



City of Hudson

205 Third Street
Hudson, Wisconsin 54016-1604
FAX (715) 386-3385

Michael J. Wallace
Assistant Building Inspector
(715) 386-3775

David Gray
Assistant Building Inspector/Engineer

Elizabeth A. Molnar
Administrative Assistant

Guide for Constructing Residential Decks

Building Permits

Building permits are required for any deck built in the City of Hudson. A building permit application shall include:

1. Site plan (showing distance from deck to all property lines)
2. Deck plan (identifying all construction details)
3. Completed application form.

Deck Design

All decks shall be designed to support 40 pounds per square foot live load and all appropriate dead loads. Any decks intended to support hot tubs or roofs shall be designed to carry the additional weight. Weight and capacity of hot tubs shall be identified on plans.

Cantilevers – Overhanging Joists and Beams

Joists shall not overhang beams by more than 2 feet, nor shall beams overhang posts by more than 1 foot, unless an engineered plan is submitted.

Inspections

1. Footing Inspections: Required before placement of concrete.
2. Framing Inspections:
 - a. For decks less than 2 feet from grade – Framing inspection required prior to installation of decking material.
 - b. For decks more than 2 feet from grade – Framing inspection required after completion.

Frost Footings

Footings are required to support any deck attached to a structure. Footings shall be designed to adequately support loads and be a minimum of 48" deep.

Resistance to Decay

All exposed wood shall be naturally resistant to decay (redwood, cedar, etc) or approved pressure treated wood. This includes posts, beams, joists, decking, guardrails and handrails.

Flashing

All connections between the deck and adjoining walls shall be weatherproof. Flashing shall be corrosive-resistant material.



Fasteners

Use only stainless steel, high strength aluminum, or hot-dipped galvanized. Joist hangers shall be secured per manufacturers specifications.

Guardrails

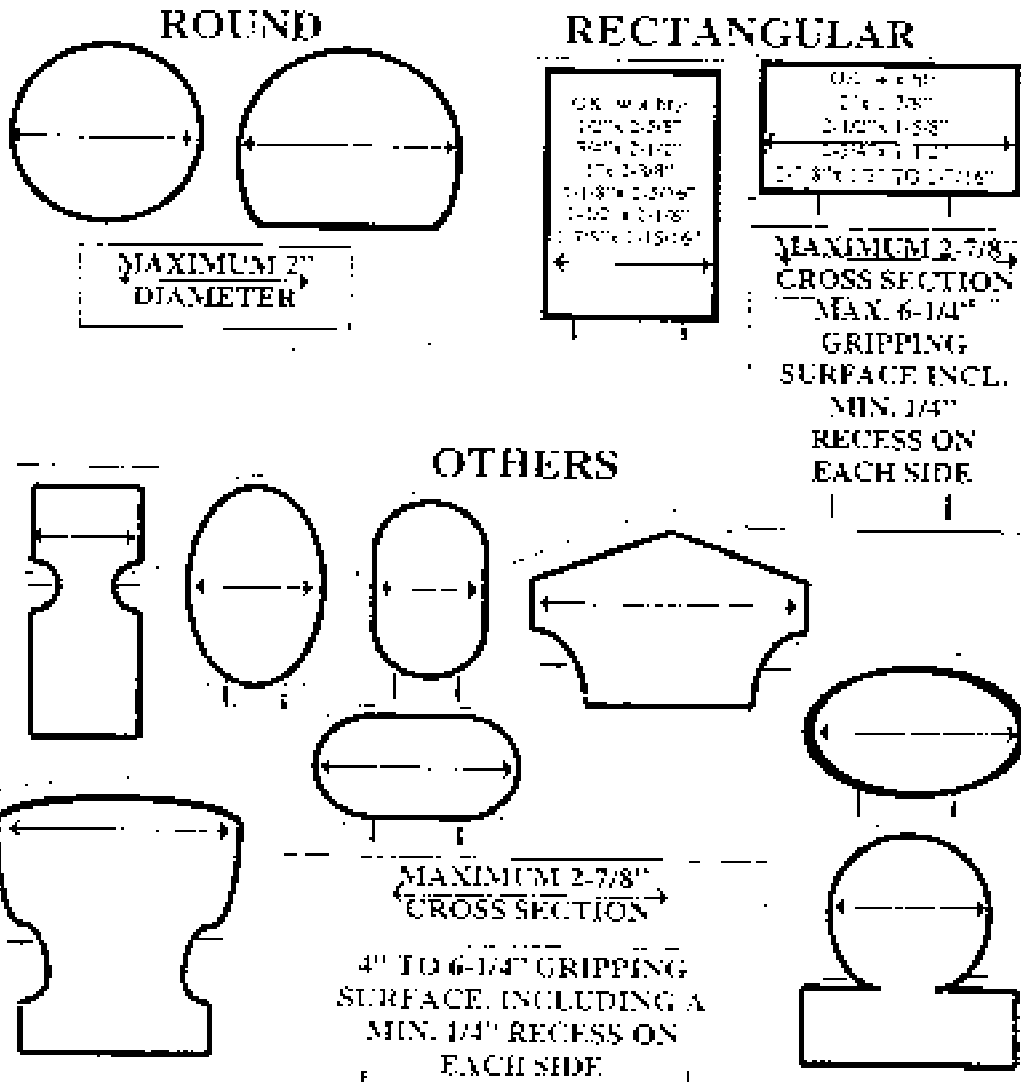
Guardrails are required for all decks more than 24" above grade or stairs exceeding three risers. When required, guardrails shall be a minimum of 36" above the decking. Openings in guardrails shall have rails or an ornamental pattern such that a 4 inch sphere cannot pass through.

Handrails

Stairs with more than three risers shall be provided with at least one handrail for the full length of stairs. Handrails shall be located between 30 – 38 inches above the nosing of the treads. See attached for example of acceptable handrails.

21.04(2)(a)5.

HANDRAIL SHAPES



Joist Span

Based on No. 2 or better wood grades.
 (Design Load = 40#LL + 10#DL, Deflection = L/360)

	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

Sample Calculations for Using Joist Span, Beam Size and Footing Size Tables

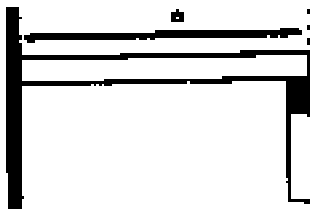
CASE I SOLUTION:

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" O.C., 2x10s at 16" O.C. or 2x12s at 24" O.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.

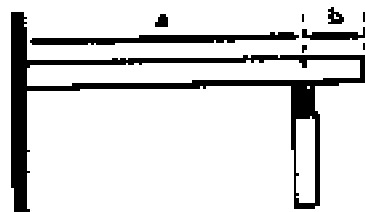


Use "a" to determine joist size and "a" + "b" to determine beam and footing sizes. The length of "b" is restricted by both the length of "a" and the size of the joists.

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

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

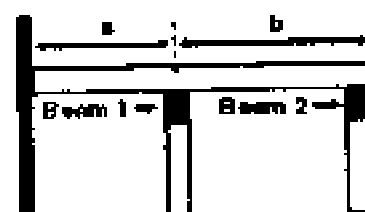


Use "a" or "b", whichever is greater, to determine joist size. Use "a" + "b" to determine the size of Beam 1 and the post footing size for the posts supporting Beam 1. Use joist length "b" to determine both the size of Beam 2 and the post footing size for the posts supporting Beam 2.

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" O.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 2x10s or 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.



Beam and Footing Sizes

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

		Post Spacing										
		4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'
5'	Southern Pine Beam	1 2x6	1 2x8	1 2x6	2 2x6	2 2x6	2 2x6	2 2x8	2 2x8	2 2x10	2 2x10	2 2x10
	Ponderosa Pine Beam	1 2x6	1 2x8	1 2x8	2 2x8	2 2x8	2 2x8	2 2x10	2 2x10	2 2x12	2 2x12	2 2x10
7'	Corner Footing	6 8 4	7 6 5	7 6 5	8 7 6	9 7 6	9 7 6	10 8 7	10 8 7	10 9 7	11 8 8	11 9 8
	Intermediate Footing	9 8 7	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
9'	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
	Ponderosa Pine Beam	1 2x6	1 2x8	1 2x8	2 2x8	2 2x8	2 2x10	2 2x10	2 2x10	2 2x12	2 2x12	2 2x10
11'	Corner Footing	7 6 5	8 6 5	9 7 6	9 8 7	10 8 7	10 8 7	11 9 8	11 9 8	12 10 9	13 10 9	13 10 9
	Intermediate Footing	10 8 7	11 9 8	12 10 9	13 11 9	14 11 10	15 12 10	16 13 11	16 13 11	17 14 12	18 15 13	18 15 13
13'	Southern Pine Beam	1 2x6	1 2x6	2 2x6	2 2x6	2 2x8	2 2x8	2 2x10	2 2x10	2 2x12	2 2x12	3 2x10
	Ponderosa Pine Beam	1 2x6	1 2x8	2 2x8	2 2x8	2 2x10	2 2x10	2 2x10	2 2x12	2 2x12	3 2x12	3 2x10
15'	Corner Footing	7 6 5	8 7 6	9 7 6	10 8 7	10 8 7	11 9 8	12 10 9	12 10 9	13 10 9	13 11 9	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
17'	Southern Pine Beam	1 2x6	1 2x6	2 2x6	2 2x6	2 2x8	2 2x8	2 2x10	2 2x10	2 2x12	2 2x12	3 2x10
	Ponderosa Pine Beam	1 2x6	1 2x8	2 2x8	2 2x8	2 2x10	2 2x10	2 2x12	2 2x12	3 2x12	3 2x12	Eng Bm
19'	Corner Footing	8 6 5	9 7 6	10 8 7	10 8 7	11 9 8	12 10 9	12 10 9	13 11 9	14 11 10	14 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'	Southern Pine Beam	1 2x6	2 2x6	2 2x6	2 2x8	2 2x8	2 2x10	2 2x10	2 2x12	2 2x12	3 2x10	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
23'	Corner Footing	8 7 6	9 7 6	10 9 7	11 9 8	12 9 8	13 10 9	13 10 9	14 11 10	14 12 10	15 12 10	15 12 10
	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
25'	Southern Pine Beam	1 2x6	2 2x6	2 2x6	2 2x8	2 2x8	2 2x10	2 2x10	2 2x12	3 2x10	3 2x12	3 2x10
	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
27'	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
	Intermediate Footing	13 10 9	14 12 10	15 13 11	17 14 12	18 15 13	19 15 13	20 16 14	21 17 15	22 18 15	23 18 15	24 19 17
29'	Southern Pine Beam	1 2x6	2 2x6	2 2x6	2 2x8	2 2x10	2 2x10	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
31'	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
	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 15	24 19 17	24 20 17
33'	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
	Ponderosa Pine Beam	2 2x6	2 2x8	2 2x8	2 2x10	3 2x10	3 2x12	3 2x12	3 2x12	Eng Bm	Eng Bm	Eng Bm
35'	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
	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 15	23 19 17	24 20 17	25 21 18
37'	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
	Ponderosa Pine Beam	2 2x6	2 2x8	2 2x10	2 2x10	3 2x10	3 2x12	3 2x12	Eng Bm	Eng Bm	Eng Bm	Eng Bm
39'	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 11	17 14 12	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 18 16	24 20 17	25 21 18	26 21 18

Notes:

- Joist length is total length of joist, including any runblers.
- 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 shown by 90%.
 - Increase center footing size shown by 55%.
 - 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.

