18-0          | 16-1  | 13-5  | 15-5          | 13-9  | 11-3  |
| 2x12 | 17-9           | 15-5  | 12-7  | 21-9          | 19-0  | 15-4  | 18-5          | 16-0  | 13-0  |

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

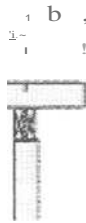
Example: a = 12'; Post Spacing = 8'

Use the **Joist Span** table to find the acceptable joist sizes for a 12' span, 2x8s at 12" G.C., 2x10s at 16" G.C. or 2x12s at 24" G.C.

Use the **Beam and Footing Sizes** table and find the 8' post spacing column. With a 12' deck span, the beam may be either two 2x8s or two 2x10s, depending on wood used. Depending on the type of soil, the footing diameter at the base must be a minimum of 12", 10" or 9" for the corner post and 17", 14" or 12" for all intermediate posts.

Example: a = 8', b = 2', Post Spacing = 10'

Refer to the **Joist Span** table. For an 8' joist span, either 2x8s at 24" G.C. or 2x6s at 16" G.C. are acceptable.



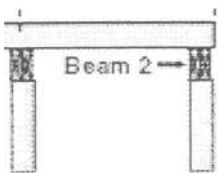
For sizing the beam, use a joist length of 10' (8' + 2') and a post spacing of 10'. The **Beam and Footing Sizes** table indicates that the beam may be either two 2x10s or two 2x12s, depending on wood used. Depending on the type of soil, the footing diameter at the base must be a minimum of 13", 11" or 10" for the corner post and 18", 15" or 13" for all intermediate posts. Note that because of the 2' cantilever all footing sizes were increased by 1" as required by footnote 2 at the end of the table.

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', b = 7', Post Spacing = 9'

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

For Beam 1 and footings, use a joist length of 13' (6' + 7') and a post spacing of 9'. The **Beam and Footing Sizes** table indicates that the beam may be two 2x12s, depending on the wood used. Depending on the type of soil, the footing diameters for Beam 1 posts shall be 13", 11" or 9" for the corner (outside) post and 19", 15" or 13" for all intermediate posts. For Beam 2 and footings, use a joist length of 7' and post spacing of 9'. The beam may be two 2x8s or two 2x10s, depending on wood used. Depending on the type of soil, the footing diameters for Beam 2 shall be 10", 8" or 7" for the corner posts, and 14", 11" or 10" for all intermediate posts.



Use "a" to determine joist size and "a" + "b" to determine beam and footing sizes. The length of "b" is restricted by both the length of "a" and the size of the joists.

# Beam and Footing Sizes

Based on No.2 or better Ponderosa Pine and Southern Pine  
(Treated for weather and/or ground exposure)

|     |                      | Post Soaking |          |          |          |          |          |          |          |          |          |          |          |
|-----|----------------------|--------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
|     |                      | 4'           | 5'       | 6'       | 7'       | 8'       | 9'       | 10'      | 11'      | 12'      | 13'      | 14'      |          |
| 6'  | Southern Pine Beam   | 1-2x6        | 1-2x6    | 1-2x6    | 2-2x6    | 2-2x6    | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x10   | 2-2x10   |
|     | Ponderosa Pine Beam  | 1-2x6        | 1-2x6    | 1-2x6    | 2-2x8    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x10   | 2-2x10   | 2-2x12   | 2-2x12   |
|     | Corner Footing       | 6 5 4        | 7 6 5    | 7 6 5    | 8 7 6    | 9 7 6    | 9 7 6    | 10 8 7   | 10 8 7   | 10 8 7   | 10 9 7   | 11 9 8   | 11 9 8   |
|     | Intermediate Footing | 9 8 7        | 10 8 7   | 10 9 7   | 11 9 8   | 12 10 9  | 12 10 9  | 13 10 9  | 14 11 10 | 14 12 10 | 15 12 10 | 15 13 11 | 16 13 11 |
| 7'  | Southern Pine Beam   | 1-2x6        | 1-2x6    | 1-2x6    | 2-2x6    | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x10   | 2-2x12   | 2-2x12   |
|     | Ponderosa Pine Beam  | 1-2x6        | 1-2x6    | 1-2x6    | 2-2x8    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x10   | 2-2x12   | 3-2x10   | 3-2x10   |
|     | Corner Footing       | 7 5 5        | 7 6 5    | 8 7 6    | 9 7 6    | 9 8 7    | 10 8 7   | 10 8 7   | 10 8 7   | 11 9 8   | 11 9 8   | 12 10 9  | 12 10 9  |
|     | Intermediate Footing | 9 8 7        | 10 8 7   | 11 9 8   | 12 10 9  | 13 11 9  | 14 11 10 | 15 12 10 | 15 12 10 | 16 13 11 | 16 13 11 | 17 14 12 | 17 14 12 |
| 8'  | Southern Pine Beam   | 1-2x6        | 1-2x6    | 2-2x6    | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x10   | 2-2x12   | 2-2x12   |
|     | Ponderosa Pine Beam  | 1-2x6        | 1-2x6    | 2-2x8    | 2-2x8    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x10   | 3-2x10   | 3-2x10   | 3-2x12   |
|     | Corner Footing       | 7 6 5        | 8 6 6    | 9 7 6    | 9 8 7    | 10 8 7   | 10 8 7   | 10 8 7   | 11 9 8   | 11 9 8   | 12 10 9  | 13 10 9  | 13 11 9  |
|     | Intermediate Footing | 10 8 7       | 11 9 8   | 12 10 9  | 13 11 9  | 14 11 10 | 15 12 10 | 15 12 10 | 16 13 11 | 16 13 12 | 17 14 12 | 18 15 13 | 18 15 13 |
| 9'  | Southern Pine Beam   | 1-2x6        | 1-2x6    | 2-2x6    | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x10   | 2-2x12   | 2-2x12   | 3-2x10   |
|     | Ponderosa Pine Beam  | 1-2x6        | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x10   | 2-2x10   | 3-2x10   | 3-2x10   | 3-2x12   | 3-2x12   |
|     | Corner Footing       | 7 6 5        | 8 7 6    | 9 7 6    | 10 8 7   | 10 9 7   | 11 9 8   | 12 10 8  | 12 10 9  | 13 10 9  | 13 11 9  | 14 11 10 | 14 11 10 |
|     | Intermediate Footing | 10 9 7       | 12 10 8  | 13 10 9  | 14 11 10 | 15 12 10 | 16 13 11 | 17 14 12 | 17 14 12 | 18 15 13 | 19 15 13 | 20 16 14 | 20 16 14 |
| 10' | Southern Pine Beam   | 1-2x6        | 1-2x6    | 2-2x6    | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x10   | 2-2x12   | 2-2x12   | 3-2x10   |
|     | Ponderosa Pine Beam  | 1-2x6        | 1-2x6    | 2-2x8    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x10   | 3-2x10   | 3-2x10   | 3-2x12   | Eng Bm   |
|     | Corner Footing       | 8 6 6        | 9 7 6    | 10 8 7   | 10 8 7   | 11 9 8   | 12 10 8  | 12 10 9  | 13 11 9  | 14 11 10 | 14 12 10 | 15 12 10 | 15 12 10 |
|     | Intermediate Footing | 11 9 8       | 12 10 9  | 14 11 10 | 15 12 10 | 16 13 11 | 17 14 12 | 17 14 12 | 18 15 13 | 19 16 14 | 20 16 14 | 21 17 15 | 21 17 15 |
| 11' | Southern Pine Beam   | 1-2x6        | 2-2x6    | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x12   | 2-2x12   | 3-2x10   | 3-2x10   | 3-2x12   |
|     | Ponderosa Pine Beam  | 2-2x6        | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x12   | 2-2x12   | 3-2x10   | 3-2x12   | 3-2x12   | Eng Bm   | Eng Bm   |
|     | Corner Footing       | 8 7 6        | 9 7 6    | 10 8 7   | 11 9 8   | 12 9 8   | 12 10 9  | 13 11 9  | 14 11 10 | 14 12 10 | 15 12 10 | 15 13 11 | 15 13 11 |
|     | Intermediate Footing | 12 9 8       | 13 11 9  | 14 12 10 | 15 12 10 | 16 13 11 | 17 14 12 | 17 14 12 | 18 15 13 | 19 16 14 | 20 16 14 | 21 17 15 | 21 17 15 |
| 12' | Southern Pine Beam   | 1-2x6        | 2-2x6    | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x12   | 3-2x10   | 3-2x10   | 3-2x12   | 3-2x12   |
|     | Ponderosa Pine Beam  | 2-2x6        | 2-2x6    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x12   | 2-2x12   | 3-2x12   | 3-2x12   | Eng Bm   | Eng Bm   | Eng Bm   |
|     | Corner Footing       | 9 7 6        | 10 8 7   | 10 9 7   | 11 9 8   | 12 10 9  | 13 10 9  | 14 11 10 | 14 12 10 | 15 12 10 | 15 13 11 | 16 13 11 | 16 13 11 |
|     | Intermediate Footing | 12 10 9      | 14 11 10 | 15 12 10 | 16 13 11 | 17 14 12 | 18 15 13 | 19 16 14 | 20 16 14 | 21 17 15 | 22 18 15 | 23 18 16 | 23 18 16 |
| 13' | Southern Pine Beam   | 1-2x6        | 2-2x6    | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x12   | 3-2x10   | 3-2x12   | 3-2x12   | 3-2x12   |
|     | Ponderosa Pine Beam  | 2-2x6        | 2-2x6    | 2-2x8    | 2-2x10   | 2-2x12   | 2-2x12   | 2-2x12   | 3-2x12   | 3-2x12   | Eng Bm   | Eng Bm   | Eng Bm   |
|     | Corner Footing       | 9 7 6        | 10 8 7   | 11 9 8   | 12 10 8  | 13 10 9  | 13 11 9  | 14 12 10 | 15 12 10 | 15 13 11 | 16 13 11 | 17 14 12 | 17 14 12 |
|     | Intermediate Footing | 13 10 9      | 14 12 10 | 15 13 11 | 16 13 11 | 17 14 12 | 18 15 13 | 19 15 13 | 20 16 14 | 21 17 15 | 22 18 15 | 23 19 16 | 24 19 17 |
| 14' | Southern Pine Beam   | 1-2x6        | 2-2x6    | 2-2x6    | 2-2x8    | 2-2x10   | 2-2x10   | 2-2x12   | 2-2x12   | 3-2x10   | 3-2x12   | 3-2x12   | 3-2x12   |
|     | Ponderosa Pine Beam  | 2-2x6        | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x12   | 3-2x10   | 3-2x12   | 3-2x12   | Eng Bm   | Eng Bm   | Eng Bm   | Eng Bm   |
|     | Corner Footing       | 9 8 7        | 10 8 7   | 11 9 8   | 12 10 9  | 13 11 9  | 14 11 10 | 15 12 10 | 15 13 11 | 16 13 11 | 17 14 12 | 17 14 12 | 17 14 12 |
|     | Intermediate Footing | 13 11 9      | 15 12 10 | 16 13 11 | 17 14 12 | 18 15 13 | 20 16 14 | 21 17 15 | 22 18 15 | 23 18 16 | 24 19 17 | 24 20 17 | 24 20 17 |
| 15' | Southern Pine Beam   | 2-2x6        | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x12   | 2-2x12   | 3-2x10   | 3-2x12   | 3-2x12   | Eng Bm   | Eng Bm   |
|     | Ponderosa Pine Beam  | 2-2x6        | 2-2x8    | 2-2x8    | 2-2x10   | 3-2x10   | 3-2x10   | 3-2x12   | 3-2x12   | Eng Bm   | Eng Bm   | Eng Bm   | Eng Bm   |
|     | Corner Footing       | 10 8 7       | 11 9 8   | 12 10 8  | 13 10 9  | 14 11 10 | 14 12 10 | 15 12 11 | 16 13 11 | 17 14 12 | 17 14 12 | 18 15 13 | 18 15 13 |
|     | Intermediate Footing | 14 11 10     | 15 12 11 | 17 14 12 | 18 15 13 | 19 16 14 | 20 17 14 | 21 17 15 | 22 18 16 | 23 19 17 | 24 20 17 | 25 21 18 | 25 21 18 |
| 16' | Southern Pine Beam   | 2-2x6        | 2-2x6    | 2-2x8    | 2-2x8    | 2-2x10   | 2-2x12   | 2-2x12   | 3-2x10   | 3-2x12   | 3-2x12   | Eng Bm   | Eng Bm   |
|     | Ponderosa Pine Beam  | 2-2x6        | 2-2x8    | 2-2x10   | 2-2x10   | 3-2x10   | 3-2x10   | 3-2x12   | 3-2x12   | Eng Bm   | Eng Bm   | Eng Bm   | Eng Bm   |
|     | Corner Footing       | 10 8 7       | 11 9 8   | 12 10 9  | 13 11 9  | 14 11 10 | 15 12 10 | 16 13 11 | 16 13 12 | 17 14 12 | 18 15 13 | 18 15 13 | 18 15 13 |
|     | Intermediate Footing | 14 11 10     | 16 13 11 | 17 14 12 | 18 15 13 | 20 16 14 | 21 17 15 | 22 18 16 | 23 19 16 | 24 20 17 | 25 21 18 | 26 21 18 | 26 21 18 |

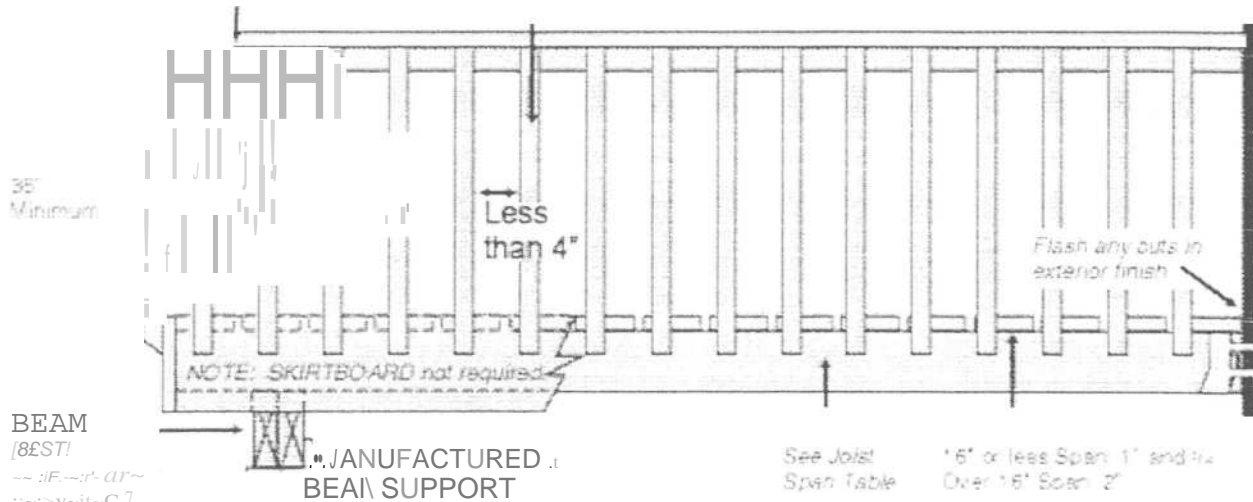
**Notes:**

- Joist length is total length of joist, including any cantilevers.
- When joist extends (cantilevers) beyond support beam by 18" or more, add 1" to footing dimensions shown.
- Requirements for future 3-season porches or screen porches:
  - Increase corner footing size to 24" x 24" x 12" thick.
  - Increase center footing size to 24" x 24" x 12" thick.
  - Locate all footings at extremities of deck (no cantilevers).
  - Beam sizes indicated need not be altered.

4. All footing sizes above are base diameters (in inches) and are listed for THREE SOIL TYPES:

CLAY  
SAND

|                      |          |
|----------------------|----------|
| Corner Footing       | 10 8 7   |
| Intermediate Footing | 14 11 10 |



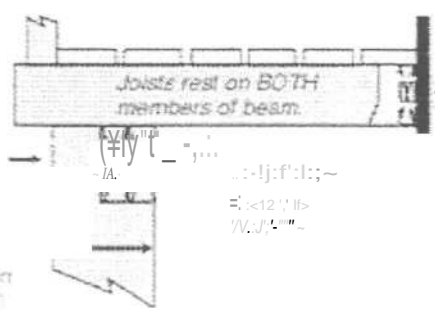
BEAM  
[BEST]  
Any splices  
in beam must be  
over a support

MANUFACTURED  
BEAM SUPPORT

See Joist  
Span Table  
6" or less Span: 1" and 1/2"  
Over 6" Span: 2"

POST  
3/4" Minimum

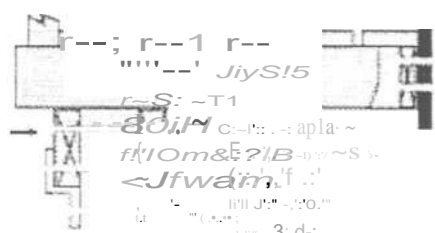
ALTER  
BEAM  
(BE/En)



5/8" Minimum  
(4X5 or 5X5)

that penetrate  
1 1/2" minimum into  
the beam.

ALTER  
BEAM



98" Minimum

ALTERNATE  
FOOTING

BACKFILL MATERIAL

POST

GRADE

CONCRETE  
PIER  
FOOTING

See Table  
for Footing Size

See Table  
for Footing Size

## Residential Deck Information

The following are some major requirements concerning decks from the Wisconsin State Building Code. Each new deck built must conform to these specifications.  
Decks are required to be inspected by All Croix Inspections.

|                                   |  |
|-----------------------------------|--|
| <b>Footings</b>                   | Minimum of 48" below finish grade.   |
| <b>Load</b>                       | Must be able to support 40lbs. per square foot live load   |
| <b>Guardrail</b>                  | Minimum height of 36". Design to prevent through passage of 4" sphere or larger. Required if higher than 24" to grade.   |
| <b>Steps / Landing</b>            | Minimum width is 36"<br>Maximum riser 8"<br>Minimum run 9"<br>All steps must be uniform (within 3/8")<br>Level landing shall be at least 3' x 3'   |
| <b>Handrail on Steps</b>          | Required if more than 3 risers. Height between 30" to 38", from nosing of tread. Handrails should be symmetrical about the vertical centerline to allow equal wrap around of the thumb and fingers.    |
| <b>Cantilever</b>                 | Maximum of 24" overhang of Joists from support beam  |
| <b>Flashing</b>                   | All connections between deck and dwelling need to be weatherproof.   |
| <b>Joist Hangers &amp; Joists</b> | All Joists need to be properly secured with approved Joist hangers and nails. Floor joists must have blocking at 8' intervals.   |
| <b>Nails and Screws</b>           | Use only stainless steel, high strength aluminum, or hot-dipped galvanized.  |
| <b>Wood Materials</b>             | All exposed wood used in the construction of decks is required to be approved wood of natural resistance to decay or approved treated wood. This includes posts, beams, joists, decking, and railings. |

Inspection of footing is required before backfilling post or placement of concrete.  
Final inspection when deck is completed.