Deck

Building Inspections Department
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Residential

TERMINOLOGY

1. RAIL TOP CAP
2. BALLUSTERS
3. RAIL POST
4. SUPPORT POST
5. RIM OR BAND JOIST
6. DECKING
7. JOISTS
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9. PIER
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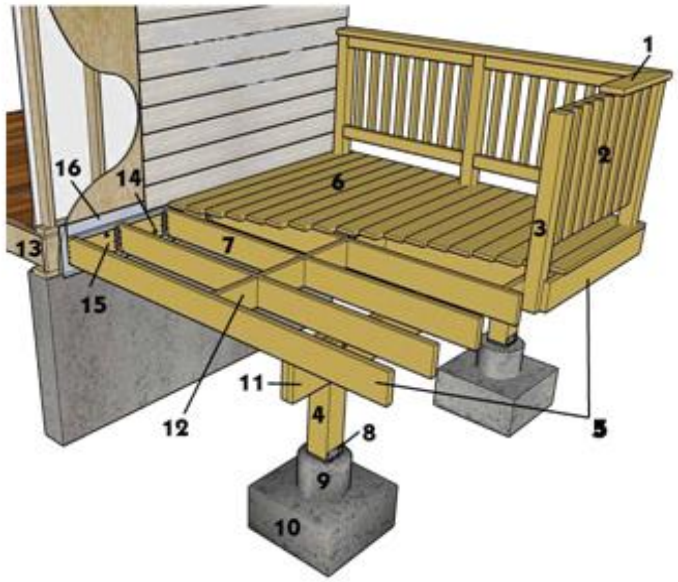
16. FLASHING



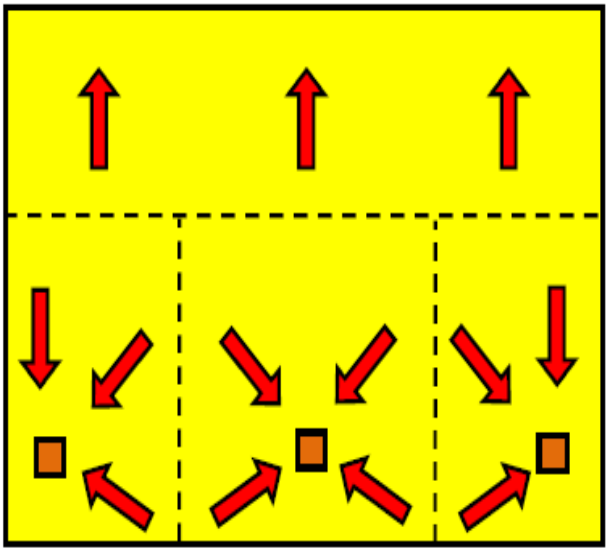
Decking
Materials commonly used for decking include standard dimension lumber (2X4 or 2X6), radius-edged decking, or a manufactured decking product such as composite.

The table below does not include the maximum spans for decking used as stair treads.

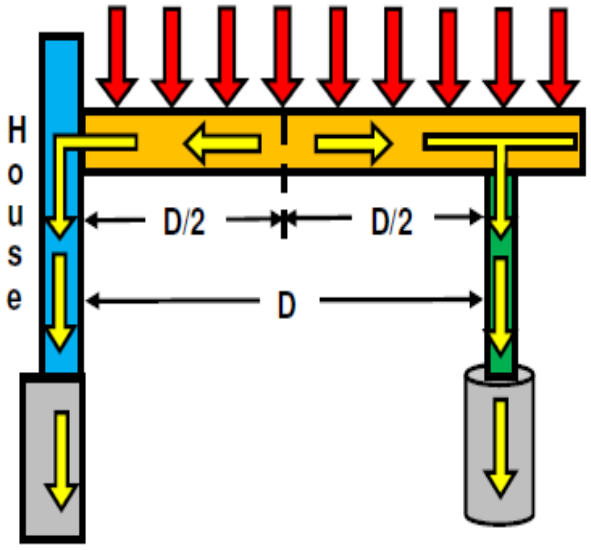
Manufactured and composite decking products may be used only when approved by the Building Department. This approval is based on the material carrying an ESR or similar report. Decking without a research report will not be approved. Ask the decking supplier to provide you with a copy of the research report.

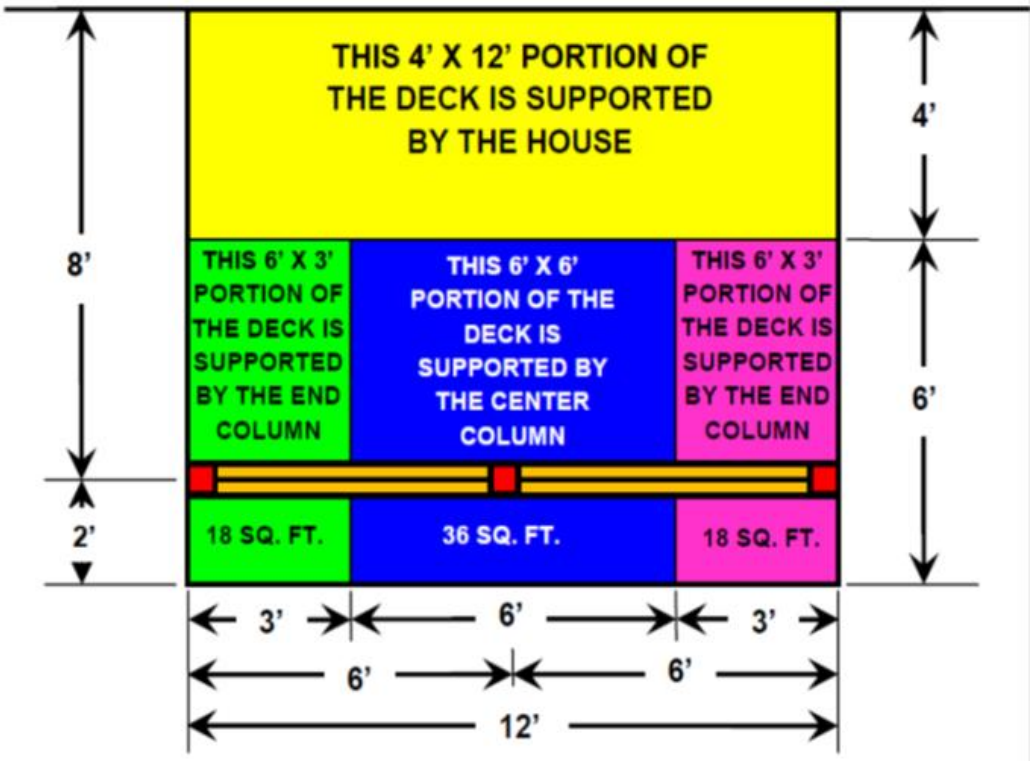
MAXIMUM WOOD DECK BOARD SPANS (NOT ON STAIRS)	
DECKING MATERIAL	**JOIST SPACING**
2x6 OR 5/4 SOUTHERN PINE PERPENDICULAR TO JOIST	**24" O.C.**
5/4 CEDAR OR REDWOOD AND 2X4 PERPENDICULAR TO JOIST OR 5/4 SOUTHERN PINE OR 2X6 AT 45 DEGREES TO JOIST	**16" O.C.**
5/4 AND 2X4 CEDAR OR REDWOOD AT 45 DEGRESS TO JOIST	**12" O.C.**
MANUFACTURED OR COMPOSITE DECKING	**PER MANUFACTURER'S REQUIREMENTS**

UNDERSTANDING LOAD PATHS



Loads are assumed to be uniform across the floor





- Required footing sizes are determined by calculating the area of the deck supported by each footing. Loads shall be assumed to be equally shared between the supporting elements.

Minimum deck footings should be sized according to the following table. Footings must extend ***at least 42 inches below grade*** (frost line). Footing sizes are based on 2,000 PSF.

MINIMUM DECK FOOTING SIZES* – NOT FOR USE WITH HOT TUBS							
Max. Area of Deck Supported in Sq Ft	**Footing Diameter Required in Inches**	**Max. Area of Deck Supported in Sq Ft**	**Footing Diameter Required in Inches**	**Max. Area of Deck Supported in Sq Ft**	**Footing Diameter Required in Inches**	**Max. Area of Deck Supported in Sq Ft**	**Footing Diameter Required in Inches**
10	**8**	**23**	**11**	**41**	**14**	**65**	**18**
13	**8**	**27**	**12**	**47**	**15**	**72**	**19**
16	**9**	**32**	**13**	**53**	**16**	**79**	**20**
19	**10**	**36**	**13**	**59**	**17**	**86**	**20**

Footing sizes refer to the bottom diameter of a typical bell shaped footing – 12"thickness.

2020 MN Residential Code Section R403.1 – Footings shall be supported on undisturbed natural soil or engineered fill.

- Any proposed construction of a deck, porch, or an addition may require soils corrections, or an engineer's soils report may be required to verify minimum bearing capacity of 1,500 PSF.

HOW TO DESIGN FOOTING FOR A DECK

Note: Areas of known poor soils require soils corrections and/or deck footings must be designed by a licensed professional engineer prior to the issuance of the permit.

1. **Concrete Footings** – The permit holder is responsible for the design size, but they cannot be a smaller diameter than listed in the Minimum Deck Footing Size Table above. In lieu of using this table, another option is to provide an engineer's soils report to verify minimum bearing capacity, and design them accordingly. If the deck may be converted to a porch in the future, it is recommended to size the footings accordingly. Footings must still be set on sandy/suitable soils **(No black organic type soils)** or the footing inspection will fail. In some developments, the depth to suitable soil may be much deeper than the 42" frost depth. The footing inspection will fail if suitable soils cannot be verified, and soils corrections and/or deck footings must be designed by a licensed professional engineer.

2. **Non-concrete manufactured pin style footings (Diamond Pier) –** This is considered an alternative design method, if electing to use pin style footings a soil engineer's report identifying suitable soils needs to be submitted at time of application.

   Please call and speak to a Building Inspector to determine if a specific brand is permitted, and to verify the permitted design size, and soil requirements prior to deciding on this type of footing. The City of Faribault has specific requirements to follow in addition to the manufacturer's requirements. These pin style footings are only permitted for decks, and will not allow your deck to be converted to a porch in the future.

3. **Helical piles (screw-pile)** - Please call to talk to a Building Inspector to determine if a specific brand is permitted. These are long screw-like piles that can reach suitable soils without the need for soils corrections. Screw-piles must be installed by a certified contractor.

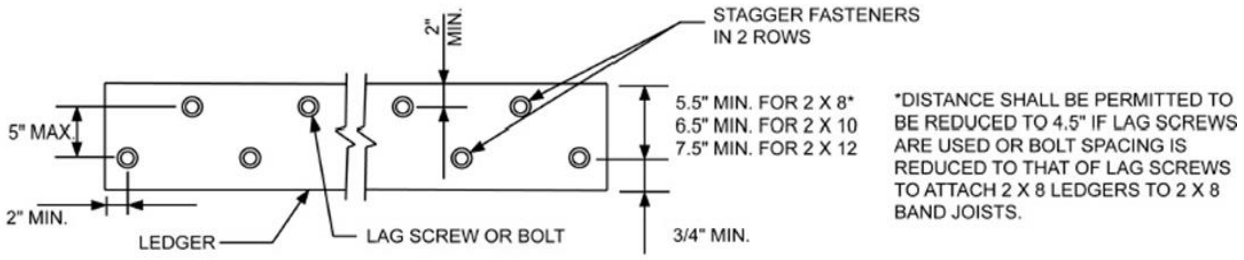
TABLE R507.9.1.3(1) FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGER AND A 2-INCH-NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST[c, f, and g] (Deck live load = 40 psf, deck dead load = 10 psf)							
JOIST SPAN	**6' and less**	**6'1" to 8'**	**8'1" to 10'**	**10'1" to 12'**	**12'1" to 14'**	**14'1" to 16'**	**16'1" to 18'**
Connection details	**On-center spacing of fasteners[d and e]**						
½ inch diameter lag screw with $^{15}/_{32}$ inch maximum sheathing[a]	**30**	**23**	**18**	**15**	**13**	**11**	**10**
½ inch diameter bolt with $^{15}/_{32}$ inch maximum sheathing	**36**	**36**	**34**	**29**	**24**	**21**	**19**
½ inch diameter bolt with $^{15}/_{32}$ inch maximum sheathing and ½ inch stacked washers[b, h]	**36**	**36**	**29**	**24**	**21**	**18**	**16**

a Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.
b The tip of the lag screw shall fully extend beyond the inside face of the band joist.
c Sheathing shall be wood structural panel or solid sawn lumber.
d 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.

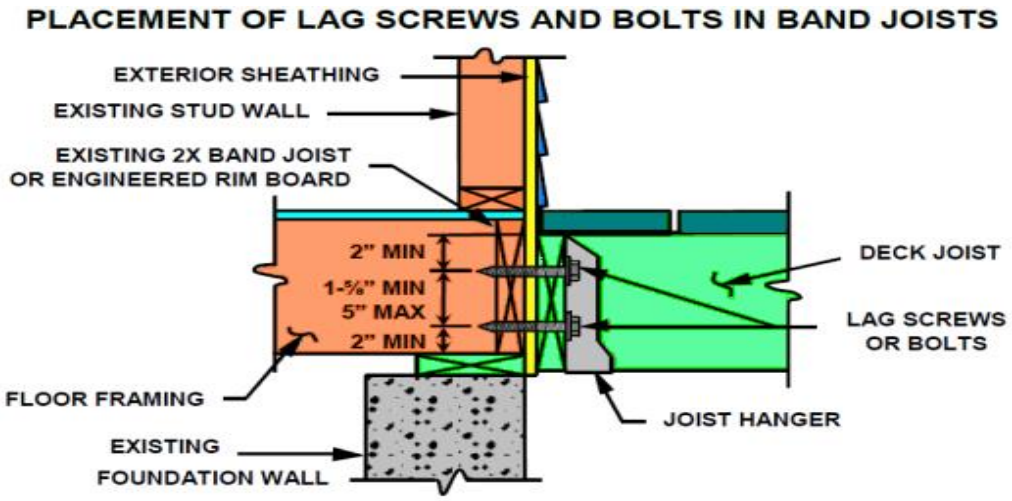
TABLE 507.9.1.3(2) PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS				
	TOP EDGE	**BOTTOM EDGE**	**ENDS**	**ROW SPACING**
Ledger[a]	**2 inches[d]**	**¼ inch**	**2 inches[b]**	**1 ⅝ inches[b]**
Band Joist[c]	**¾ inches**	**2 inches**	**2 inches[b]**	**1 ⅝ 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 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 R507.2.1(1).

FIGURE R507.9.1.3(1)

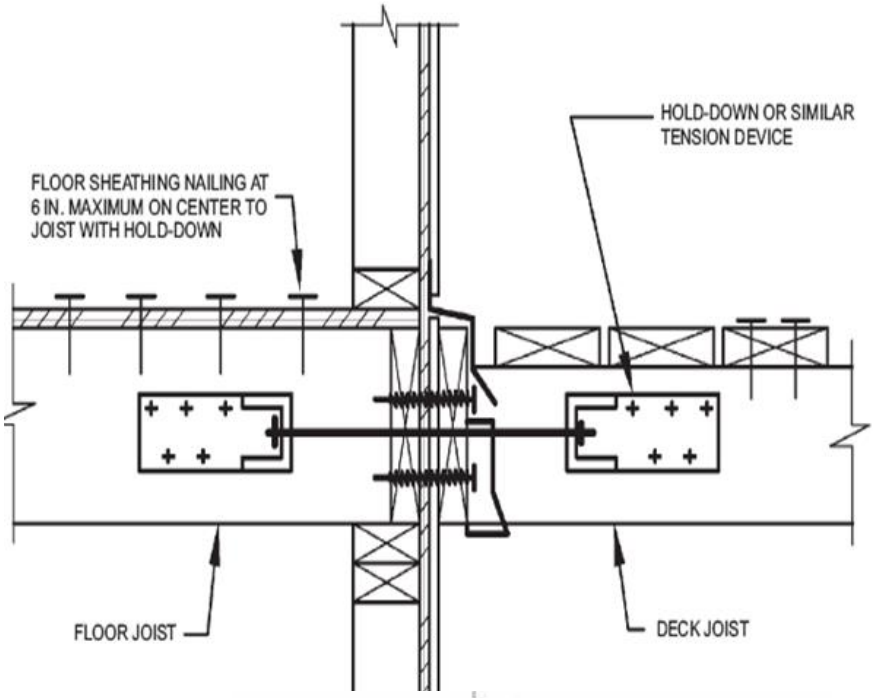


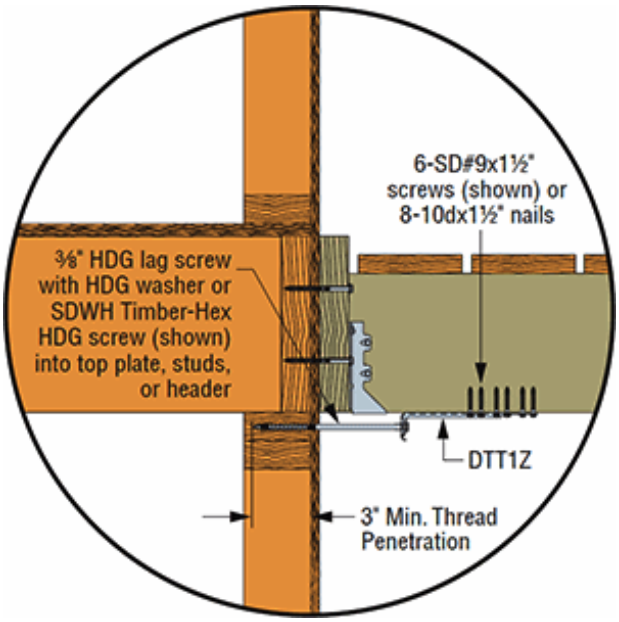
- **Two Fasteners at each required spacing / location from Table R507.9.1.3(1) above satifies the lateral load requirements for the City of Faribault for most decks.**



DECK ATTACHEMENT FOR LATERAL LOADS

Lateral load connections which are required in 507.9.2(1) (shown right) can be achieved by using 4 connections similar to Simpsons DTT1Z (shown below). Submit proposed method and material with application for approval.





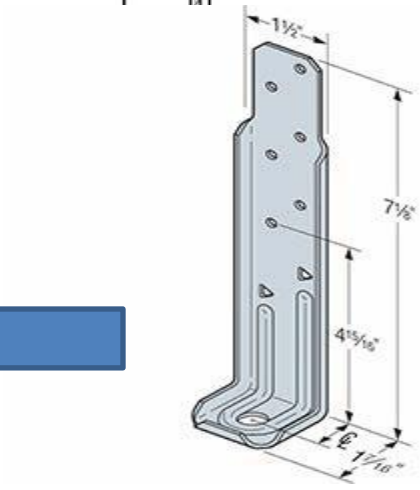


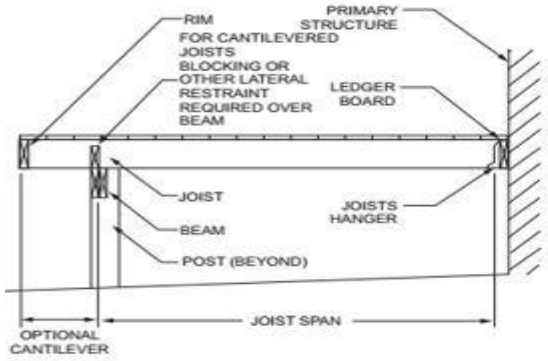
Figure R507.6 (Typical Deck Joist Spans)

SPECIES[a]	SIZE	ALLOWABLE JOIST SPAN[b]			MAXIMUM CANTILEVER[b,f]		
		SPACING OF DECK JOISTS (inches)			SPACING OF DECK JOISTS WITH CANTILEVERS[c] (inches)		
		12	16	24	12	16	24
Southern pine	2 × 6	9-11	9-0	7-7	1-3	1-4	1-6
	2 × 8	13-1	11-10	9-8	2-1	2-3	2-5
	2 × 10	16-2	14-0	11-5	3-4	3-6	2-10
	2 × 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 × 6	9-6	8-8	7-2	1-2	1-3	1-5
	2 × 8	12-6	11-1	9-1	1-11	2-1	2-3
	2 × 10	15-8	13-7	11-1	3-1	3-5	2-9
	2 × 12	18-0	15-9	12-10	4-6	3-11	3-3
Redwood, western cedars, ponderosa pine[e], red pine[e]	2 × 6	8-10	8-0	7-0	1-0	1-1	1-2
	2 × 8	11-8	10-7	8-8	1-8	1-10	2-0
	2 × 10	14-11	13-0	10-7	2-8	2-10	2-8
	2 × 12	17-5	15-1	12-4	3-10	3-9	3-1

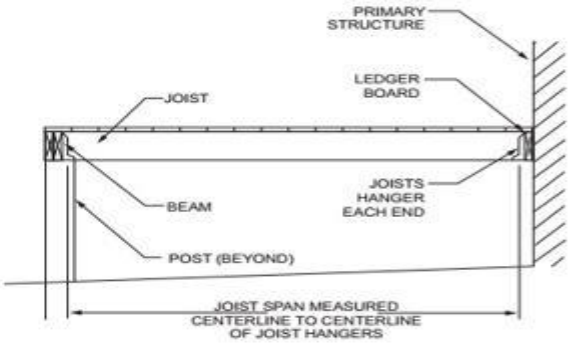
Note: Max joist cantilever shall be limited to ¼ of the joist span or the maximum cantilever length specified in R507.7, whichever is less.

Deck Beam Span Lengths

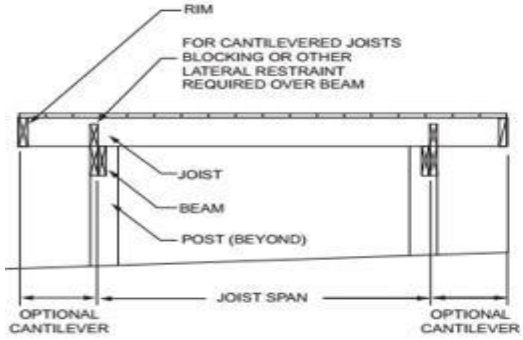
SPECIES[c]	SIZE[d]	DECK JOIST SPAN LESS THAN OR EQUAL TO: (feet)						
		6	8	10	12	14	16	18
Southern pine	1 – 2 × 6	4-11	4-0	3-7	3-3	3-0	2-10	2-8
	1 – 2 × 8	5-11	5-1	4-7	4-2	2-10	3-7	3-5
	1 – 2 × 10	7-0	6-0	5-5	4-11	4-7	4-3	4-0
	1 – 2 × 12	8-3	7-1	6-4	5-10	5-5	5-0	4-9
	2 – 2 × 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2 – 2 × 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2 – 2 × 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2 – 2 × 12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3 – 2 × 6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3 – 2 × 8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3 – 2 × 10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
	3 – 2 × 12	15-3	13-3	11-10	10-9	10-0	9-4	8-10
Douglas fir-larch[e], hem-fir[e], spruce-pine-fir[e], redwood, western cedars, ponderosa pine[f], red pine[f]	3 × 6 or 2 – 2 x 6	5-5	4-8	4-2	3-10	3-6	3-1	2-9
	3 × 8 or 2 – 2 × 8	6-10	5-11	5-4	4-10	4-6	4-1	3-8
	3 × 10 or 2 – 2 × 10	8-4	7-3	6-6	5-11	5-6	5-1	4-8
	3 × 12 or 2 – 2 × 12	9-8	8-5	7-6	6-10	6-4	5-11	5-7
	4 × 6	6-5	5-6	4-11	4-6	4-2	3-11	3-8
	4 × 8	8-5	7-3	6-6	5-11	5-6	5-2	4-10
	4 × 10	9-11	8-7	7-8	7-0	6-6	6-1	5-8
	4 × 12	11-5	9-11	8-10	8-1	7-6	7-0	6-7
	3 – 2 × 6	7-4	6-8	6-0	5-6	5-1	4-9	4-6
	3 – 2 × 8	9-8	8-6	7-7	6-11	6-5	6-0	5-8
	3 – 2 × 10	12-0	10-5	9-4	8-6	7-10	7-4	6-11
	3 – 2 × 12	13-11	12-1	10-9	9-10	9-1	8-6	8-1



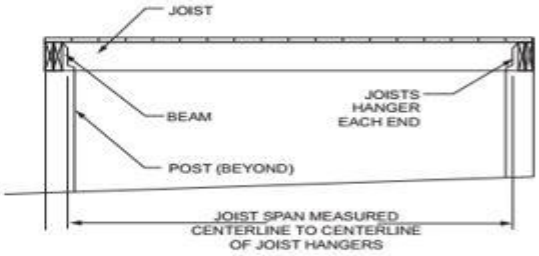
CANTILEVERED JOISTS WITH DROPPED BEAM



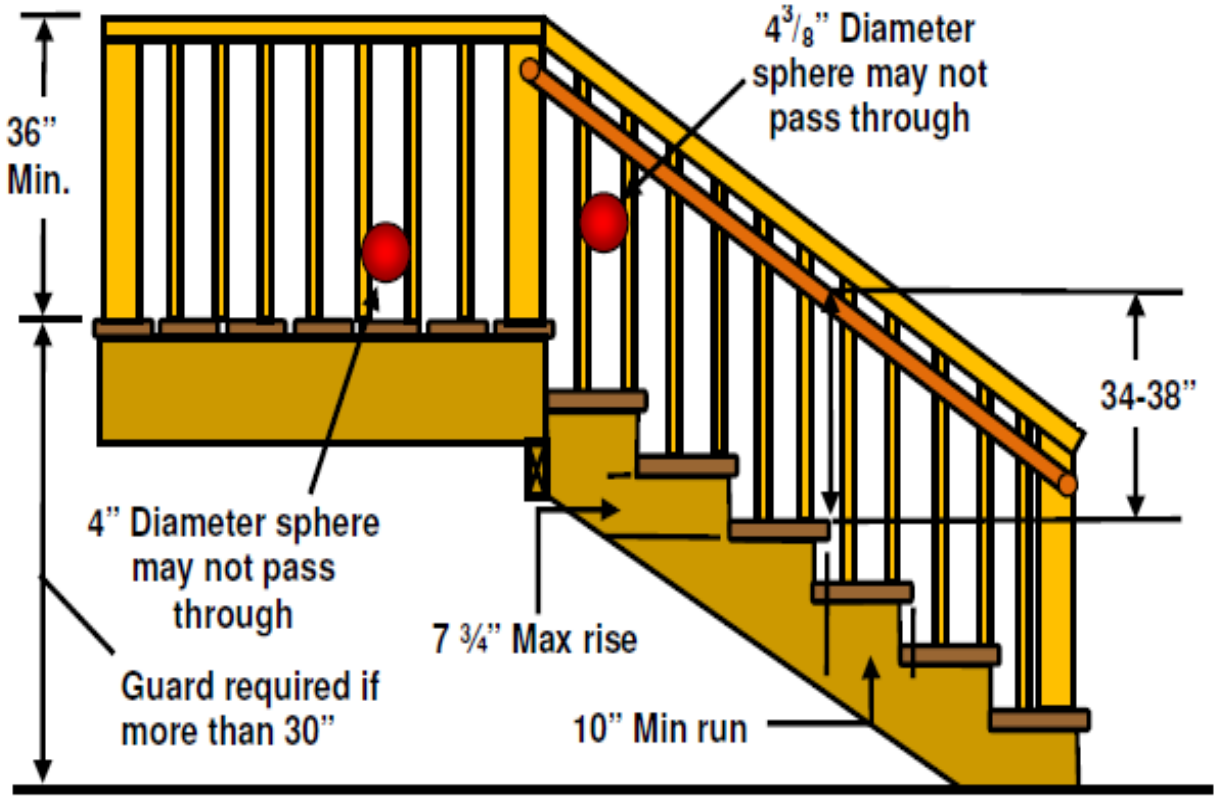
JOISTS WITH FLUSH BEAM



JOISTS ON FREE-STANDING DECK WITH DROPPED BEAM



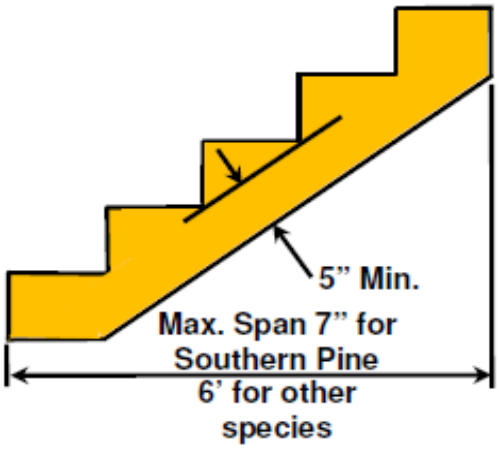
JOISTS ON FREE-STANDING DECK WITH FLUSH BEAM



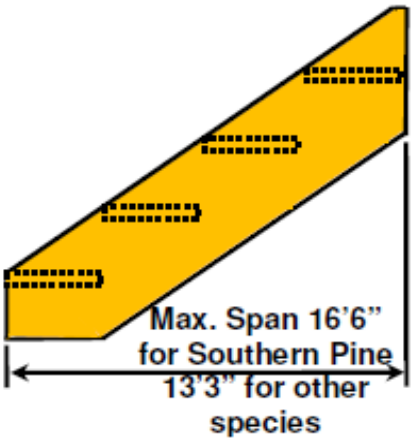
Handrails shall be continuous for full length of flight, graspable and handrail ends shall be returned or terminate in newel posts or safety terminals.

STAIR STRINGER SPANS

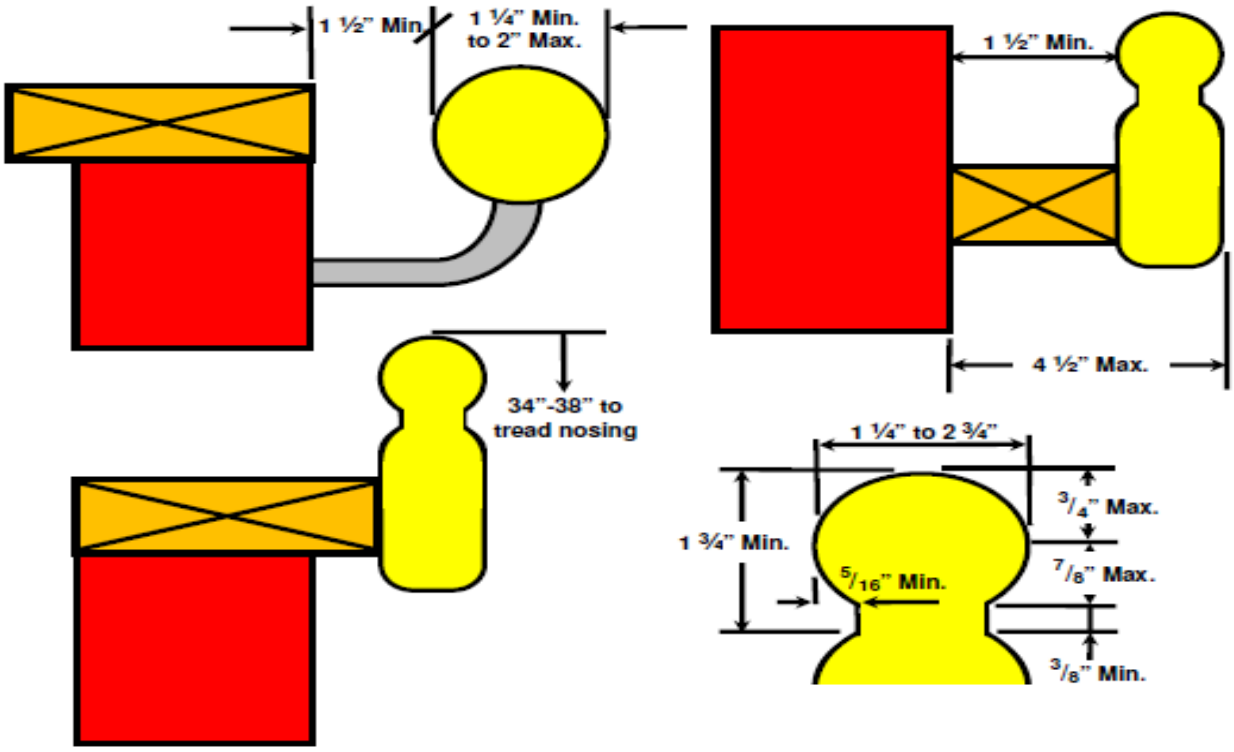
LANDINGS OR COLUMNS AND BEAMS MAY BE USED TO SHORTEN STRINGER SPANS



CUT STRINGER



SOLID STRINGER



COMPOSITES AND OTHER DECK/RAILING PRODUCTS

THIS HANDOUT DOES NOT COVER DECK OR RAILING PRODUCTS MADE OF COMPSITES, ALUMINUM, STEEL, GLASS, OR ANY OTHER MAN MADE PRODUCT. THOSE PRODUCTS MAY BE USED IF THE MANUFACTURER HAS A RESEARCH REPORT FROM THE INTERNATIONAL CODE COUNCIL OR OTHER APPROVED TESTING AGENCYAND THE PRODUCT IS INSTALLED IN STRICT ACCORDANCE WITH THAT REPORT.