City of Lakeville
Positioned to Thrive

Building Inspections Department
20195 Holyoke Ave, Lakeville, MN 55044
Phone #: (952)985-4440
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RESIDENTIAL DECKS

Building and Zoning Requirements

(Effective date 1/24/15)
(Revised 7/1/15)

PERMIT SUBMITAL CHECKLIST:

☐ Signed completed Building Permit application form.

☐ 2 Copies of a Certificate of Survey, drawn to scale indicating the lot dimensions, the location and ground coverage area of existing structure(s), and the location and area of the proposed deck. Indicate the setbacks from property lines. A Certificate of Survey for the property may be on file at City Hall.

☐ 2 Copies of deck plans showing proposed designs and materials. Plans shall be drawn to scale and shall include the following information:

1. A floor plan indicating the following:
   - ☐ Proposed deck size.
   - ☐ Size and spacing of floor joists and beams.
   - ☐ Size of decking.
   - ☐ Existing house rim-board and attachment method to existing house
   - ☐ Decking material
   - ☐ Size, location and spacing of posts.
   - ☐ Species and grade of lumber to be used.

2. Elevations indicating the following:
   - ☐ Height of structure from established grade.
   - ☐ Diameter and depth of footings.
   - ☐ Guardrail height (if any.)
   - ☐ Spacing of intermediate rails (if any.)
   - ☐ Stairs (location and size.)

Attached are examples of drawings which are intended as a **GUIDE ONLY!!**

REQUIRED INSPECTIONS: Call 952-985-4440 between 8:00 A.M. and 4:30 P.M. to schedule an inspection. Provide at least 24-hour advance notice and permit number at time of scheduling.

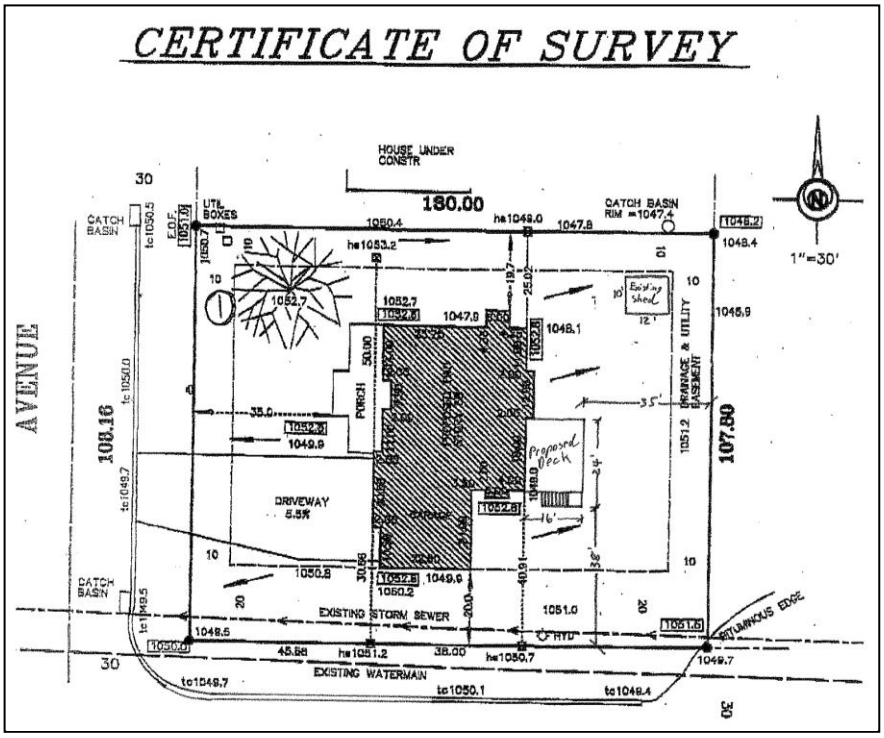
☐ **Footings:** After the holes are dug, but **PRIOR TO POURING CONCRETE!**

☐ **Final:** When the structure has been completed.

GENERAL NOTES:

- The stamped, City approved Plan and Survey shall be kept on the job site and accessible to the building inspector until the final inspection has been conducted and approved.
- The Inspection Record Card shall be placed on an exterior wall of the home near the deck location and shall remain posted until the final inspection has been conducted and approved. Cards should be protected from the weather.
- Prior to digging, call Gopher Services at 651-454-0002 to verify utility locations. Forty-eight hour notice is required, excluding weekends and holidays. You can also go online at: http://www.gopherstateonecall.org/index.php/i-have-an-upcoming-project-that-requires-digging

SAMPLE SURVEY



- Draw deck on survey to scale with dimensions showing proposed size and setbacks to property lines.
- Property pins to be located by owner if required to verify setbacks.
- Show all existing structures, including pools and sheds.
- Decks shall meet the required setbacks:

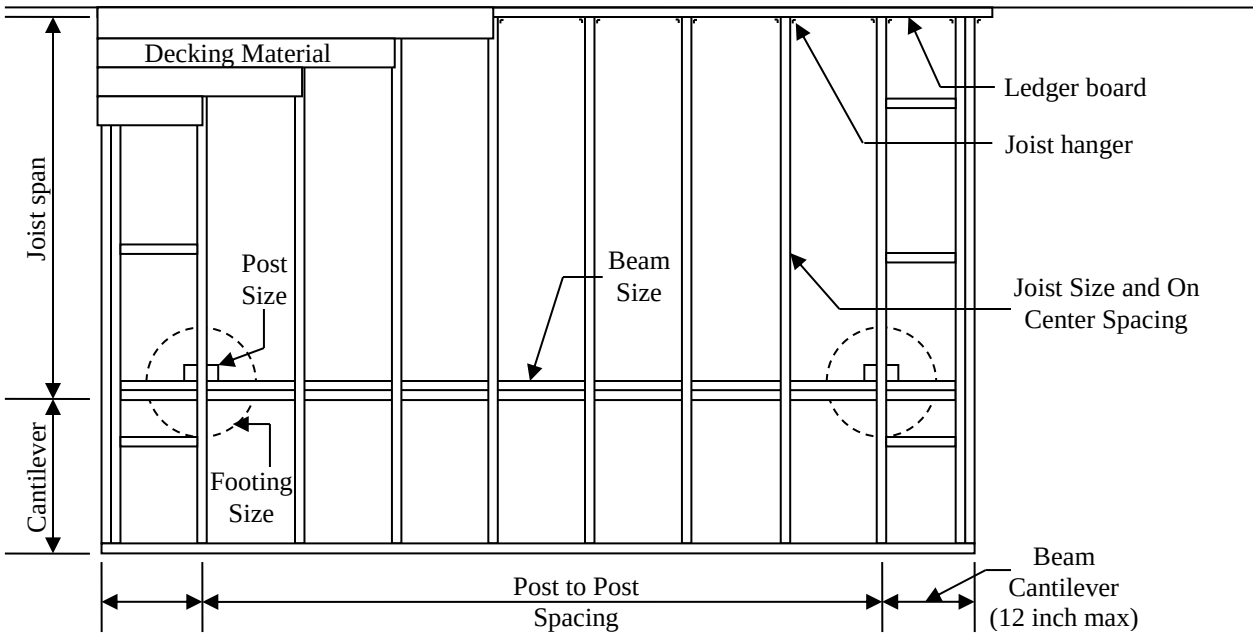
  a. For lots of record or preliminary platted lots established prior to March 17, 2003: Except as may be limited within environmental protection districts, terraces, steps, decks, stoops or similar structures constructed to the height of the ground floor of the principal structure may extend up to five feet (5') of a side yard lot line or ten feet (10') of a rear yard lot line, but not more than five feet (5') into a required front yard or side yard adjacent to a public right of way. (Ord. 739, sec. 1, 5-5-2003)

  b. For lots of record or preliminary platted lots established after March 17, 2003: Except as may be limited within environmental protection districts the required side yard and rear yard setbacks for terraces, steps, decks, and stoops that are thirty inches (30") or less above grade shall be:

  (1) Side yard: Five feet (5'), but not encroaching more than five feet (5') into the required side yard adjacent to a public right of way.

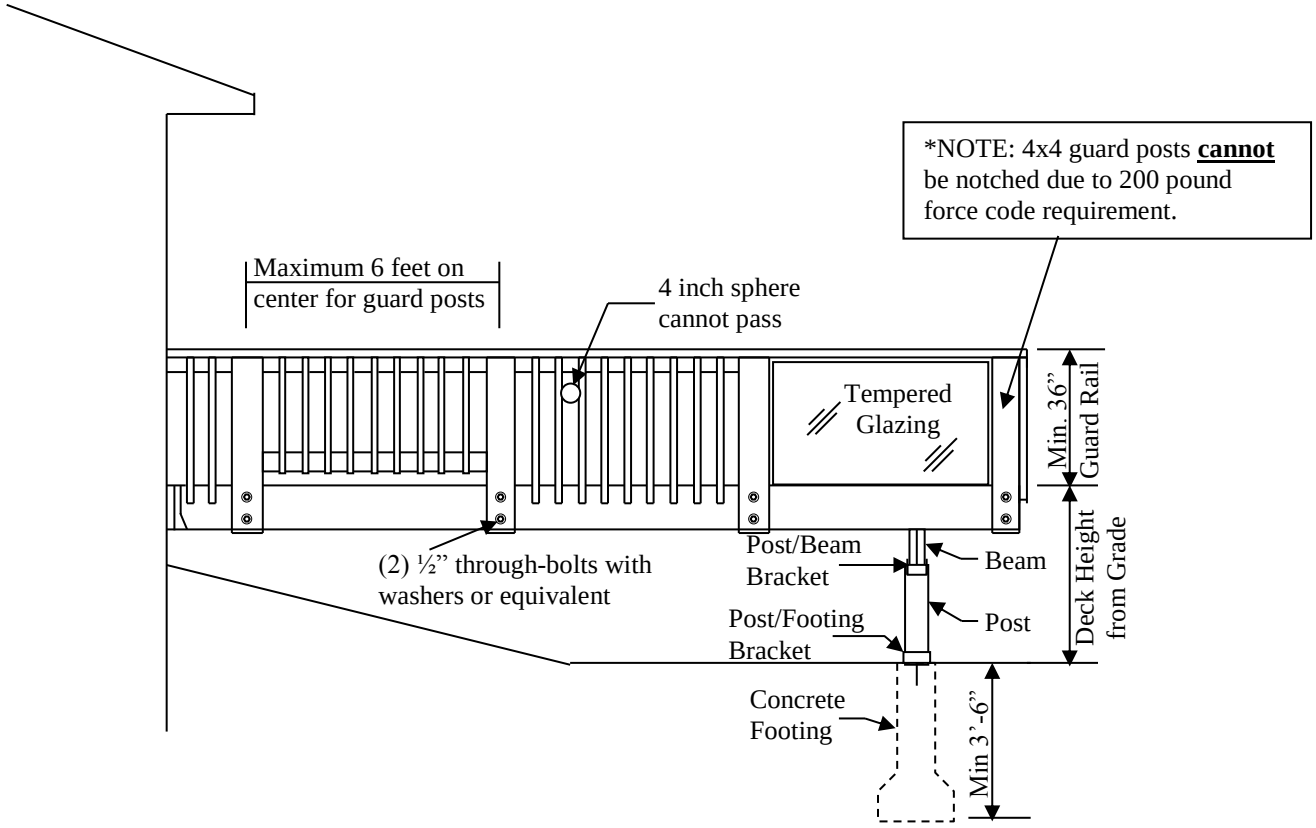
  (2) Rear yard: Ten feet (10'). (Ord. 936, 3-16-2015)

- Detached accessory buildings with a gross floor area of two hundred (200) square feet or less: Such structures shall be set back at least six feet (6') from any other building or structure on the same lot and shall not be located within a required buffer yard or drainage and/or utility easement.
- Detached accessory buildings exceeding two hundred (200) square feet in gross floor area: Such structures shall be set back at least ten feet (10') from any other building or structure on the same lot, and shall not be located within a required buffer yard or drainage and/or utility easement.
- In all residential districts, swimming pools and any attached or functionally related deck that is more than thirty inches (30") above grade shall be set back ten feet (10') from all adjoining lots and, except for fences and pump enclosures, shall be located at least ten feet (10') away from the principal building on the same lot and shall not be located within a drainage or utility easement or required buffer yard.



(Provide all lumber sizes and dimensions shown above)

Sample Floor Plan



Sample Elevation

(Various guard systems shown, other systems can be used that meet code)

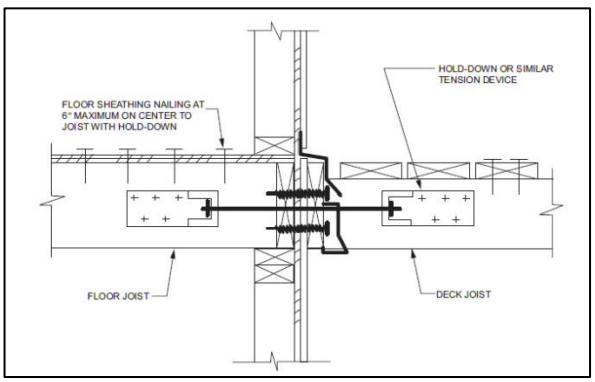
GENERAL BUILDING AND ZONING CODE REQUIREMENTS:

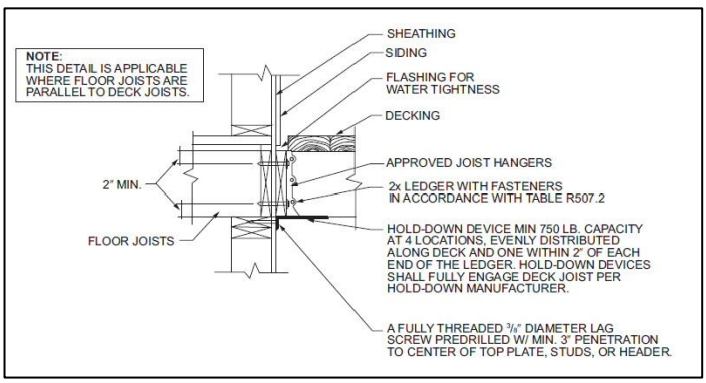
- Footings shall be designed and constructed below frost depth (42" minimum ground cover required from bottom of footing to grade or side slope.)
- Approved wood of natural resistance to decay or treated wood shall be used. Other man made products (composite plastics) shall be pre-approved by the City, comply with ASTM D7032 and installed per manufacturer recommendations.
- Fasteners for pressure-preservative treated wood shall be of hot-dip zinc-coated galvanized steel, stainless steel, silicon bronze or copper. The coating weights for zinc-coated fasteners shall be in accordance with ASTM A153.

  Exceptions: One-half inch (12.7mm) diameter or larger steel bolts. Fasteners other than nails and timber rivets shall be permitted to be of mechanically deposited zinc-coated steel with coating weights in accordance with ASTM B695, Class 55, minimum.

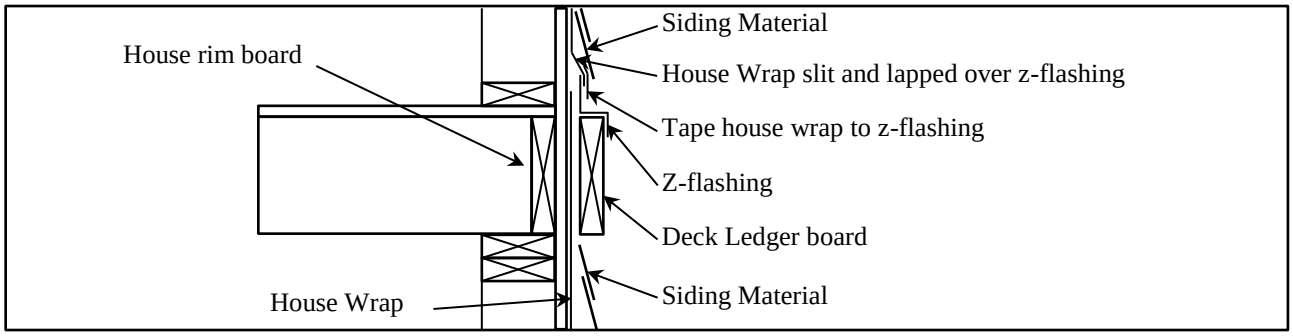
- Only joist hanger nails (16d or 10d nails, 2-1/2" minimum length, in double shear nail holes) may be used in joist hangers with all holes filled. (Roofing nails and screws are prohibited.)

- Floor joist and stair stringers spaced at 24 inches on center requires minimum 2 inch nominal decking. Floor joists or stair stringers spaced at 16 inches o/c. may use 5/4-inch minimum decking. (5/4-inch decking may be installed diagonally across 16" o/c. joists.)
- Decks shall be capable of supporting 40# per square foot live load and 10# per square foot dead load for a total load of 50# per square foot. Balconies shall be designed using 60# live load and 10# dead.
- Splices in beam members shall occur over posts.
- Connection between posts and footings (foundation anchor strap or an approved post holder.)
- Provide connection between posts and beams (Bolted shoulder cut post or approved bracket. Strapping or through bolting without bearing on a shoulder cut is not approved.)
- Maximum cantilever of beam past a post cannot exceed <u>12 inches</u>.
- A special design is required for decks attached to house cantilevers. Any beams used for framing around cantilevers must be let into the house wall and bear on the wall framing. Beams cannot be hung off ledger boards unless it is determined to be a marginal load such as a small stair landing.
- <u>Decks built to support a future porch</u>: Posts must be at outer portion of deck rims, beam cantilevers are not permitted and larger diameter footings may be required.
- **Lateral Load Connection now required by code**: Decks shall be attached to address lateral loads. Two examples are shown below:





- Care should be given to properly flash the ledger board using a z-flashing installed over the top of the deck ledger with the house wrap weather barrier extending over the top of the z-flashing. Take care to not fasten the first deck board though the ledger flashing.



- Standard connection of a 2x ledger to a 2x rim board is to be with 1/2" lag screws or bolts with washers in accordance with the tables below. (Other fasteners shall be pre-approved and installed per manufacturer.) Connecting a deck ledger to other forms of rim boards are to be done in accordance with rim board manufacturer's specifications and accepted engineering practices.

Fastener Spacing with a solid-sawn 2x Rim Board.[1,2,3]

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[4,5]**						
½" diameter lag screw with 15/32" maximum sheathing	30	23	18	15	13	11	10
½" diameter bolt with 15/32" maximum sheathing	36	36	34	29	24	21	19
½" diameter bolt with 15/32" max. sheathing and ½" stacked washers[6,7]	36	36	29	24	21	18	16

[1] Ledgers shall be flashed to prevent water from contacting the house rim board.

[2] When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1" thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel rim board), the ledger attachment shall be designed in accordance with accepted engineering practice.

[3] A minimum 1" x 9-1/2" Douglas Fir laminated veneer lumber rim board shall be permitted in lieu of the 2x solid-sawn rim board.

[4] Lag screws and bolts shall be staggered in accordance with Section R507.2.1.

[5] Deck ledger shall be minimum 2 x 8 pressure-preservative-treated No. 2 grade lumber, or other approved materials.

[6] The maximum gap between the face of the ledger board and face of the wall sheathing shall be ½".

[7] Wood structural panel sheathing, gypsum board sheathing, or foam sheathing not exceeding 1" thickness shall be permitted. The maximum distance between the face of the ledger board and the face of the rim joist shall be 1".

Placement of lag screws and bolts in deck ledgers and rim boards.

MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS				
	TOP EDGE	**BOTTOM EDGE**	**ENDS**	**ROW SPACING**
Ledger[a]	2 inches[d]	¾ inch	2 inches[b]	1-5/8 inches[b]
Rim board[c]	¾ inches	2 inches	2 inches[b]	1-5/8 inches[b]

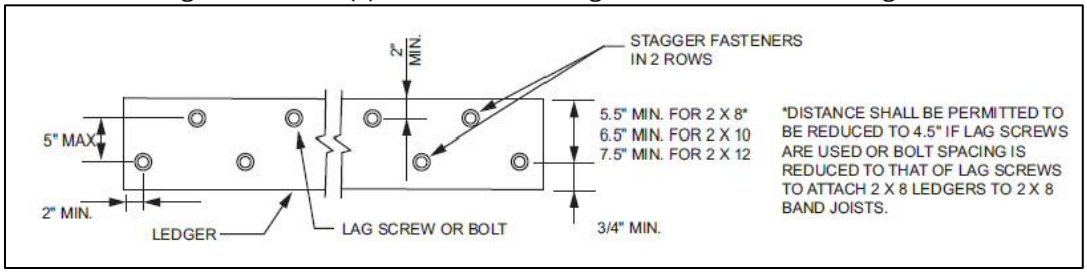
[a] Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.2.1(1).

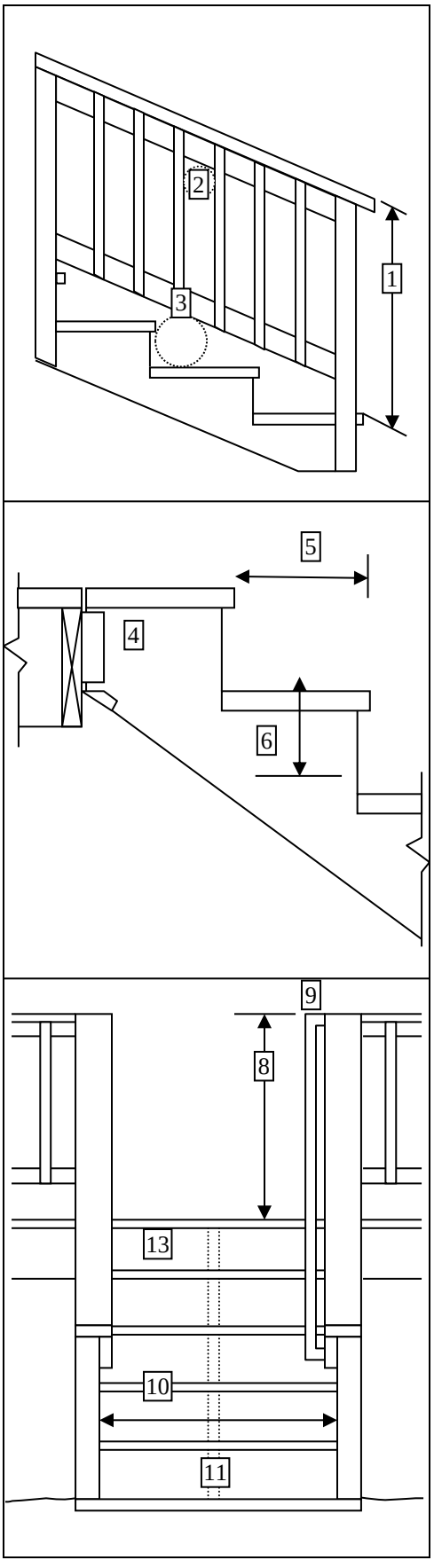
[b] Maximum 5 inches.

[c] For engineered rim board, 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 R507-2.1(1).

Figure R507.2. 1(1) – Placement of Lag Screws and Bolts in Ledgers





STAIR AND LANDING REQUIREMENTS

1. Stairways with a total rise of 30 inches or more above grade shall be provided with guards not less than 34 inches high measured up from the tread nose.
2. Guards shall have intermediate rails spaced so that a 4-3/8 inch sphere cannot pass through.
3. The triangular area formed by the treads and a horizontal bottom rail shall be built as to not allow the passage of a 6 inch sphere.
4. Attach stair stringers to the deck with metal straps or hangers.
5. Minimum tread depth is 10 inches from nosing to nosing. All treads shall be uniform in depth within 3/8 inch from largest to smallest. A nosing of ¾ inch to 1-1/4 inch shall be provided on stairways with solid risers, and the nosings shall also be uniform within 3/8 of an inch from largest to smallest.
6. Maximum riser height is 7-3/4 inches. Risers shall be uniform within 3/8 inch from the largest to the smallest riser.
7. When using composite lumber for stair treads they must be installed with the specified maximum stringer spacing listed in the products testing report.
8. The grippable handrail shall be installed between 34 and 38 inches above the sloped plain formed by the tread nosings of the stairway.
9. Handrails shall be continuous the full length of the stairway and shall either terminate into a newel post or be returned into the guardrail as shown. Provide 1-½ inches clearance between handrail and guard.
10. The minimum width of a stairway is 36 inches. Handrails are allowed to project up to 4-1/2 inches into the minimum allowed width.
11. The bottom of stair stringers shall be supported on a hard level surface like concrete or pavers or shall be provided with treated wood blocks to keep the stringers from sinking into the ground.
12. A level landing measuring a minimum of 36” x 36” shall be provided at the top and bottom of stairways.
13. Open risers shall be constructed as to not allow the passage of a 4 inch sphere.
14. A grippable handrail is required for stairs that consist of 4 or more risers.

GRIPPABLE HANDRAILS

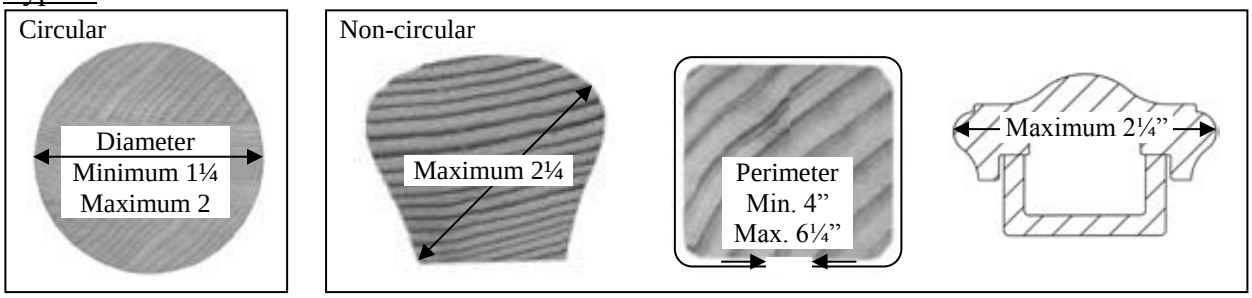
What the code says:

R311.5.6.3 Handrail grip size. All required handrails shall be of one of the following types or provide equivalent graspability.

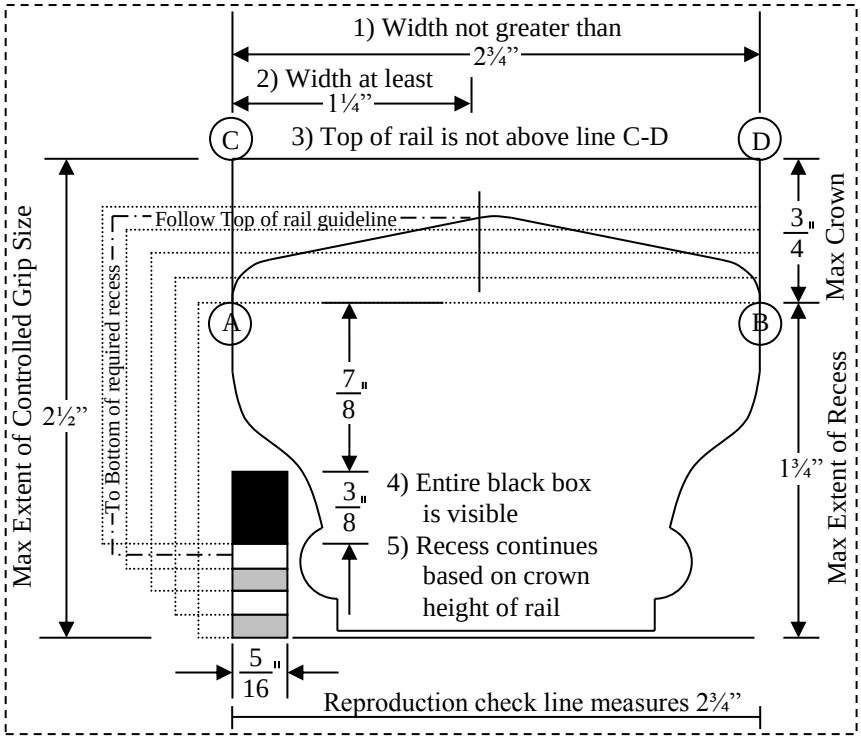
1. Type I. Handrails with a circular cross section shall have an outside diameter of at least 1¼ inches and not greater than 2 inches. If the handrail is not circular it shall have a perimeter dimension of at least 4 inches and not greater than 6¼ inches with a maximum cross section of dimension of 2¼ inches.
2. Type II. Handrails with a perimeter greater than 6¼ inches shall provide a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of ¾ inch measured vertically from the tallest portion of the profile and achieve a depth of at least 5/16 inch within 7/8 inch below the widest portion of the profile. This required depth shall continue for at least 3/8 inch to a level that is not less than 1¾ inches below the tallest portion of the profile. The minimum width of the handrail above the recess shall be 1¼ inches to a maximum of 2¾ inches. Edges shall have a minimum radius of 0.01 inch.

What this means:

Type I:



Type II:



Instructions:

Position rail section with the widest point of grip at line AB and left edge touching line AC, keeping horizontal axis of rail parallel to line AB.

With rail in position, it must pass 1) thru 5) to meet the code requirements. If profile is asymmetrical both sides must pass.

JOIST SPAN TABLE

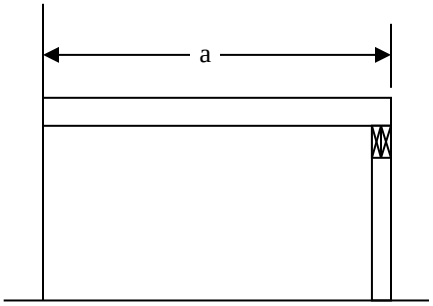
(Design Load=40#LL+10#DL, Deflection=L/360 and wet service conditions)

	Doug Fir-Larch, Spruce-Pine –Fir(SPF), Hem-Fir #2			Southern Pine #2 (SP)			Doug Fir-Larch, Spruce-Pine –Fir(SPF), Hem-Fir #2			Southern Pine #2 (SP)		
	12" o.c	16" o.c.	24" o.c.	12" o.c	16" o.c.	24" o.c.	12" o.c	16" o.c.	24" o.c.	12" o.c	16" o.c.	24" o.c.
	Max Joist Span						Max Cantilever [a]					
	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)	(ft.-in.)
2x6	9-6	8-4	6-10	9-11	9-0	7-7	0-11	1-0	1-2	1-0	1-1	1-3
2x8	12-6	11-1	9-1	13-1	11-10	9-8	1-8	1-10	2-2	1-10	2-0	2-4
2x10	15-8	13-7	11-1	16-2	14-0	11-5	2-10	3-2	2-9	3-1	3-5	2-10
2x12	18-0	15-9	12-10	18-0	16-6	13-6	4-4	3-11	3-3	4-6	4-2	3-4

[a] Maximum allowable cantilever cannot exceed L/4 or ¼ of the actual main span.

Sample Calculations for Using Joist Span and Beam Size Tables:

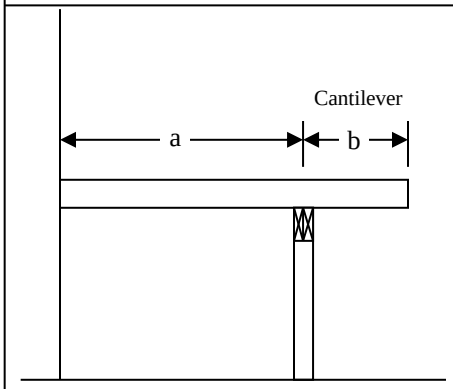
(Refer to tables for joist and beam size requirements)



Example: a=12', post spacing=8'
Use the Joist Span table to find acceptable joist sizes for a 12' span:
SPF #2: minimally 2x8@12" o.c., 2x10@16" o.c., or 2x12@24" o.c.
SP #2: minimally 2x8@12" o.c., 2x10@16" o.c., or 2x12@24" o.c.

Use the Beam size table with 12' joist span and post spacing 8' min:
SPF #2: minimally (3)2x10
SP #2: minimally (2)2x12, (3)2x10

Use Footing size table: 18" intermediate/ 13" corner footings.

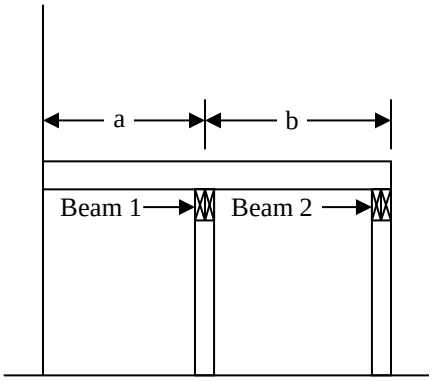


Use (a) to determine joist size and (a)+2(b) to determine beam size. The length of cantilever (b) is restricted by both the length of (a) and the size of the joists.

Example: a=8', b=2', post spacing=10'
Use the Joist Span table to find acceptable joist size for an 8' span/2' cantilever:
SPF #2: minimally 2x8@24" o.c.
SP #2: minimally 2x8@16" o.c. or 2x10@24"o.c.

Use the Beam size table with joist length 12'(8'+(2x2)) and post spacing of 10':
SPF #2: no beams work, reduce span of joists or post spacing.
SP #2: minimally (3)2x12

Use Footings size table: 20" intermediate/14" corner footings.



Use (a) or (b), whichever is greater, to determine joist size. Use (a)+(b) to determine the size of beam 1. Use (b) to determine the size of beam 2.

Example: a=6', b=8', post spacing=9'
Use the Joist span table with the larger span of 8':
SPF #2: minimally 2x6@16" o.c., 2x8@24" o.c.
SP #2: minimally 2x6@16" o.c., 2x8@24" o.c.

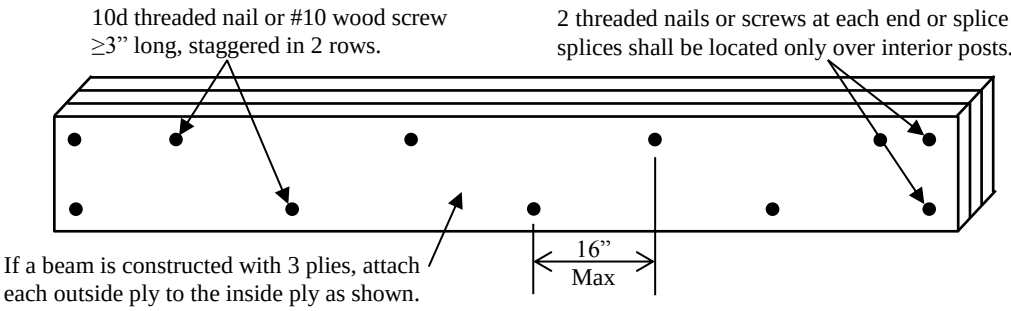
For Beam 1, use the joist length of 14'(6'+8') and a post spacing of 9':
SPF #2: no beams work, reduce span of joists or post spacing.
SP #2: minimally (3)2x12

For Beam 2 use a joist length of 8' and post spacing of 9':
SPF #2: minimally (3)2x10
SP #2: minimally (2)2x12, (3)2x8

Use Footings size table: Beam 1: 20"/14" Beam 2: 15"/11"

BEAM SPAN TABLE

Species	Size	Deck Joist length Less Than or Equal To: (Feet)						
		6	8	10	12	14	16	18
		(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)	(ft-in)
Southern Pine	(2) 2x6	6-8	5-8	5-1	4-7	4-3	4-0	3-9
	(2) 2x8	8-6	7-4	6-6	5-11	5-6	5-1	4-9
	(2) 2x10	10-1	8-9	7-9	7-1	6-6	6-1	5-9
	(2) 2x12	11-11	10-4	9-2	8-4	7-9	7-3	6-9
	(3) 2x6	7-11	7-2	6-5	5-10	5-5	5-0	4-9
	(3) 2x8	10-7	9-3	8-3	7-6	6-11	6-5	6-1
	(3) 2x10	12-9	11-0	9-9	8-9	8-3	7-8	7-3
	(3) 2x12	15-0	13-0	11-7	10-6	9-9	9-1	8-7
Doug Fir Larch, Hem Fir, Spruce Pine Fir	(2) 2x6	5-2	4-5	3-11	3-7	3-3	2-10	2-6
	(2) 2x8	6-7	5-8	5-1	4-7	4-3	3-10	3-5
	(2) 2x10	8-1	7-0	6-3	5-8	5-3	4-10	4-5
	(2) 2x12	9-5	8-2	7-3	6-7	6-1	5-8	5-4
	4x6	6-2	5-3	4-8	4-3	3-11	3-8	3-5
	4x8	8-2	7-0	6-3	5-8	5-3	4-11	4-7
	4x10	9-8	8-4	7-5	6-9	6-3	5-10	5-5
	4x12	11-2	9-8	8-7	7-10	7-3	6-9	6-4
	(3) 2x6	7-1	6-5	5-9	5-3	4-10	4-6	4-3
	(3) 2x8	9-5	8-3	7-4	6-8	6-2	5-9	5-5
	(3) 2x10	11-9	10-2	9-1	8-3	7-7	7-1	6-8
	(3) 2x12	13-8	11-10	10-6	9-7	8-10	8-3	7-10

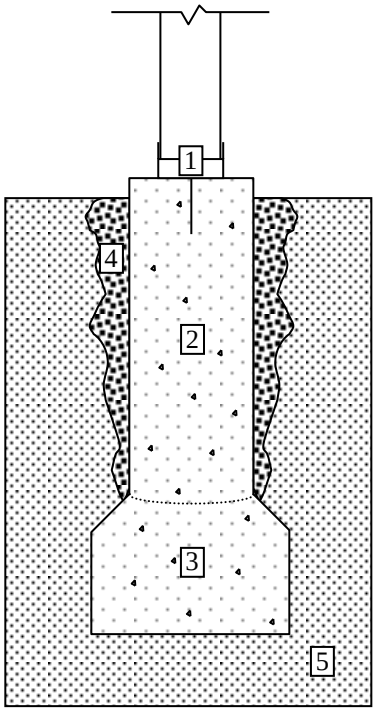


FOOTING SIZE TABLE

(Figures assumes a 1,500 psf soil capacity and 50 psf total deck load.)
(Dimensions shown are the required diameter at the base of the Intermediate/corner footings in inches)

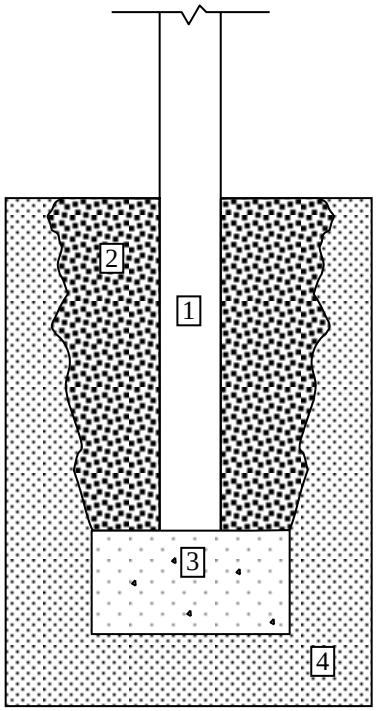
		Post Spacing								
		5'	6'	7'	8'	9'	10'	11'	12'	13'
Joist Length	6'	10 / 8	11 / 8	12 / 9	13 / 9	13 / 10	14 / 10	15 / 11	15 / 11	16 / 11
	7'	11 / 8	12 / 9	13 / 9	14 / 10	14 / 10	15 / 11	16 / 11	17 / 12	17 / 12
	8'	12 / 8	13 / 9	14 / 10	14 / 10	15 / 11	16 / 12	17 / 12	18 / 13	18 / 13
	9'	12 / 9	13 / 10	14 / 10	15 / 11	16 / 12	17 / 12	18 / 13	19 / 13	19 / 14
	10'	13 / 9	14 / 10	15 / 11	16 / 12	17 / 12	18 / 13	19 / 13	20 / 14	20 / 15
	11'	13 / 10	15 / 11	16 / 11	17 / 12	18 / 13	19 / 13	20 / 14	21 / 15	21 / 15
	12'	14 / 10	15 / 11	17 / 12	18 / 13	19 / 13	20 / 14	21 / 15	21 / 15	22 / 16
	13'	15 / 10	16 / 11	17 / 12	18 / 13	19 / 14	20 / 15	21 / 15	22 / 16	23 / 17
	14'	15 / 11	17 / 12	18 / 13	19 / 14	20 / 14	21 / 15	22 / 16	23 / 17	24 / 17
	15'	16 / 11	17 / 12	18 / 13	20 / 14	21 / 15	22 / 16	23 / 16	24 / 17	25 / 18
	16'	16 / 12	18 / 13	19 / 14	20 / 14	21 / 15	23 / 16	24 / 17	25 / 18	26 / 18
	17'	17 / 12	18 / 13	20 / 14	21 / 15	22 / 16	23 / 17	24 / 17	25 / 18	26 / 19
	18'	17 / 12	19 / 13	20 / 14	21 / 15	23 / 16	24 / 17	25 / 18	26 / 19	27 / 19
	19'	18 / 13	19 / 14	21 / 15	22 / 16	23 / 17	25 / 18	26 / 18	27 / 19	28 / 20
	20'	18 / 13	20 / 14	21 / 15	23 / 16	24 / 17	25 / 18	26 / 19	28 / 20	29 / 20

Note: 8"-16" diameter footings – minimum 8" thick at base
17"-20" diameter footings – minimum 10' thick at base
21"-30" diameter footings – minimum 12" thick at base



CARDBOARD FORM PIER FOOTING

1. Anchor strap or post holder required to connect post to footing.
2. Cardboard form tube held up a few inches above grade to keep post from ground contact. Minimum 12 inch diameter recommended for 6x6 posts, 8 inch diameter may be used with 4x4 posts on small landings.
3. Bell: Flare bottom of footing to minimum diameter required to handle the deck load. Flare deck footings to minimum 24 inch diameter if a future porch is planned.
4. Backfill against cardboard form tube.
5. Footing shall be poured on dry undisturbed soil. Any water accumulation from rain must be pumped out or allowed to dry prior to concrete being poured.



SHALLOW CONCRETE FOOTING (Cookie)

1. Treated post, must be .60 rated for ground contact.
2. Backfill with original earth material and compact as hole is backfilled.
3. Pour concrete footing to minimum diameter and depth as required by deck load. Bottom of footing must be a minimum 42 inches below grade.
4. Footing shall be poured on dry undisturbed soil. Any water accumulation from rain must be pumped out or allowed to dry prior to concrete being poured.