Township of Spring

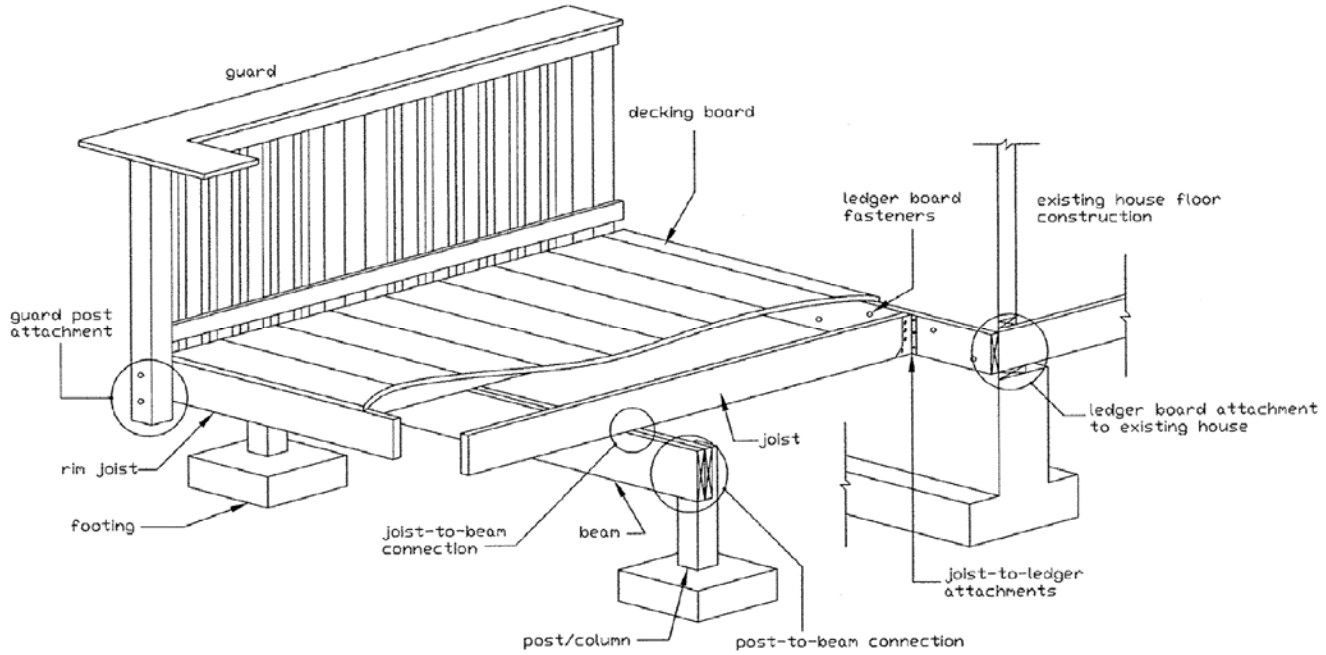
Code Enforcement Department

Deck Submittal Guide

This Book is intended to aid in the submittal of residential deck building permits. This book does not replace the adopted Building Code. This book may not cover all applicable Code sections that apply to deck construction. This document is not intended to preclude the use of other construction methods or materials. For design assistance please contact a design or construction professional.

Typical Deck Details

Based on the 2015 International Residential Code



APPLICATION PROCESS FOR PERMIT

Any owner or authorized agent, who intends to construct a deck, or any other work regulated by the International Residential Code, shall first submit an application to the Building Official and obtain the required permit.

Applications are handled by the Township of Spring Code Enforcement Department between the hours 8:00a.m. and 5:00p.m, Monday - Friday, except major holidays.

Applications can be found on the Township website under the Code Enforcement department, and in the Township lobby. Applications can be mailed, emailed or faxed upon request.

Once an application has been submitted, it will undergo the review process. Application submittals undergo a Zoning review and a Building Code review. The Building department has up to 15 business days to review an application and contact the owner or agent with any questions/concerns. The Zoning department has up to 30 days to review an application. If the application is approved, the applicant will be contacted via phone or email.

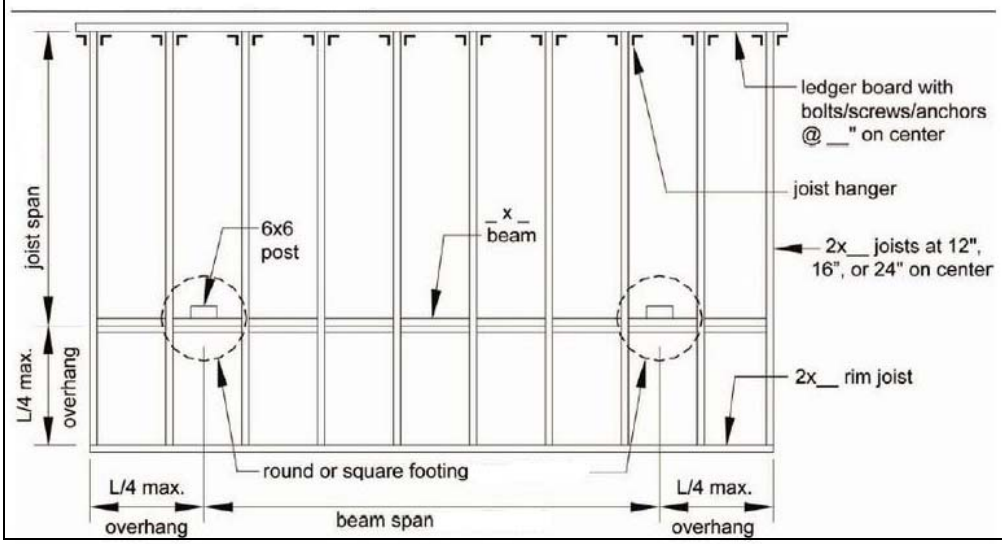
Failure to obtain the required permit before the start of construction may lead to violations and fines as prescribed by law, and shall result in the potential permit fee being doubled.

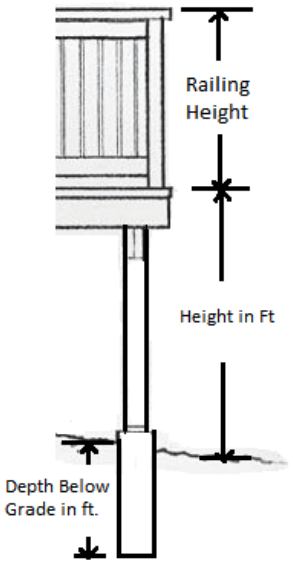
1. Complete the Deck Application and submit that to the Township along with three sets of the required structural drawing and plot plan. If unable to complete the application or the required drawings, please seek a design professional. The Township cannot by law provide design assistance.

2. The structural drawing should contain the following information:
    - Footing details showing footing diameter and footing depth
    - Post details showing post locations, post size and spacing
    - Header Locations, and header sizes
    - Post to beam connection detail
    - Floor Joist size, floor joist spacing and floor joist spans
    - Cantilever spans
    - Ledger Connection and bolt spacing
    - Flashing
    - Cross bracing

STRUCTURAL DRAWING EXAMPLE

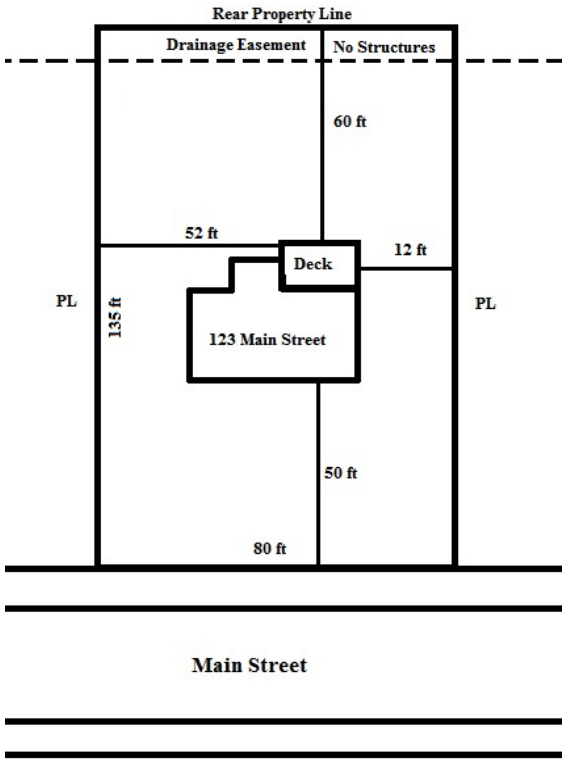
A structural framing plan is required when applying for a deck permit. The plan should show the deck from a bird's-eye-view indicating the necessary elements of framing.





3. The Plot plan shall contain the following information:

    - Property Boundaries
    - The proposed deck and the setback distances to the property lines
    - Location of all roads, easements, alleys and rights-of-way
    - Location of existing structures including the house, pools, and sheds etc.



4. Except for patios and decks < 30 inches to grade, all of the following inspections are required during deck construction:

    - Footing inspections are required <u>before</u> the concrete is poured. All holes must be cleaned and free from loose dirt.
    - Framing inspection must be completed before concealing structural members.
    - Final inspection shall be scheduled when all construction of the deck has been completed.
    - NOTE: ALL INSPECTIONS ARE MANDATORY BY LAW. FAILURE TO OBTAIN THE INSPECTIONS MAY CAUSE VIOLATIONS AND FINES, OR OTHER APPROPRIATE PENALTIES AT LAW OR IN EQUITY TO ABATE OR RESTRAIN THE VIOLATION.

5. Before digging, Contact PA 1 Call for Utility Locations by dialing 811. (State Law)

6. It shall be the duty of the permit holder or their agent to notify the building official that such work is ready for inspection. It shall be the duty of the person requesting any inspections required by this code to provide access and means for inspection of such work.

7. All inspections must be made at least 24 hours in advance. All construction documents shall be on the jobsite and provided to inspector upon request.

8. Decks may not be occupied until all inspections have been completed and a certificate of occupancy has been issued by the Building Code Official.

<u>NOTICE</u>

<u>Please Note that this book is intended to be a helpful guide for deck application submittal.</u> <u>This document is not intended to preclude the use of other construction methods or materials. This book does not cover every code applicable to deck construction</u>. <u>For additional information please consult the International Code Council's 2015 International Residential Code.</u>

FOOTINGS

Except for freestanding decks not attached to the house for support, all footers must be a minimum of 36" below grade and bear on solid, undisturbed soil. Deck footings closer than 5'-0" to an existing exterior house wall must bear at the same elevation as the existing footer of the house. The size of footings supporting piers and columns shall be based on the tributary load and an assumed soil load bearing capacity of 2000 lbs. per square foot.

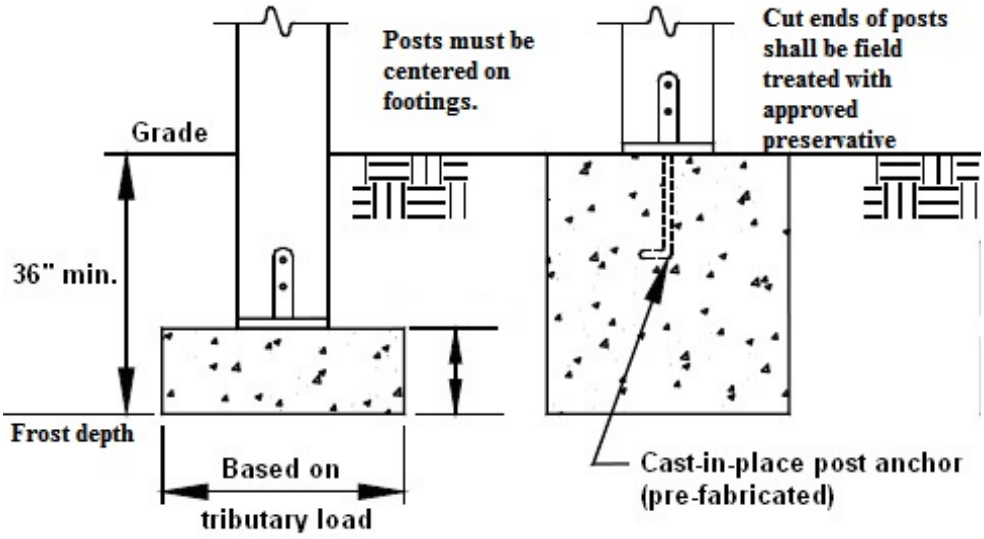
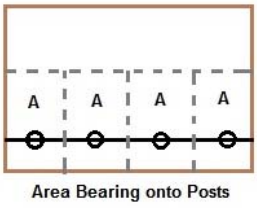


Figure 1
Example Footings

DETERMINING FOOTING DIAMETERS

1. Determine the Area of the Deck bearing onto the Post. (See Load Distribution Diagram Figure 3 below shown on page 5)



Area Bearing onto Posts

2. Multiply the Area bearing onto the Post by 50 Lbs. This gives you the total weight bearing onto the post.

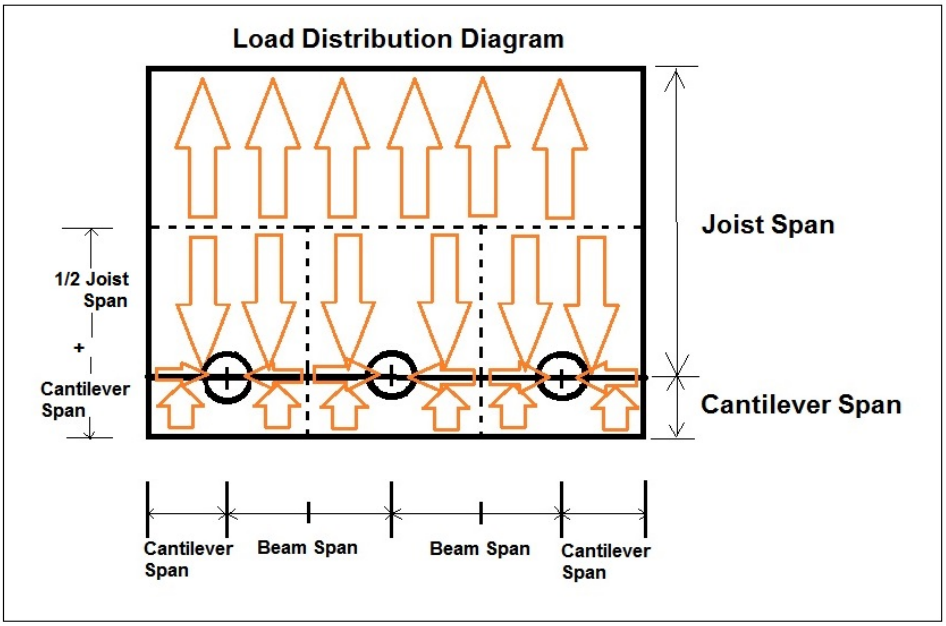
Deck Loads = 40LL + 10 DL
50 lbs per square ft total

Figure 2

Allowable Soil Pressure	2000 lbs / psf		1500 lbs / psf	
Load on Post Footing (lbs)	Footing Diameter Based on Type (inches)			
	Square	Circle	Square	Circle
1000	9	10	10	12
1500	11	12	12	14
2000	12	14	14	16
2500	14	16	16	18
3000	15	17	17	20
3500	16	18	19	21
4000	17	20	20	23
4500	18	21	21	24
5000	19	22	22	25

3. Refer to Figure 2 on the left to choose the correct footing diameter based on the load bearing capacity of the soil, the total weight bearing onto the post, and the type of footing to be installed.

   Note: In reference to the soils listed in the Berks County Soil Survey and local soil evaluations, the majority of soils located in Spring Township are assumed to be capable of supporting a 2000 lb per square ft load bearing capacity. Where expansive, compressive and shifting soil exists or when soil characteristics are questionable, a soil evaluation conducted by an approved agency may be required.



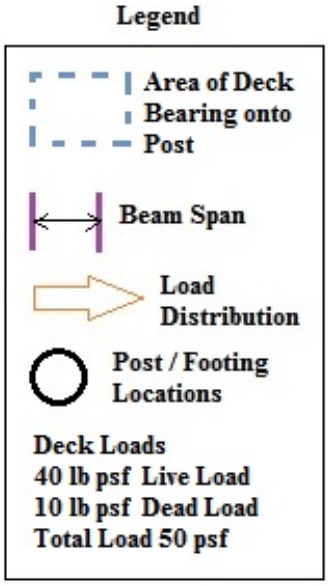


Figure 3

JOIST SIZING AND SPAN

Figure 4

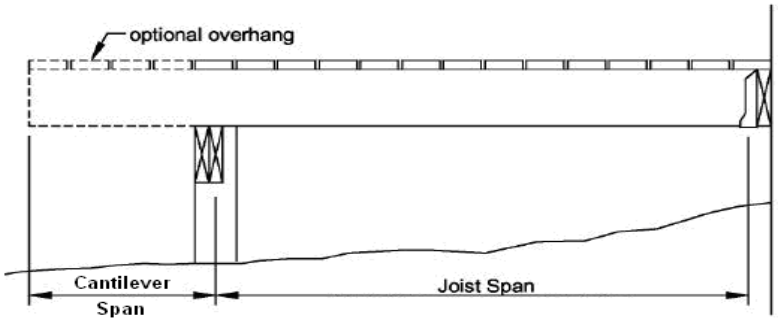
TABLE R507.5
DECK JOIST SPANS FOR COMMON LUMBER SPECIES[f] (ft. - in.)

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.

Figure 5



BEAM SIZE REQUIREMENTS

Beams shall not exceed values in Table 3 shown below. The ends of each beam shall have not less than 1.5 inches of bearing onto wood supports. Beams may not be supported on deck ledgers or band joists. If using engineered lumber, engineered specs are required upon submission.

Figure 6

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

POST-TO BEAM CONNECTIONS

Post-to-beam connections shall comply with one of the following examples. Other methods may be determined appropriate by the Building Code Official provided an ES report or engineered specifications are provided.

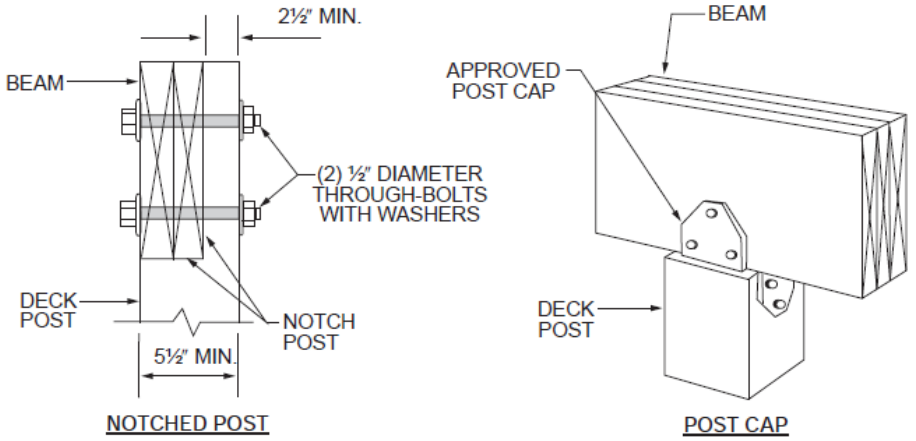


Figure 7

JOIST-TO-BEAM CONNECTIONS

All joists shall be properly attached to each beam and ledger with appropriate means of fasteners. The following attachment methods are permitted: toenails, hurricane clips and joist hangers. NOTE: SCREWS ARE NOT PERMITTED. See Figure 8 for available options. (Option 1 is only permitted when deck is attached to house).

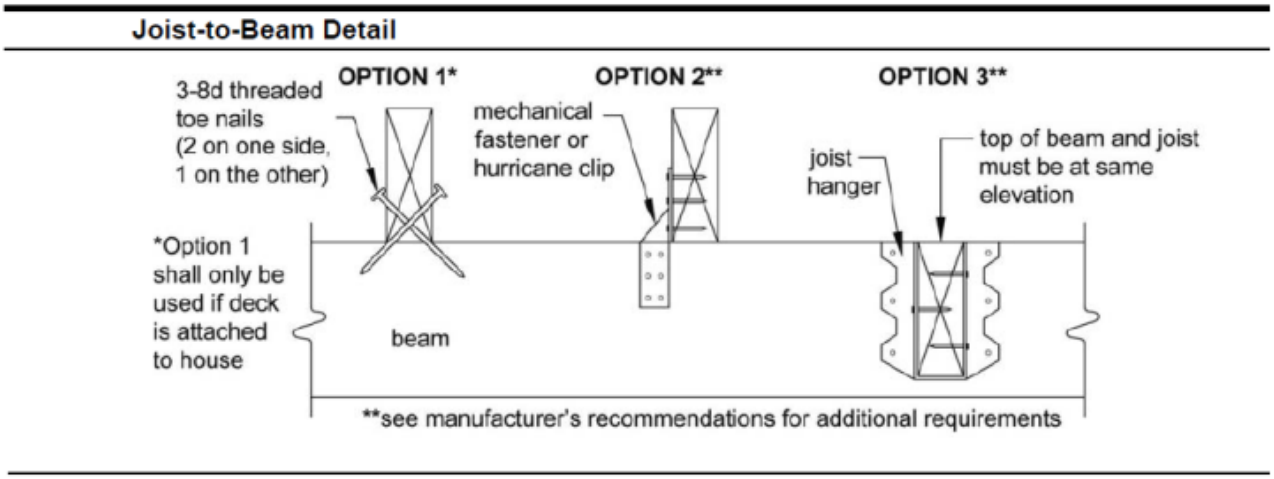


Figure 8

LEDGER ATTACHMENT

The connection between a deck ledger and a 2-inch nominal lumber band joist bearing on a sill plate or wall plate shall be constructed with ½-inch lag screws or bolts with washers in accordance with Table R507.2 of the 2015 IRC. Lag screws, bolts and washers shall be hot-dipped galvanized or stainless steel. The removal of siding and installation of flashing is required between the house and the ledger. NOTE: YOU MAY NOT ATTACH LEDGER BOARDS TO EXISTING CANTILEVERS, OPEN WEB TRUSSES OR STONE OR MASONRY VENEER. If these conditions occur, the deck must be freestanding. If a freestanding deck is utilized, then it must be braced diagonally to resist lateral loads.

Figure 9

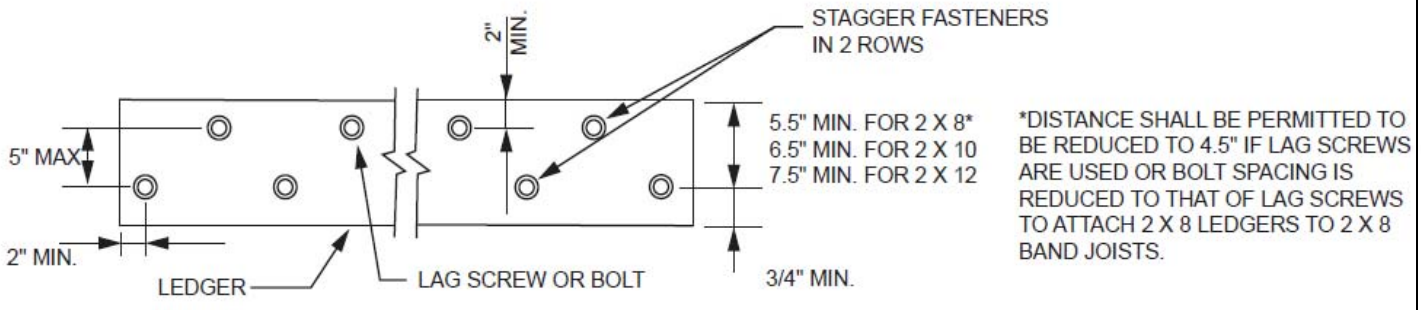


Figure 10

Refer to Table R 507.2 for the spacing of ledger fasteners.

TABLE R507.2
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 R703.8 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.

Figure 11

Deck Lateral Load Attachment Methods

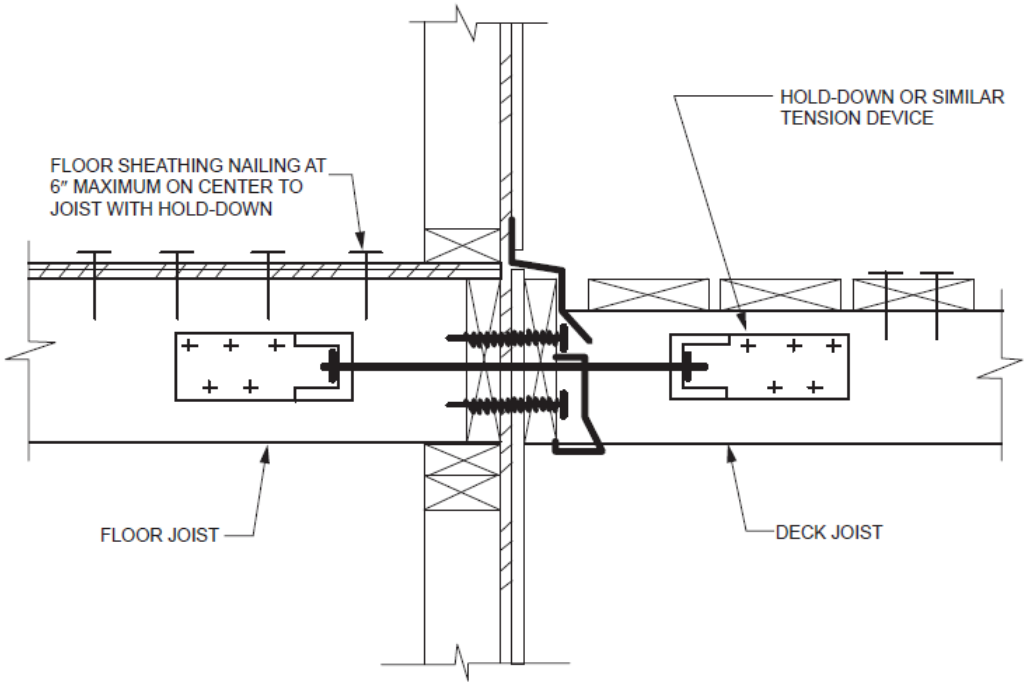


FIGURE 507.2.3(1)
DECK ATTACHMENT FOR LATERAL LOADS

Figure12

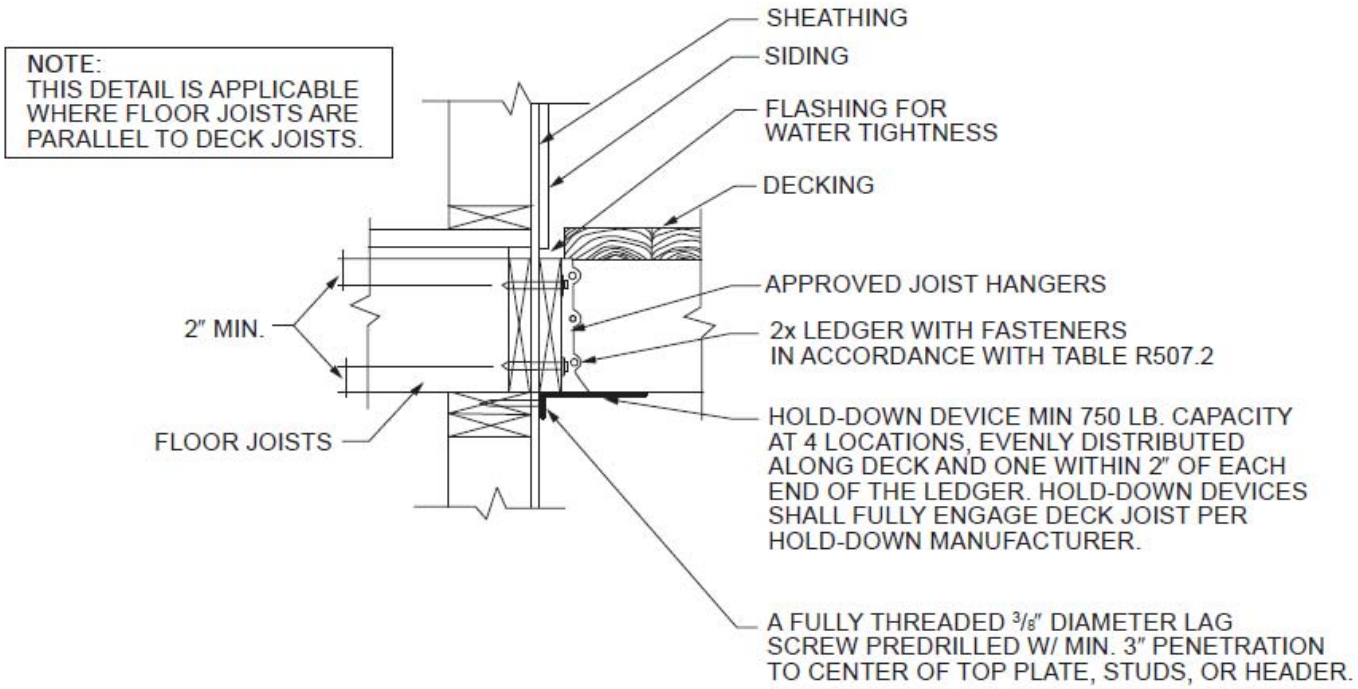


FIGURE R507.2.3(2)
DECK ATTACHMENT FOR LATERAL LOADS

Figure13

BRACING

Exterior landings, decks, and stairs shall be positively anchored to the primary structure to resist both vertical and lateral forces or shall be designed to be self-supporting. Attachment shall not be accomplished by use of toenails or nails subject to withdrawal. Decks greater than 2 feet above grade shall be provided with diagonal bracing.

Freestanding decks shall require diagonal bracing both parallel and perpendicular to the beam at each post.

Figure 22. Diagonal Bracing Requirements

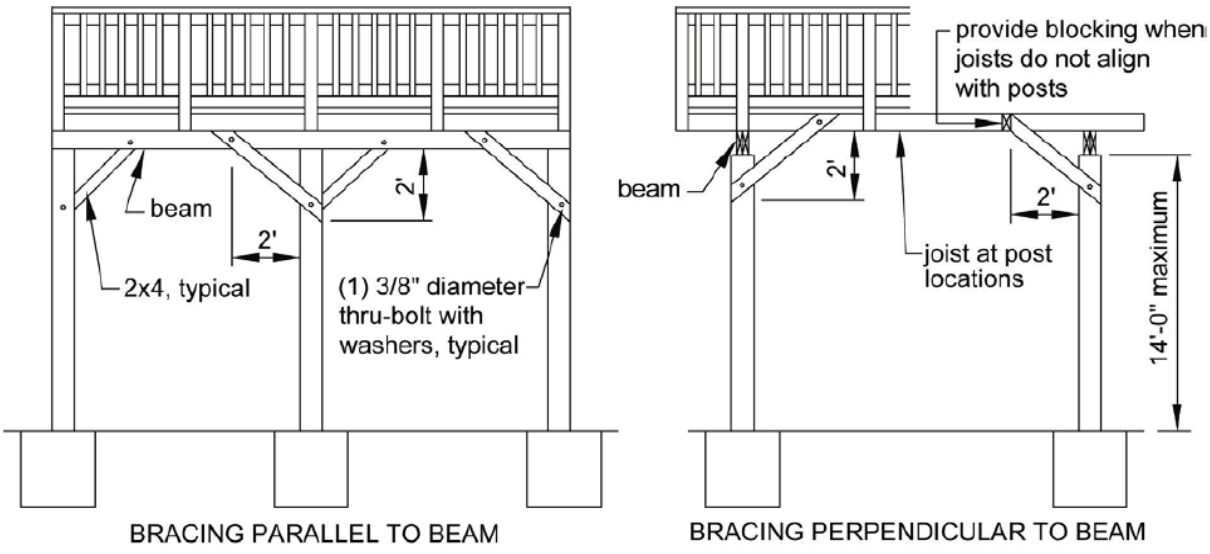


Figure 14

GUARD REQUIREMENTS

Porches, balconies, ramps or raised floor surfaces located more than 30” above grade shall have guards not less than 36” in height. Open sides of stairs with a total rise of more than 30” shall not have guards less than 34” measured vertically from the tread nosing. If a fixed bench is adjacent to a guard, the guard height must be measured from the bench surface.

Required guards on open sides of stairways, decks, balconies and porches shall have intermediate rails or ornamental closures which do not allow the passage of a 4 inch sphere. Exceptions: (see Figure 16)

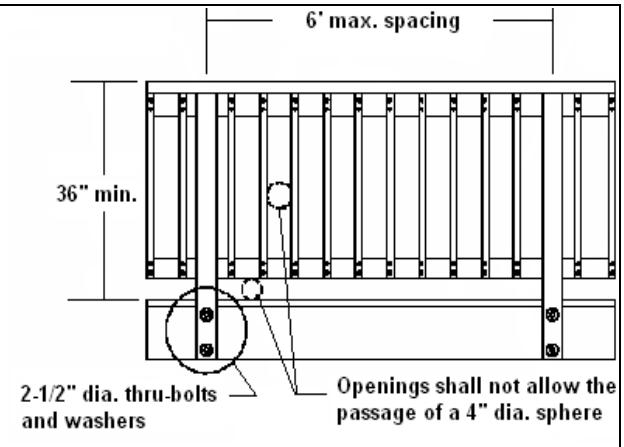


Figure 15

1. The triangular openings formed by the riser, tread and bottom rail at the open side of the stairway are permitted to be of such size that a 6 inch sphere cannot pass through.
2. Openings for required guards on the sides of stairs shall not allow the passage of a 4-3/8 inch sphere.

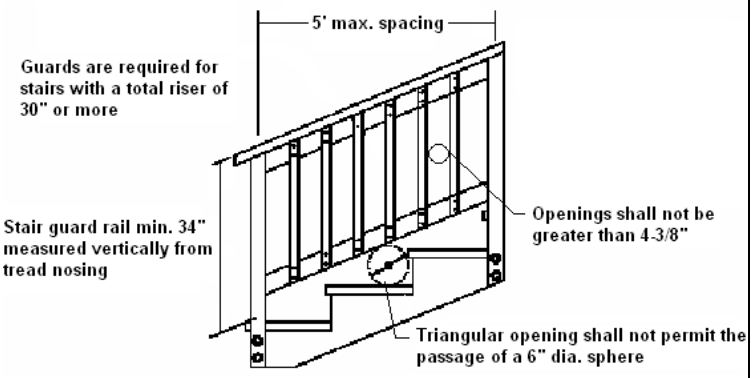


Figure 16

TREAD AND RISER REQUIREMENTS

The maximum riser height shall be 8-1/4 inches measured vertically between leading edges of adjacent treads. The minimum tread depth shall be 9 inches measured horizontally from beginning to end of tread.

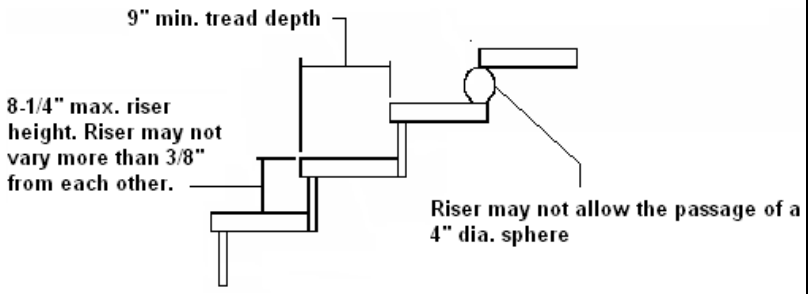


Figure 17

HANDRAIL REQUIREMENTS

Handrails shall be provided on at least one side of each continuous run of treads or flight with four or more risers. Handrails shall be located between 34” and 38” measured vertically from the sloped plane adjoining tread nosing (see figure 14). It shall be continuous for the full length of the flight. Handrails shall have safety returns at the top and bottom or terminate into newel posts.

Handrails shall comply with one of the following options:

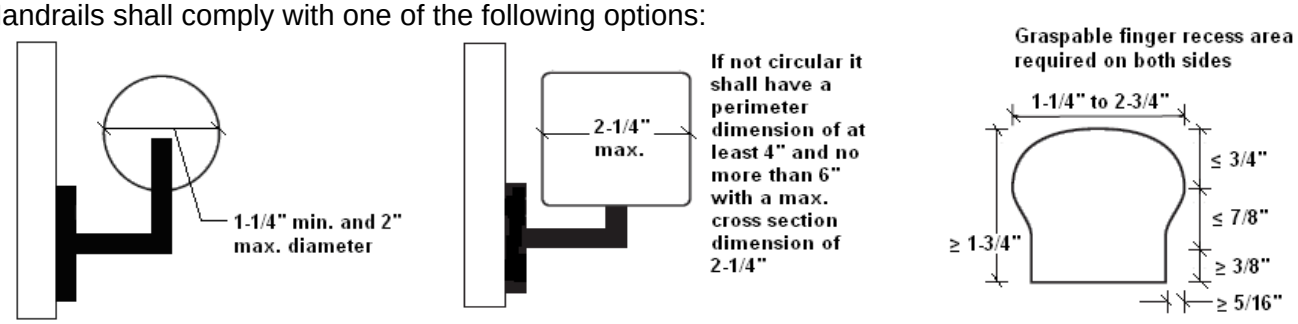


Figure 18