TOWN OF CHILI

Building Department
3333 Chili Avenue, Rochester, NY 14624
(585) 889-6143 fax: (585) 889-8710

Decks: What You Need to Know

- Effective May 12, 2020, New York has new building code requirements for detached one- and two-family dwellings and townhouses not more than 3 stories in height, all of which are included in the new International Residential Code of New York State. **This applies to all new residential construction in New York.**

- A building permit is required before you begin work. You need to provide us with some basic information:
  - What you are going to build (overall dimensions and footprint)
  - Where you are going to build it (location in relation to the house or other structures and to the property lines)
  - How you are going to build it (framing diagram or plans stamped by a design professional)

  The first two can be marked on a copy of an instrument survey map. The framing diagram should be a separate drawing(s) or plans stamped by a design professional.

- The framing drawings shall include:
  - Is the deck going to be attached to the house by a ledger board (if so, please provide information on flashing, fasteners and means of attachment), or is it going to be freestanding?
  - What is the height above the surrounding grade?
  - What is the depth of footings?
  - What size posts are to be used?
  - Size and location of beams to support the structure
  - Size and spacing of joists
  - Height and dimensions of railings and any steps, and how they are to be attached to the deck.

  This information is required to complete a review of your application according to the code requirements and to issue a permit.

- Decks are required to support a 40 psf load and should be built accordingly.

- Steps must not be less than 36 inches wide, with a maximum riser height of 8-1/4" and a minimum tread depth of 9 inches. Open risers, 4 inches and taller must be enclosed when located 30 inches above grade.

- Handrails shall be provided on not less than one side of each flight of stairs with four or more risers. Handrail height must be between 34" – 38" above the tread nosing.

- Guards (railings) must be provided for deck surfaces more than 30" above the floor or grade below. Openings in guards must be less than 4 inches. The triangular openings formed by stair treads, risers and guards must be less than 6 inches.

- Posts must extend a minimum of 42 inches below grade.

- All fasteners must be corrosion-resistant as appropriate for the particular type of pressure-treating used for the lumber.

- Decks are subject to the same setback requirements as the house to which they are attached.

- All of the above is just a summary of the basic requirements. Other requirements may apply. Per the International Residential Code, the stamp of a design professional may be required.

- There are three (3) required inspections: **Footing, Rough Frame (before decking goes down), and Final Inspection.**

PLEASE REVIEW THE DECK GUIDE PRIOR TO SUBMITTING ANY DECK PLANS

Required Information:

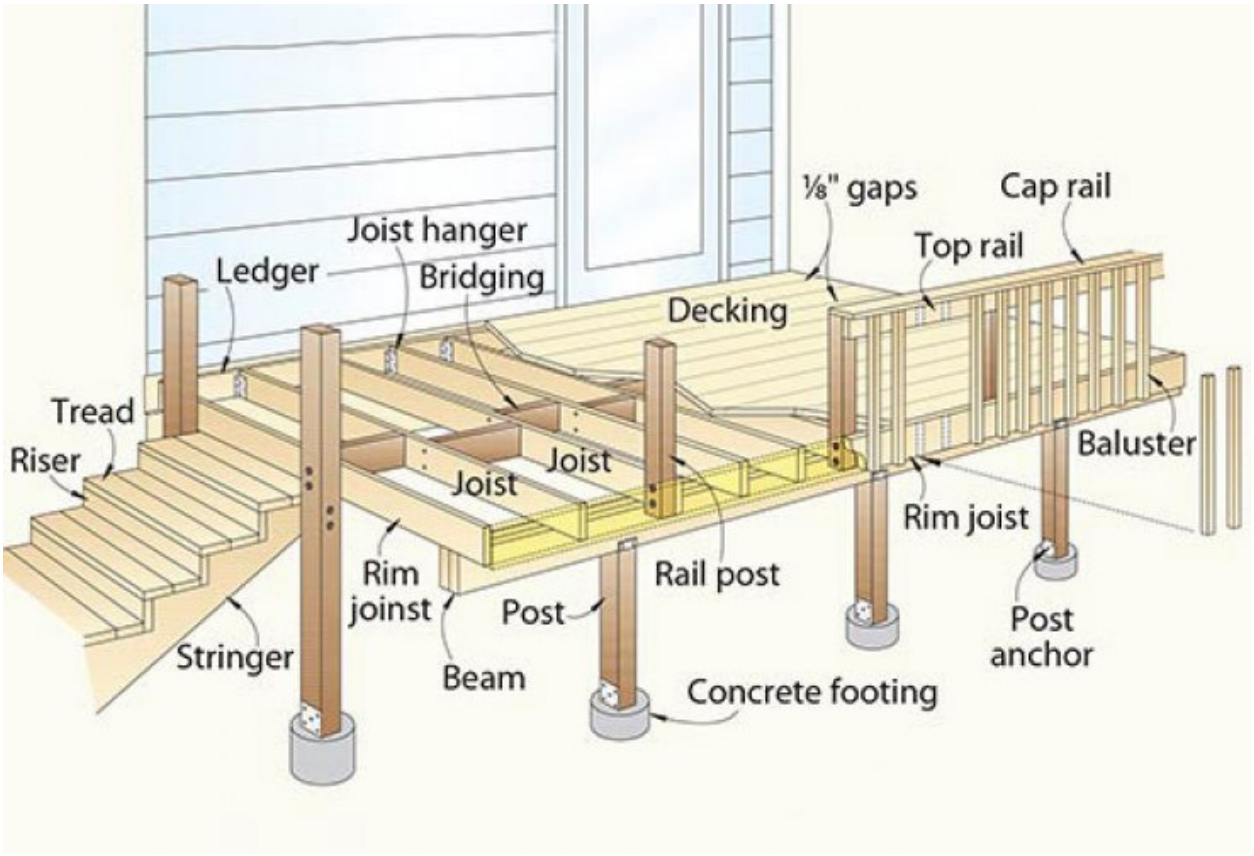
1. Completed building permit application
2. Survey map showing deck size & location
3. Liability & workers compensation insurance OR CE-200 if built by homeowner.
4. Deck plan showing:
    a. Ledger size and attachment
    b. Post size, locations and depth
    c. Beam size and separation distance
    d. Joist size and spacing
    e. Cross-sectional view showing:
        i. Deck height
        ii. Guard (railing) height
        iii. Baluster spacing

I have completely reviewed the Residential Deck Guide & submitted all required information per the Town of Chili Building Department hand-out. I acknowledge lack of information for deck construction may result in my plan to be rejected or approval delayed. I acknowledge that my, or my agents failure to construct the deck in conformance with instructions contained herein may result in the denial of a permit and result in enforcement proceedings.

_____ _____

Property Owner/Agent Date

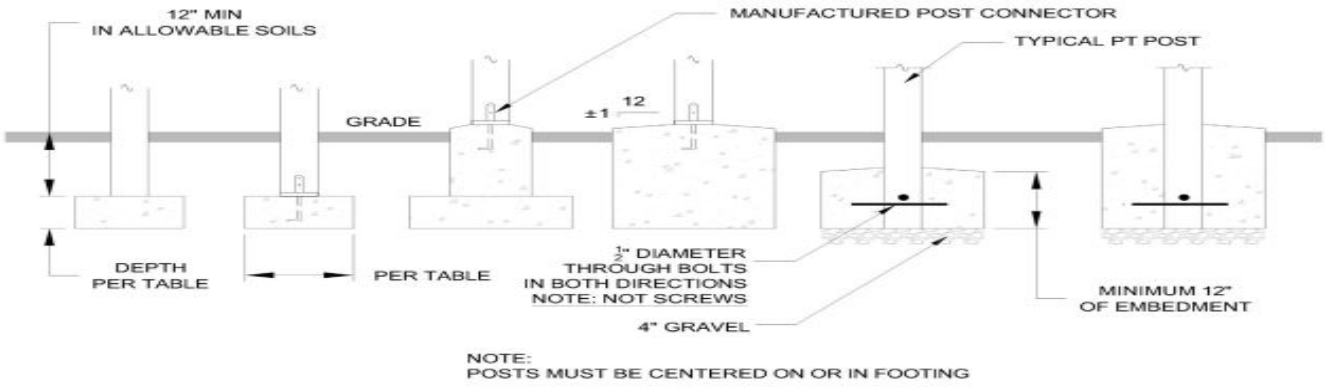
Residential Wood Deck Construction Guide



Minimum Requirements & Limitations:

R507.1 Decks.
Wood-framed decks shall be in accordance with this section. For decks using materials and conditions not prescribed in this section, refer to Section R301.

R507.3 Footings.
Decks shall be supported on concrete footings or other approved structural systems designed to accommodate all loads in accordance with Section R301. Deck footings shall be sized to carry the imposed loads from the deck structure to the ground as shown in Figure R507.3. The footing depth shall be in accordance with Section R403.1.4.
Exception: Free-standing decks consisting of joists directly supported on grade over their entire length.



R507.3.1 Minimum size.

The minimum size of concrete footings shall be in accordance with Table R507.3.1, based on the tributary area and allowable soil-bearing pressure in accordance with Table R401.4.1.

TABLE R507.3.1
MINIMUM FOOTING SIZE FOR DECKS

LIVE OR GROUND SNOW LOAD[b](psf)	TRIBUTARY AREA(sq. ft.)	LOAD BEARING VALUE OF SOILS [a, c, d] (psf)					
		1500[e]			2000[e]		
		Side of a square footing(inches)	Diameter of a round footing(inches)	Thickness(inches)	Side of a square footing(inches)	Diameter of a round footing(inches)	Thickness(inches)
40	20	12	14	6	12	14	6
	40	14	16	6	12	14	6
	60	17	19	6	15	17	6
	80	20	22	7	17	19	6
	100	22	25	8	19	21	6
	120	24	27	9	21	23	7
	140	26	29	10	22	25	8
	160	28	31	11	24	27	9

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m^2, 1 pound per square foot = 0.0479 kPa.

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 inches x 12 inches x 6 inches for 6 x 6 post.
d. If the support is a brick or CMU pier, the footing shall have a minimum 2-inch projection on all sides.
e. Area, in square feet, of deck surface supported by post and footings.

R507.3.2 Minimum depth.

Deck footings shall extend below the frost line specified in Table R301.2(1) in accordance with Section R403.1.4.1.

Exceptions:

1. 1.Free-standing decks that meet all of the following criteria:
   1. 1.1. The joists bear directly on precast concrete pier blocks at grade without support by beams or posts.
   2. 1.2. The area of the deck does not exceed 200 square feet (18.9 m^2).
   3. 1.3. The walking surface is not more than 20 inches (616 mm) above grade at any point within 36 inches (914 mm) measured horizontally from the edge.
2. Free-standing decks need not be provided with footings that extend below the frost line.

R507.4 Deck posts.

For single-level wood-framed decks with beams sized in accordance with Table R507.5, deck post size shall be in accordance with Table R507.4.

TABLE R507.4

DECK POST HEIGHT[a]

DECK POST SIZE	MAXIMUM HEIGHT[a, b](feet-inches)
4 × 4	6-9[c]
4 × 6	8
6 × 6	14
8 × 8	14

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

1. a.Measured to the underside of the beam.
2. b.Based on 40 psf live load.
3. c.The maximum permitted height is 8 feet for one-ply and two-ply beams. The maximum permitted height for three-ply beams on post cap is 6 feet 9 inches.

R507.4.1 Deck post to deck footing connection.

Where posts bear on concrete footings in accordance with Section R403 and Figure R507.4.1, lateral restraint shall be provided by manufactured connectors or a minimum post embedment of 12 inches (305 mm) in surrounding soils or concrete piers. Other footing systems shall be permitted.

Exception: Where expansive, compressible, shifting or other questionable soils are present, surrounding soils shall not be relied on for lateral support.

R507.5 Deck beams.

Maximum allowable spans for wood deck beams, as shown in Figure R507.5, shall be in accordance with Table R507.5. Beam plies shall be fastened with two rows of 10d (3-inch × 0.128-inch) nails minimum at 16 inches (406 mm) on center along each edge. Beams shall be permitted to cantilever at each end up to one-fourth of the allowable beam span. Deck beams of other materials shall be permitted where designed in accordance with accepted engineering practices.

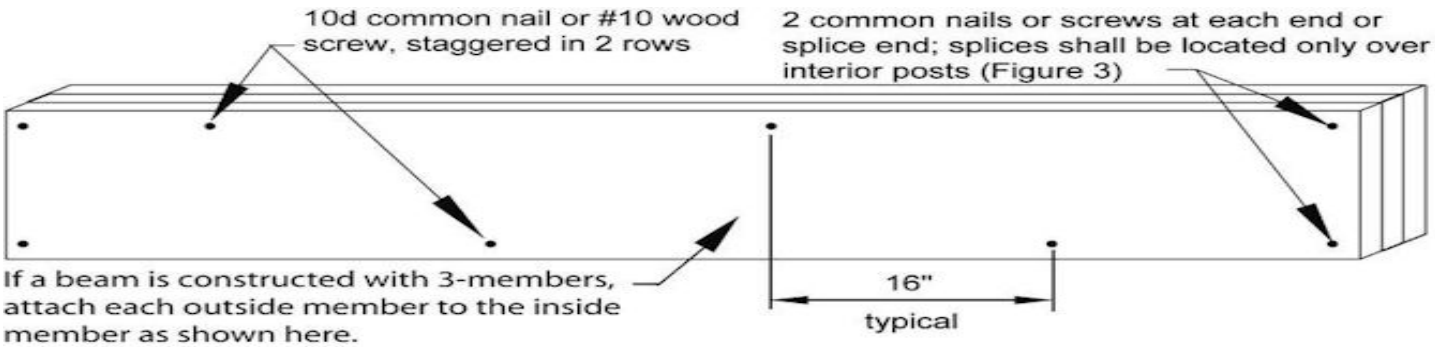


TABLE R507.5

DECK BEAM SPAN LENGTHS[a, b, g] (feet - inches)

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

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.

g. Beam cantilevers are limited to the adjacent beam's span divided by 4.

FIGURE R507.5
TYPICAL DECK BEAM SPANS

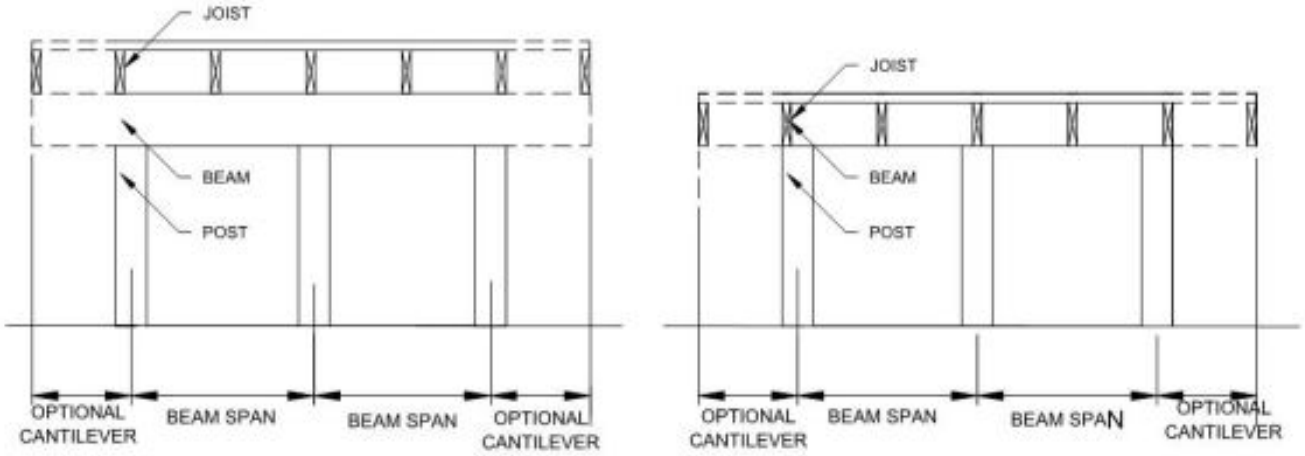


FIGURE R507.5.1(1)
DECK BEAM TO DECK POST

For SI: 1 inch = 25.4 mm.

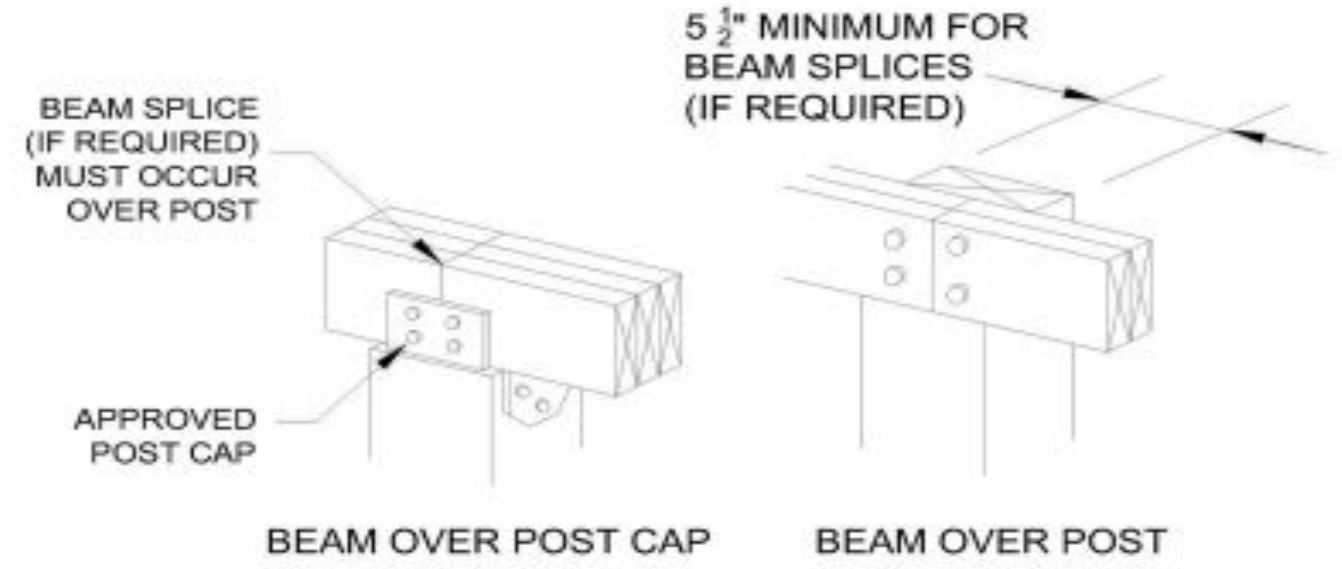
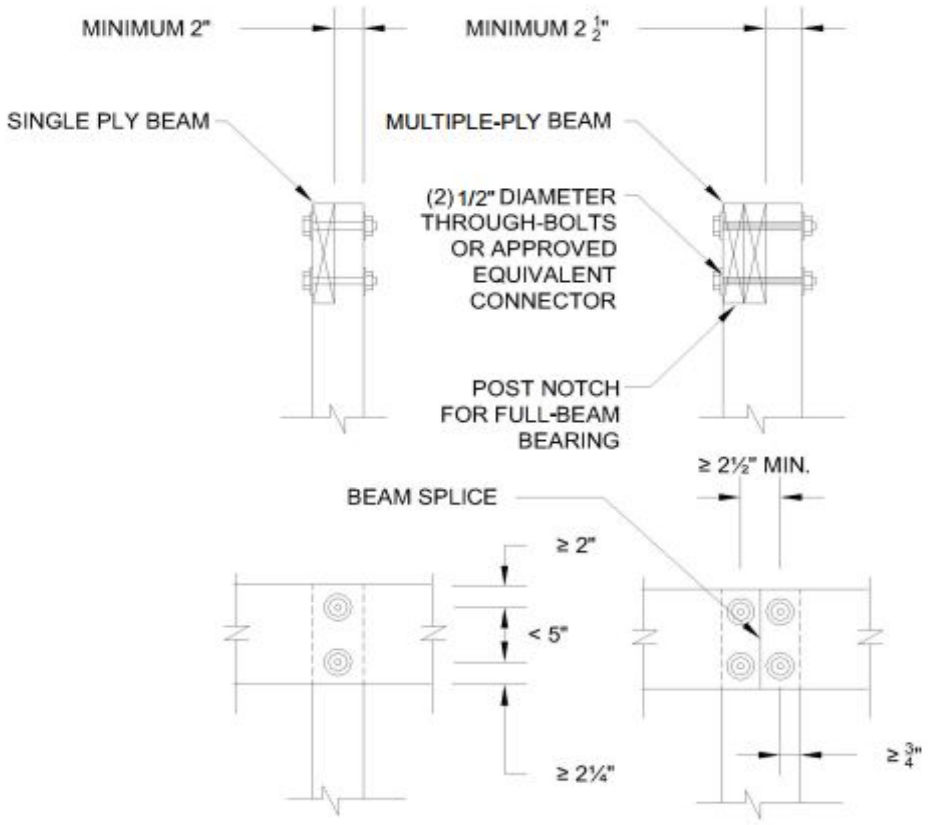
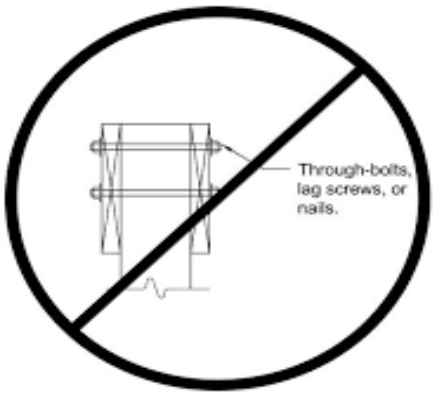


FIGURE R507.5.1(2)
NOTCHED POST-TO-BEAM CONNECTION



For SI: 1 inch = 25.4 mm.



NOTE:

Support of beams with fasteners only is prohibited. Bearing is required

R507.5.2 Deck beam connection to supports.

Deck beams shall be attached to supports in a manner capable of transferring vertical loads and resisting horizontal displacement. Deck beam connections to wood posts shall be in accordance with Figures

R507.5.1(1) and R507.5.1(2). Manufactured post-to-beam connectors shall be sized for the post and beam sizes. Bolts shall have washers under the head and nut.

R507.6 Deck joists.

Maximum allowable spans for wood deck joists, as shown in Figure R507.6, shall be in accordance with Table R507.6. The maximum joist spacing shall be limited by the decking materials in accordance with Table R507.7. The maximum joist cantilever shall be limited to one-fourth of the joist span or the maximum cantilever length specified in Table R507.6, whichever is less.

FIGURE R507.6

TYPICAL DECK JOIST SPANS

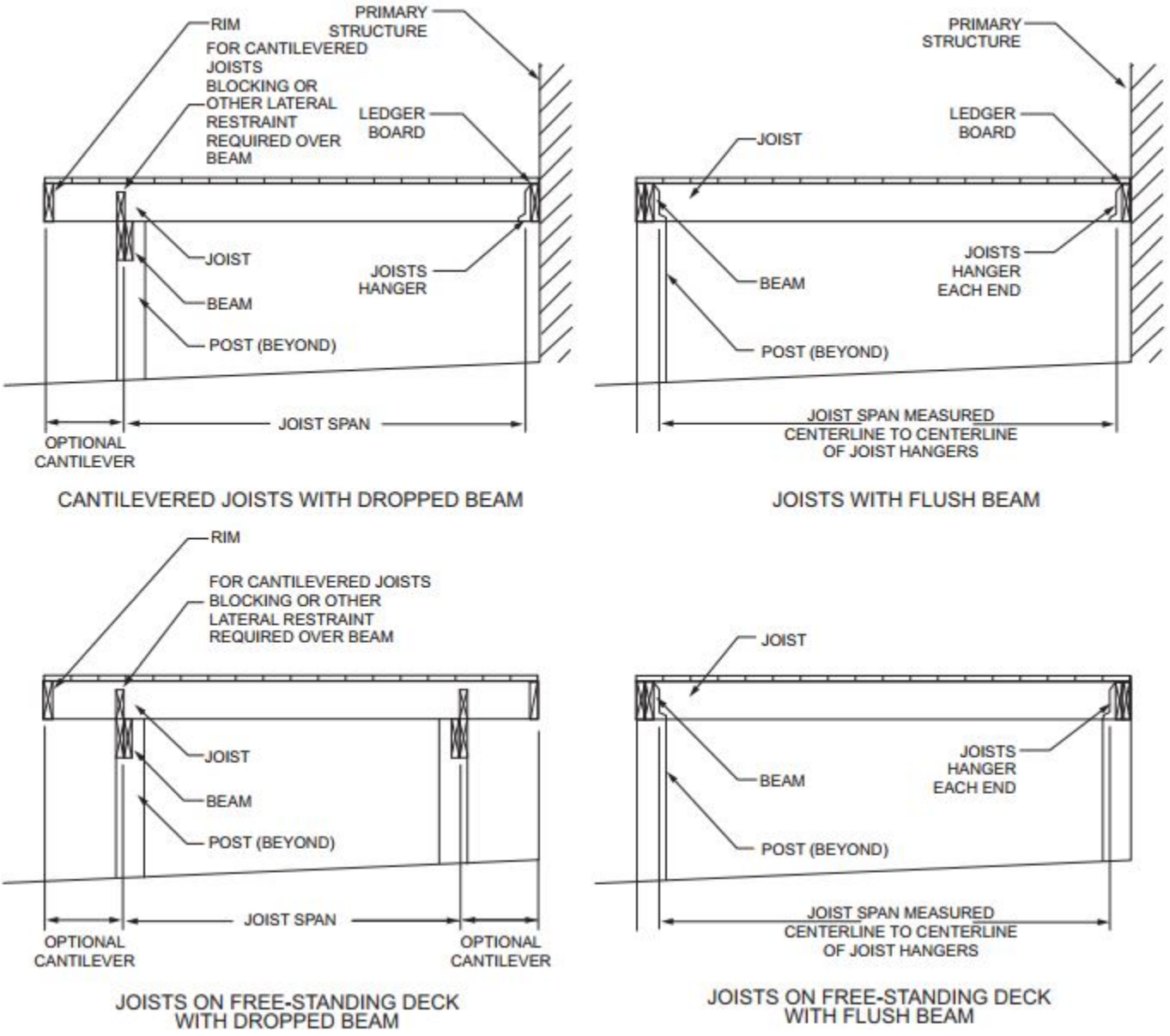


TABLE R507.6
DECK JOIST SPANS FOR COMMON LUMBER SPECIES (ft. - in.)

SPECIES[a]	SIZE	ALLOWABLE JOIST SPAN[b]			MAXIMUM CANTILEVER[c, 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

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.

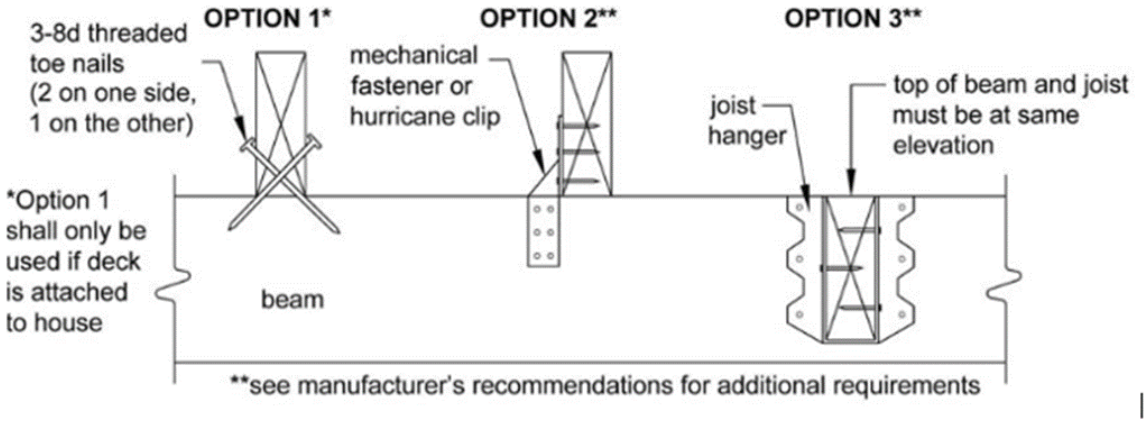
e.Northern species with no incising factor.

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

R507.6.2 Deck joist lateral restraint.

Joist ends and bearing locations shall be provided with lateral resistance to prevent rotation. Where lateral restraint is provided by joist hangers or blocking between joists, their depth shall equal not less than 60 percent of the joist depth. Where lateral restraint is provided by rim joists, they shall be secured to the end of each joist with not fewer than three 10d (3-inch by 0.128-inch) (76 mm by 3.3 mm) nails or three No. 10x 3-inch (76 mm) long wood screws.

JOIST TO BEAM DETAIL- OPTION 1 IS NOT ALLOWED IN THE TOWN OF CHILI



R507.7 Decking.

Maximum allowable spacing for joists supporting decking shall be in accordance with Table R507.7. Wood decking shall be attached to each supporting member with not less than two 8d threaded nails or two No. 8 wood screws. Other approved decking or fastener systems shall be installed in accordance with the manufacturer's installation requirements.

TABLE R507.7

MAXIMUM JOIST SPACING FOR DECKING

DECKING MATERIAL TYPE AND NOMINAL SIZE	MAXIMUM ON-CENTER JOIST SPACING	
	Decking perpendicular to joist	Decking diagonal to joist[a]
$1^1/_4$-inch-thick wood	16 inches	12 inches
2-inch-thick wood	24 inches	16 inches
Plastic composite	In accordance with Section R507.2	In accordance with Section R507.2

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.01745 rad.

a. Maximum angle of 45 degrees from perpendicular for wood deck boards.

R507.8 Vertical and lateral supports.

Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads. Such attachment **shall not be accomplished by the use of toenails or nails subject to withdrawal**. For decks with cantilevered framing members, connection to exterior walls or other framing members shall be designed and constructed to resist uplift resulting from the full live load specified in Table R301.5 acting on the cantilevered portion of the deck. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting.

R507.9.1.1 Ledger details.

Deck ledgers shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, pressure-preservative-treated Southern pine, incised pressure-preservative-treated hem-fir, or approved, naturally durable, No. 2 grade or better lumber. Deck ledgers shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

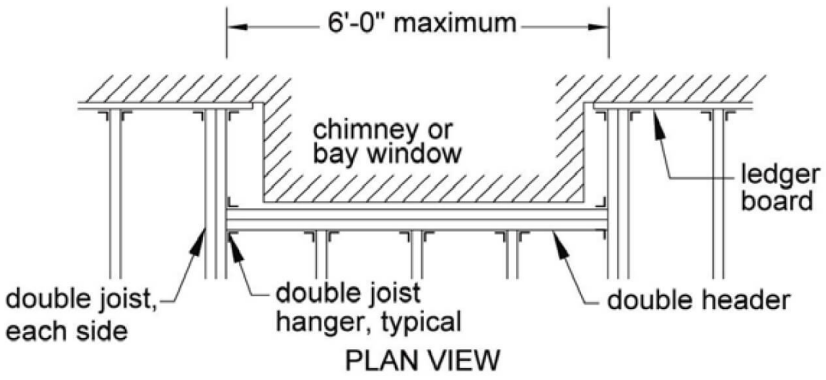
R507.9.1.2 Band joist details.

Band joists supporting a ledger shall be a minimum 2-inch-nominal (51 mm), solid-sawn, spruce-pine-fir or better lumber or a minimum 1-inch by $9^1/_2$-inch (25 mm × 241 mm) dimensional, Douglas fir or better, laminated veneer lumber. Band joists shall bear fully on the primary structure capable of supporting all required loads.

R507.9.1.3 Ledger to band joist details.

Fasteners used in deck ledger connections in accordance with Table R507.9.1.3(1) shall be hot-dipped galvanized or stainless steel and shall be installed in accordance with Table R507.9.1.3(2) and Figures R507.9.1.3(1) and R507.9.1.3(2).


overhang
or bay
window


6'-0" maximum
chimney or
bay window
ledger
board
double joist,
each side
double joist
hanger, typical
double header

PLAN VIEW

TABLE R507.9.1.3(1)

DECK LEDGER CONNECTION TO BAND JOIST[a, b] (Deck live load = 40 psf, deck dead load = 10 psf, snow load ≤ 40 psf)

CONNECTION DETAILS	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′
	On-center spacing of fasteners						
1/2-inch diameter lag screw with 1/2-inch maximum sheathing[c, d]	30	23	18	15	13	11	10
1/2-inch diameter bolt with 1/2-inch maximum sheathing[d]	36	36	34	29	24	21	19
1/2-inch diameter bolt with 1-inch maximum sheathing[e]	36	36	29	24	21	18	16

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

a. Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.

b. Snow load shall not be assumed to act concurrently with live load.

c. The tip of the lag screw shall fully extend beyond the inside face of the band joist.

d. Sheathing shall be wood structural panel or solid sawn lumber.

e. 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 R507.9.1.3(2)

PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

For SI: 1 inch = 25.4 mm.

MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS				
	TOP EDGE	BOTTOM EDGE	ENDS	ROW SPACING
Ledger[a]	2 inches[d]	3/4 inch	2 inches[b]	1 5/8 inches[b]
Band Joist[c]	3/4 inch	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 R507.9.1.3(1).

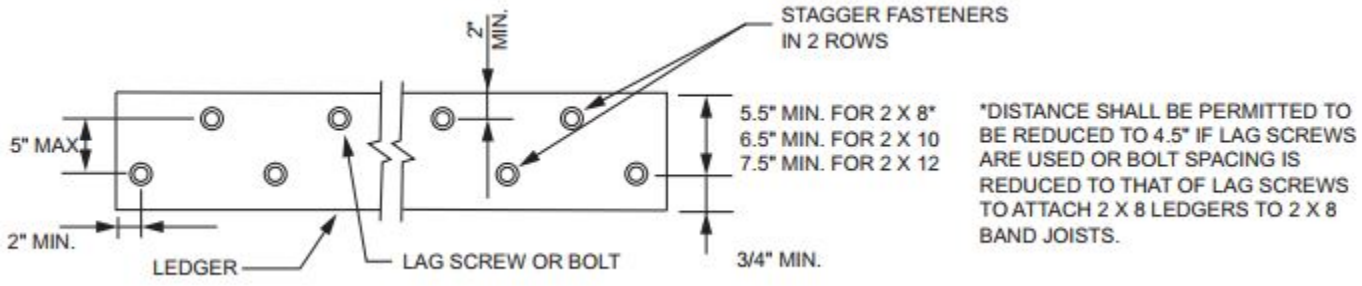
b. Maximum 5 inches.

c. For engineered rim joists, the manufacturer's recommendations shall govern.

d.T he minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure R507.9.1.3(1).

FIGURE R507.9.1.3(1)

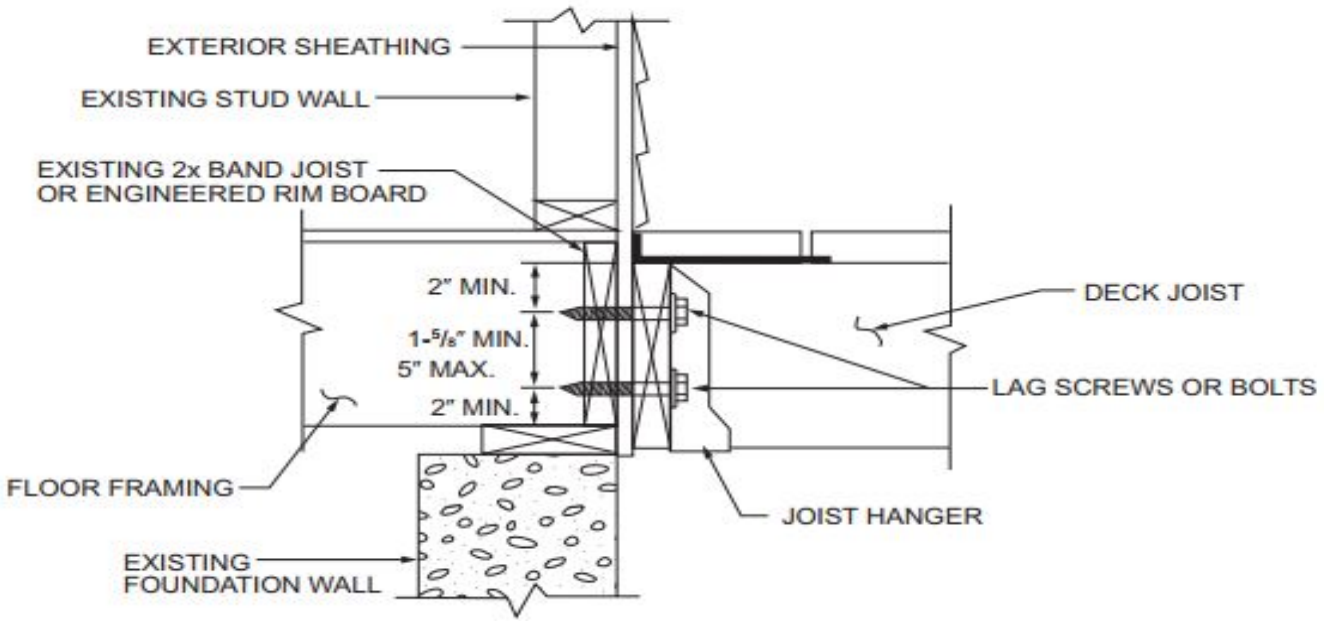
PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS



For SI: 1 inch = 25.4 mm.

FIGURE R507.9.1.3(2)

PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS



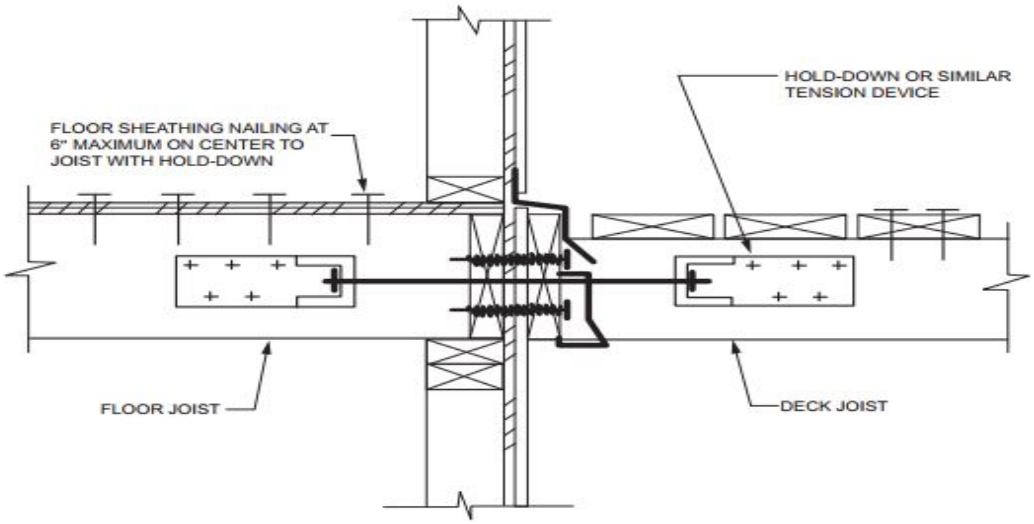
For SI: 1 inch = 25.4 mm.

R507.9.2 Lateral connection.

Lateral loads shall be transferred to the ground or to a structure capable of transmitting them to the ground. Where the lateral load connection is provided in accordance with Figure R507.9.2(1), hold-down tension devices shall be installed in not less than two locations per deck, within 24 inches (610 mm) of each end of the deck. Each device shall have an allowable stress design capacity of not less than 1,500 pounds (6672 N). Where the lateral load connections are provided in accordance with Figure R507.9.2(2), the hold-down tension devices shall be installed in not less than four locations per deck, and each device shall have an allowable stress design capacity of not less than 750 pounds (3336 N).

FIGURE R507.9.2(1)

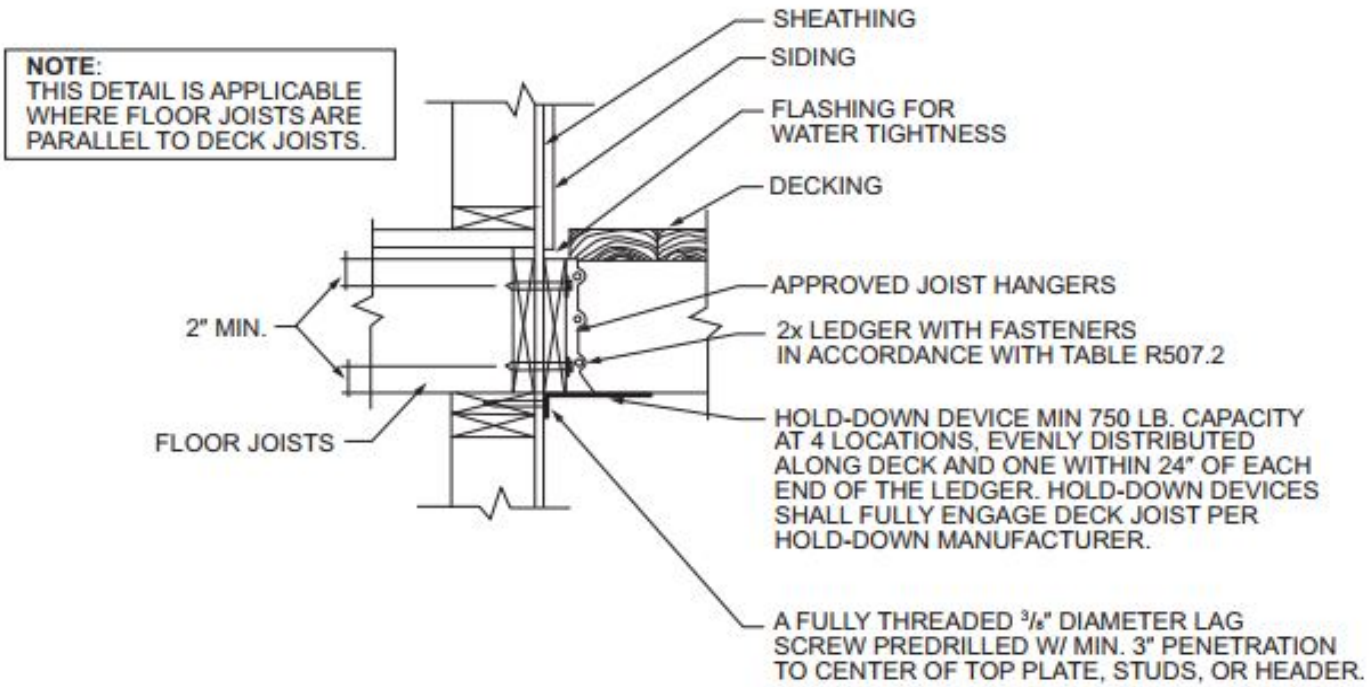
DECK ATTACHMENT FOR LATERAL LOADS



For SI: 1 inch = 25.4 mm.

FIGURE R507.9.2(2)

DECK ATTACHMENT FOR LATERAL LOADS



For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm

STAIRS

R311.7.1 Width.
Stairways shall be not less than 36 inches (914 mm) in clear width at all points above the permitted handrail height and below the required headroom height. The clear width of stairways at and below the handrail height, including treads and landings, shall be not less than $31^1/_2$ inches (787 mm) where a handrail is installed on one side and 27 inches (698 mm) where handrails are installed on both sides.

R311.7.3 Vertical rise.
A flight of stairs shall not have a vertical rise larger than 151 inches (3835 mm) between floor levels or landings.

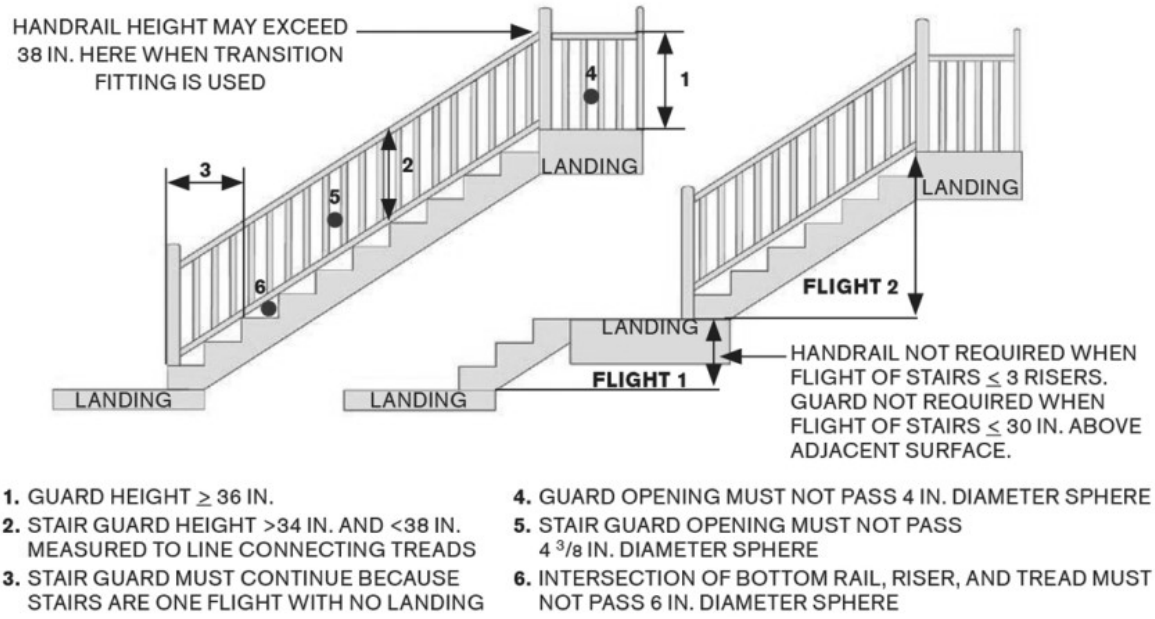
[NY]R311.7.5.1 Risers.
The riser height shall be not more than $8^1/_4$ inches (209 mm). The riser shall be measured vertically between leading edges of the adjacent treads. The greatest riser height within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm). Risers shall be vertical or sloped from the underside of the nosing of the tread above at an angle not more than 30 degrees (0.51 rad) from the vertical. At open risers, openings located more than 30 inches (762 mm), as measured vertically, to the floor or grade below shall not permit the passage of a 4-inch-diameter (102 mm) sphere.

[NY]R311.7.5.2 Treads.
The tread depth shall be not less than 9 inches (229 mm). The tread depth shall be measured horizontally between the vertical planes of the foremost projection of adjacent treads and at a right angle to the tread's leading edge. The greatest tread depth within any flight of stairs shall not exceed the smallest by more than $^3/_8$ inch (9.5 mm).

R311.7.5.3 Nosings.
Nosings at treads, landings and floors of stairways shall have a radius of curvature at the nosing not greater than $^9/_{16}$ inch (14 mm) or a bevel not greater than $^1/_2$ inch (12.7 mm). A nosing projection not less than $^3/_4$ inch (19 mm) and not more than $1^1/_4$ inches (32 mm) shall be provided on stairways. The greatest nosing projection shall not exceed the smallest nosing projection by more than $^3/_8$ inch (9.5 mm) within a stairway.
Exception: A nosing projection is not required where the tread depth is not less than 11 inches (279 mm).

R311.7.6 Landings for stairways.
There shall be a floor or landing at the top and bottom of each stairway. The width perpendicular to the direction of travel shall be not less than the width of the flight served… Where the stairway has a straight run, the depth in the direction of travel shall be not less than 36 inches (914 mm).

R311.7.7 Stairway walking surface.
The walking surface of treads and landings of stairways shall be sloped not steeper than one unit vertical in 48 inches horizontal (2-percent slope).



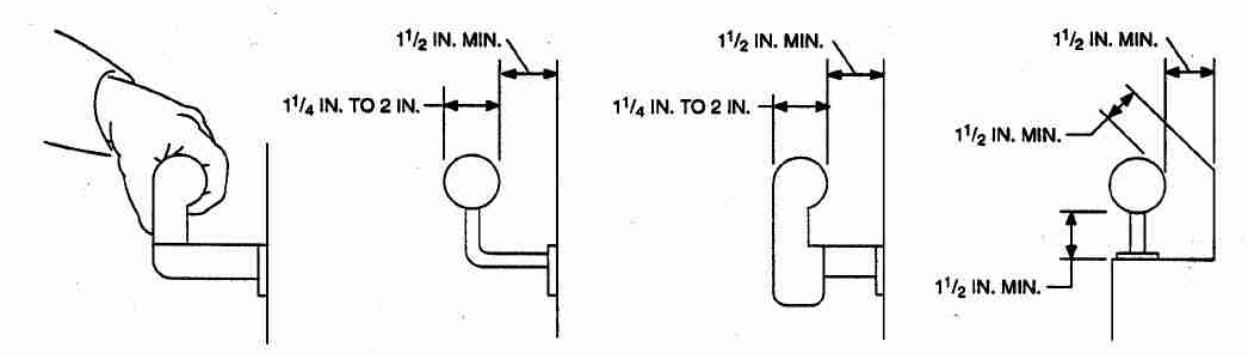
1. GUARD HEIGHT ≥ 36 IN.
2. STAIR GUARD HEIGHT >34 IN. AND <38 IN. MEASURED TO LINE CONNECTING TREADS
3. STAIR GUARD MUST CONTINUE BECAUSE STAIRS ARE ONE FLIGHT WITH NO LANDING
4. GUARD OPENING MUST NOT PASS 4 IN. DIAMETER SPHERE
5. STAIR GUARD OPENING MUST NOT PASS 4 3/8 IN. DIAMETER SPHERE
6. INTERSECTION OF BOTTOM RAIL, RISER, AND TREAD MUST NOT PASS 6 IN. DIAMETER SPHERE

HANDRAILS

R311.7.8 Handrails.
Handrails shall be provided on not less than one side of each flight of stairs with four or more risers.

R311.7.8.1 Height.
Handrail height, measured vertically from the sloped plane adjoining the tread nosing, or finish surface of ramp slope, shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm).

R311.7.8.4 Continuity.
Handrails shall be continuous for the full length of the flight, from a point directly above the top riser of the flight to a point directly above the lowest riser of the flight. Handrail ends shall be returned or shall terminate in newel posts or safety terminals.



GUARDS (RAILINGS)

R312.1.1 Where required.
Guards shall be provided for those portions of open-sided walking surfaces, including stairs, ramps and landings, that are located more than 30 inches (762 mm) measured vertically to the floor or *grade* below at any point within 36 inches (914 mm) horizontally to the edge of the open side. Insect screening shall not be considered as a *guard*.

R312.1.2 Height.
Required *guards* at open-sided walking surfaces, including stairs, porches, balconies or landings, shall be not less than 36 inches (914 mm) in height as measured vertically above the adjacent walking surface or the line connecting the *nosings*.
Exceptions:

1. *Guards* on the open sides of stairs shall have a height of not less than 34 inches (864 mm) measured vertically from a line connecting the *nosings*.
2. Where the top of the *guard* serves as a handrail on the open sides of stairs, the top of the *guard* shall be not less than 34 inches (864 mm) and not more than 38 inches (965 mm) as measured vertically from a line connecting the *nosings*.

R312.1.3 Opening limitations.
Required *guards* shall not have openings from the walking surface to the required *guard* height that allow passage of a sphere 4 inches (102 mm) in diameter.
Exceptions:

1. The triangular openings at the open side of stair, formed by the riser, tread and bottom rail of a *guard*, shall not allow passage of a sphere 6 inches (153 mm) in diameter.
2. *Guards* on the open side of stairs shall not have openings that allow passage of a sphere $4^{3}/_{8}$ inches (111 mm) in diameter.