Residential deck guidelines

The following deck construction information is not intended to be a complete resource covering all aspects of deck design and construction. A more comprehensive guide is available from the American Wood Council at AWC.org and by using the 2015 International Residential Code (IRC). Decks are the most common area of catastrophic failure in residential construction, making code compliance vitally important.

The City of Yankton has adopted the 2015 IRC. The building code and City ordinances require the following:

Submittals

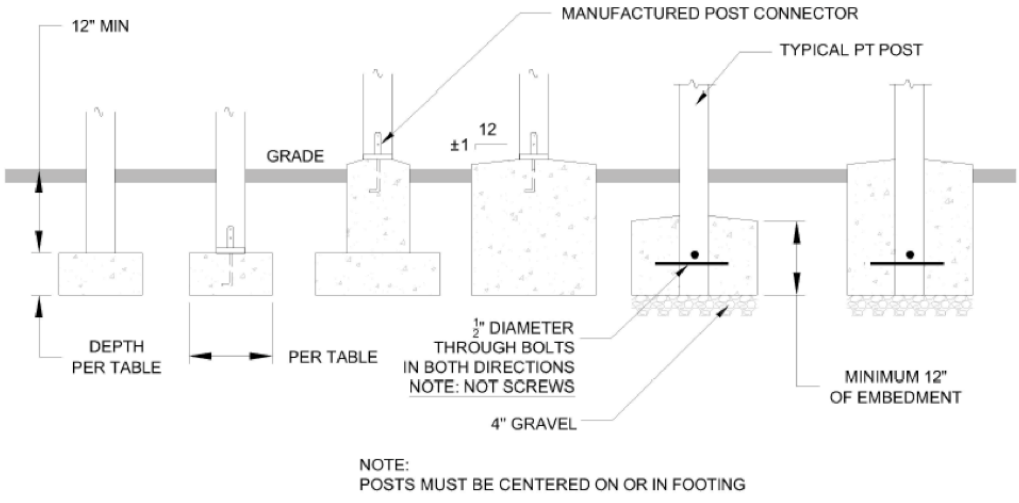
Permit applicants are required to submit a site plan showing existing structure, proposed construction and property lines. A framing plan and section drawing showing joist size and spacing, post locations, footing depths and stair locations is also required. Computer-generated plans for estimating purposes are acceptable. Plans do not have to be professionally prepared but should use standard architectural or engineering scales. Plans are subject to approval by the Building Official.

Setbacks

Decks must comply with setback rules in front and side yards. Rear yard decks and patios maintained as open space without walls may include a roof, shade feature or canopy and may encroach fifteen (15) feet into the required rear yard setback. Rear yard decks are prohibited from occupying any required side yard setback. A landing/deck, not including a roof or canopy, with or without a rail extending no more than six (6) feet into the required front setback and no more than eight (8) feet in width may occupy the front yard setback area. Means of access to the landing/deck (steps or ramp) are exempt from the six-foot restriction in this definition.

Footings & Posts

Minimum footing depth is 12” in undisturbed soil for self-supported decks. Footings for decks attached to the primary structure must be at least 42” below grade. See table below for minimum sizing.
Posts shall bear on footings and be restrained to prevent lateral displacement at the bottom support. Such lateral restraint shall be provided by manufactured connections installed in accordance with manufacturer’s instructions or a minimum post embedment of 12” in surrounding soils or concrete piers.



MINIMUM FOOTING SIZE FOR DECKS (sq ft)[a,c,d]

LIVE OR GROUND SNOW LOAD[b] (psf)	TRIBUTARY AREA[e]	SOIL BEARING CAPACITY (psf) 1500			2000			2500			≥ 3000		
		SIDE OF A SQUARE FOOTING (in)	DIAMETER OF A ROUND FOOTING (in)	THICKNESS (in)	SIDE OF A SQUARE FOOTING (in)	DIAMETER OF A ROUND FOOTING (in)	THICKNESS (in)	SIDE OF A SQUARE FOOTING (in)	DIAMETER OF A ROUND FOOTING (in)	THICKNESS (in)	SIDE OF A SQUARE FOOTING (in)	DIAMETER OF A ROUND FOOTING (in)	THICKNESS (in)
40	20	12	14	6	12	14	6	12	14	6	12	14	6
	40	14	16	6	12	14	6	12	14	6	12	14	6
	60	17	19	6	15	17	6	13	15	6	12	14	6
	80	20	22	7	17	19	6	15	17	6	14	16	6
	100	22	25	8	19	21	6	17	19	6	15	17	6
	120	24	27	9	21	23	7	19	21	6	17	19	6
	140	26	29	10	22	25	8	20	23	7	18	21	6
	160	28	31	11	24	27	9	21	24	8	20	22	7
50	20	12	14	6	12	14	6	12	14	6	12	14	6
	40	15	17	6	13	15	6	12	14	6	12	14	6
	60	19	21	6	16	18	6	14	16	6	13	15	6
	80	21	24	8	19	21	6	17	19	6	15	17	6
	100	24	27	9	21	23	7	19	21	6	17	19	6
	120	26	30	10	23	26	8	20	23	7	19	21	6
	140	28	32	11	25	28	9	22	25	8	20	23	7
	160	30	34	12	26	30	10	24	27	9	21	24	8
60	20	12	14	6	12	14	6	12	14	6	12	14	6
	40	16	19	6	14	16	6	13	14	6	12	14	6
	60	20	23	7	17	20	6	16	18	6	14	16	6
	80	23	26	9	20	23	7	18	20	6	16	19	6
	100	26	29	10	22	25	8	20	23	7	18	21	6
	120	28	32	11	25	28	9	22	25	8	20	23	7
	140	31	35	12	27	30	10	24	27	9	22	24	8
	160	33	37	13	28	32	11	25	29	10	23	25	9
70	20	12	14	6	12	14	6	12	14	6	12	14	6
	40	18	20	6	15	17	6	14	15	6	12	14	6
	60	21	24	8	19	21	6	17	19	6	15	17	6
	80	25	29	9	21	24	8	19	22	7	18	20	6
	100	28	31	11	24	27	9	21	24	8	20	22	7
	120	30	34	12	25	30	10	24	27	9	21	24	8
	140	33	37	13	28	32	11	25	29	10	23	26	9
	160	35	40	15	30	34	12	27	31	11	25	28	9

a. Interpolation permitted, extrapolation not permitted
b. Based on highest load case: Dead + Live or Dead + Snow
c. Assumes minimum square footing to be 12"x12"x6" for 6x6 post
d. If the support is a brick or cmu pier, the footing shall have a minimum 2" projection on all sides.
e. Area, in square feet, of deck surface supported by post and footing

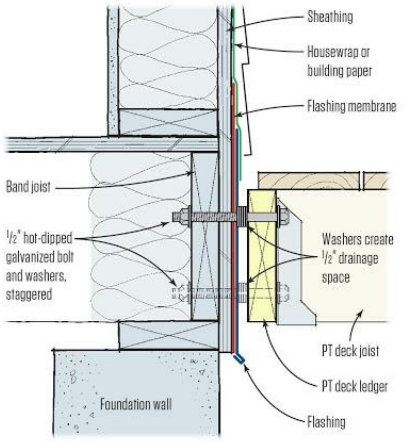
Wood & Composites/Plastic

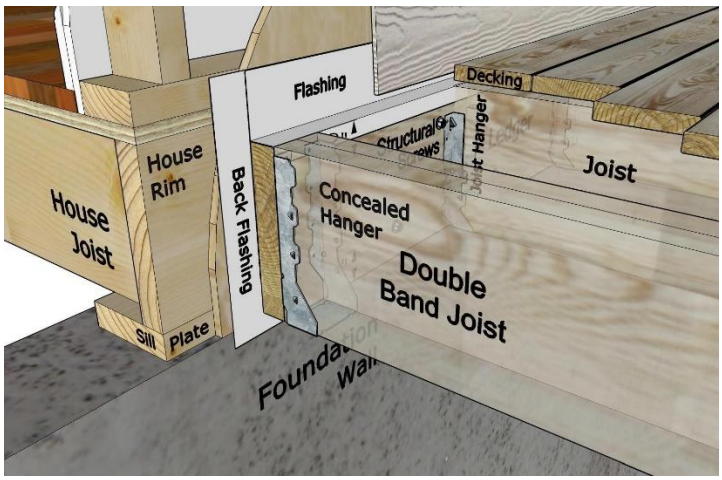
All wooden deck components shall be either naturally decay resistant or decay resistant treated lumber. Composite/engineered materials shall be installed per manufacturer's recommendations and the 2015 IRC. Fasteners shall be rated for outdoor exposure and compliant with framing and decking materials used.

Flashing

When attached to a structure, the structure to which it is attached shall have a treated wood band for the length of the deck, or corrosion-resistant flashing shall be used to prevent moisture from coming in contact with the untreated framing of the structure. Aluminum flashing shall not be used in conjunction with deck construction. The deck band and the structure band shall be constructed in contact with each other except on brick veneer structures and where plywood sheathing is required and properly flashed. Siding shall not be installed between the structure and the deck band. If attached to a brick structure, neither the flashing nor a treated band for brick structure is required.

Attaching Ledger With Drainage Spacers

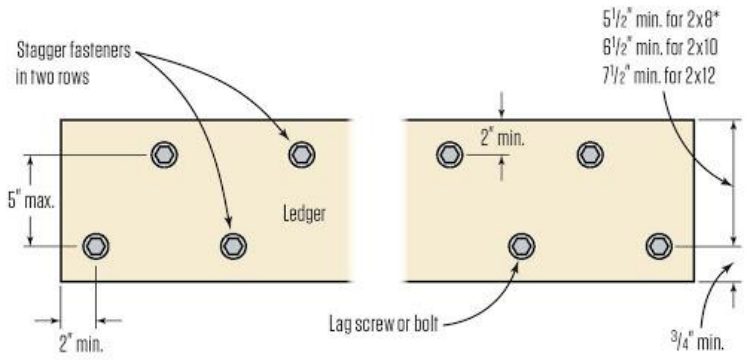




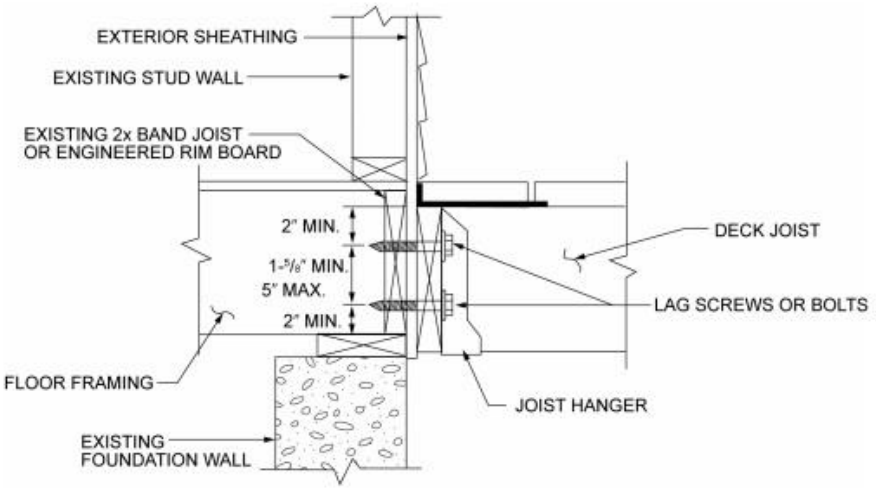
Ledgers

Ledger depth shall be equal to or greater than deck joist depth with a minimum nominal dimension of 2x8. Nails or screws shall not be used to attach ledger to the primary structure. If the presence or condition of the band is unable to be determined a non-ledger deck should be considered. Decks attached to the exterior wall of the primary structure shall be positively anchored and designed for both vertical and lateral loads.

Placement of Lag Screws and Bolts in Ledgers

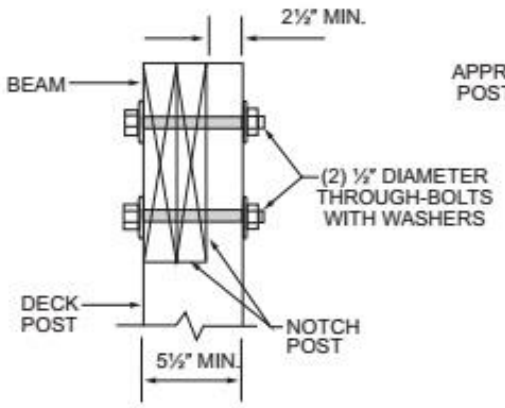


* Distance can be reduced to 4½" if lag screws are used or bolt spacing is reduced to that of lag screws to attach 2x8 ledgers to 2x8 band joists.

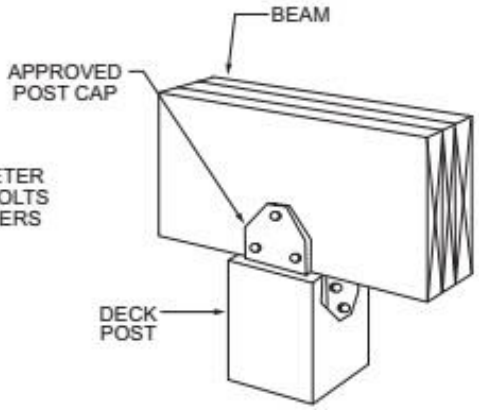


Deck post to deck beam

Deck beams shall be attached to deck posts in accordance with the images below. Manufactured post-to-beam connectors shall be sized for the post and beam sizes. All bolts shall have washers under the head and nut. In no case shall a deck beam be supported solely with fasteners.



NOTCHED POST



POST CAP

Deck Beams

Maximum allowable spans for wood deck beams shall be in accordance with Table R507.6. Beam plies shall be fastened with two rows of 10d nails minimum at 16 inches on center along each edge. Beams shall be permitted to cantilever at each end up to one-fourth of the actual beam span. Splices of multi-span beams shall be located at interior post locations.

TABLE R507.6
DECK BEAM SPAN LENGTHS[a, b] (ft. - in.)

SPECIES[c]	SIZE[d]	DECK JOIST SPAN LESS THAN OR EQUAL TO: (feet)						
		6	8	10	12	14	16	18
Southern pine	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

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.
a. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220-pound point load applied at the end.
b. Beams supporting deck joists from one side only.
c. No. 2 grade, wet service factor.
d. Beam depth shall be greater than or equal to depth of joists with a flush beam condition.
e. Includes incising factor.
f. Northern species. Incising factor not included.

Joists

Deck joists shall be permitted to cantilever not greater than one-fourth of the actual, adjacent joist span. Solid blocking over the beam is required when there is a cantilever. Engineered joist hangers and approved fasteners are required at ledgers or where joists

TABLE R507.5
DECK JOIST SPANS FOR COMMON LUMBER SPECIES[f] (ft. - in.)

SPECIES[a]	SIZE	SPACING OF DECK JOISTS WITH NO CANTILEVER[b] (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	6-8	6-8	6-8
	2 × 8	13-1	11-10	9-8	10-1	10-1	9-8
	2 × 10	16-2	14-0	11-5	14-6	14-0	11-5
	2 × 12	18-0	16-6	13-6	18-0	16-6	13-6
Douglas fir-larch[d], hem-fir[d] spruce-pine-fir[d]	2 × 6	9-6	8-8	7-2	6-3	6-3	6-3
	2 × 8	12-6	11-1	9-1	9-5	9-5	9-1
	2 × 10	15-8	13-7	11-1	13-7	13-7	11-1
	2 × 12	18-0	15-9	12-10	18-0	15-9	12-10
Redwood, western cedars, ponderosa pine[e], red pine[e]	2 × 6	8-10	8-0	7-0	5-7	5-7	5-7
	2 × 8	11-8	10-7	8-8	8-6	8-6	8-6
	2 × 10	14-11	13-0	10-7	12-3	12-3	10-7
	2 × 12	17-5	15-1	12-4	16-5	15-1	12-4

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa, 1 pound = 0.454 kg.

a. No. 2 grade with wet service factor.

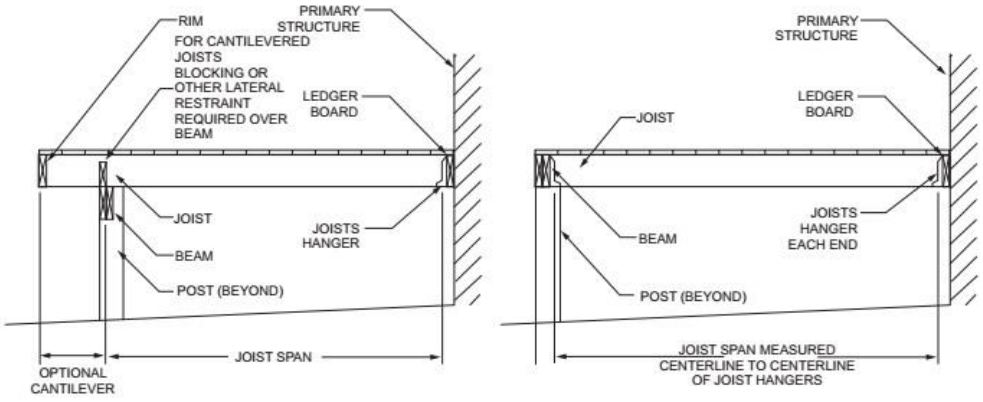
b. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360.

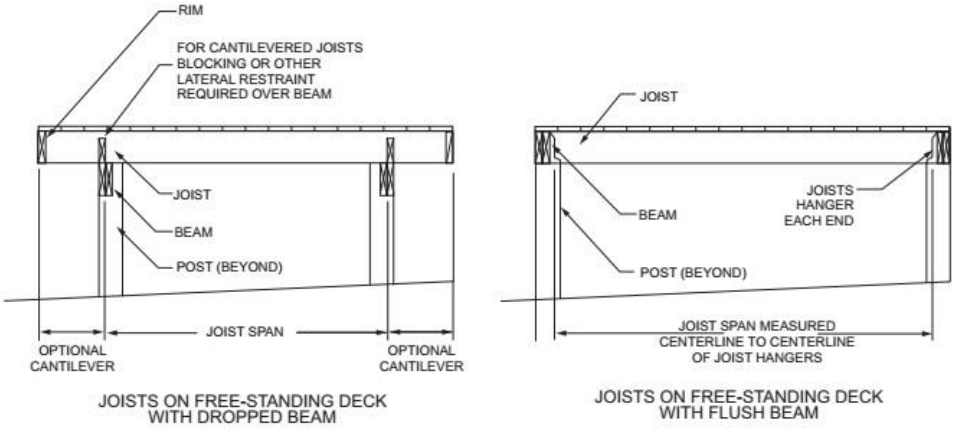
c. Ground snow load, live load = 40 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220-pound point load applied to end.

d. Includes incising factor.

e. Northern species with no incising factor

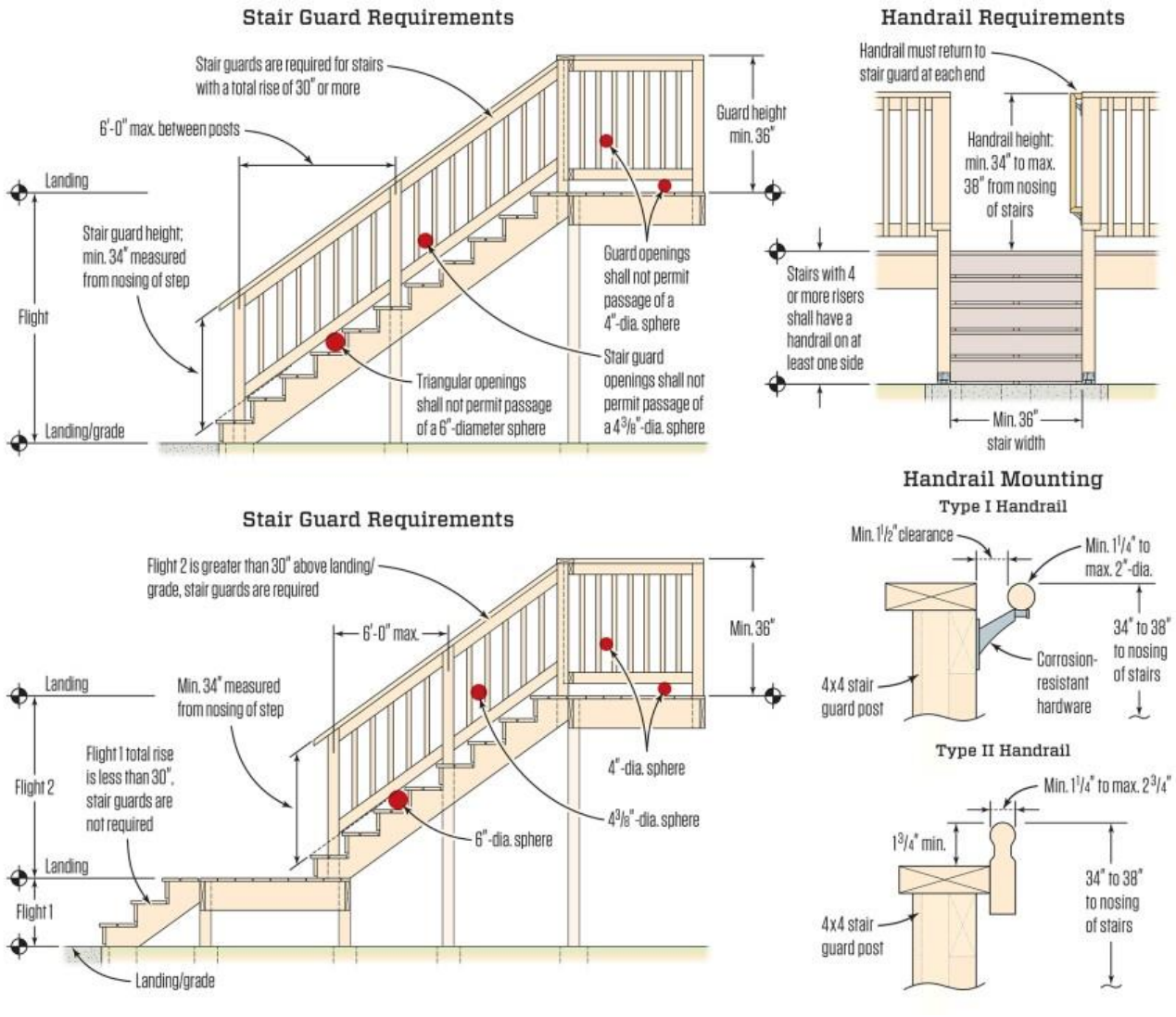
f. Cantilevered spans not exceeding the nominal depth of the joist are permitted.





Stairs and Guards

Stairs and guards shall meet the provisions of Sections R311 & R312 of the IRC. Stair handrails are permitted to be 2x dimensional lumber laid horizontally. Exterior stairways shall be provided with an artificial light source located at the top landing of the stairway.



Electrical

You many also be required to install a new electrical outlet when you build a deck. The National Electrical Code requires that all balconies, decks, and porches that are accessible from inside the dwelling unit have at least one GFCI weather resistant receptacle outlet installed within the perimeter of the balcony, deck, or porch. the receptacle shall not be located more than 6 1/2 ft above the balcony, deck, or porch surface. Any electrical work would be subject to prevailing codes as administered by the State of South Dakota.