

RESIDENTIAL DECK SUBMITTAL GUIDE

Pennsylvania Uniform Construction Code (UCC) referencing the International Residential Code
as adopted by Manheim Township Ordinances 2004-7, 2004-8 & 2005-6

PERMIT REQUIREMENTS

BUILDING PERMIT: If any portion of the deck has a walking surface located more than 30” measured vertically to the grade below,(*) a building permit is required. (*) In some municipalities, a building permit is required for all decks. Where a building permit is required, submit the following for review and approval:

- **BUILDING PERMIT APPLICATION**

Complete the Building Permit Application. It is necessary to fill out all applicable areas of the permit application including the signature of the permit applicant.

- **PLAN REQUIREMENTS**

- Three (3) copies of a site plan
- Three (3) copies of a deck framing plan
- Three (3) copies of a deck cross section
- Three (3) copies of stairway/guardrail/handrail details (if applicable).

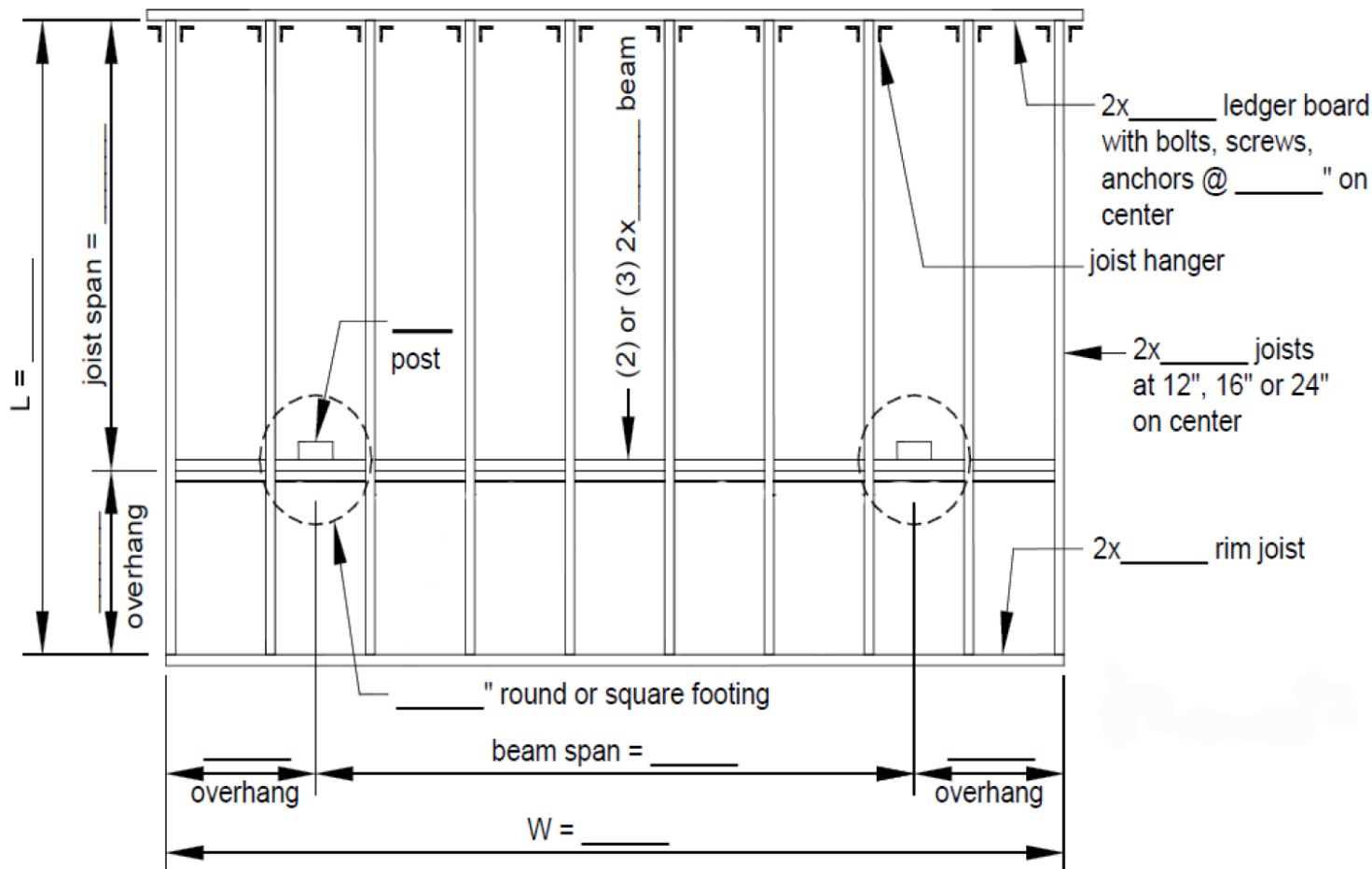
ZONING PERMIT: In municipalities with a zoning ordinance, all decks will require a zoning permit and/or zoning approval. Typically, zoning approval will require a site plan indicating the setback(s) from property lines and a lot coverage calculation. Confirm with the zoning officer for your municipality what is required to show compliance with the zoning ordinance for your municipality.

GENERAL DECK CONSTRUCTION NOTES

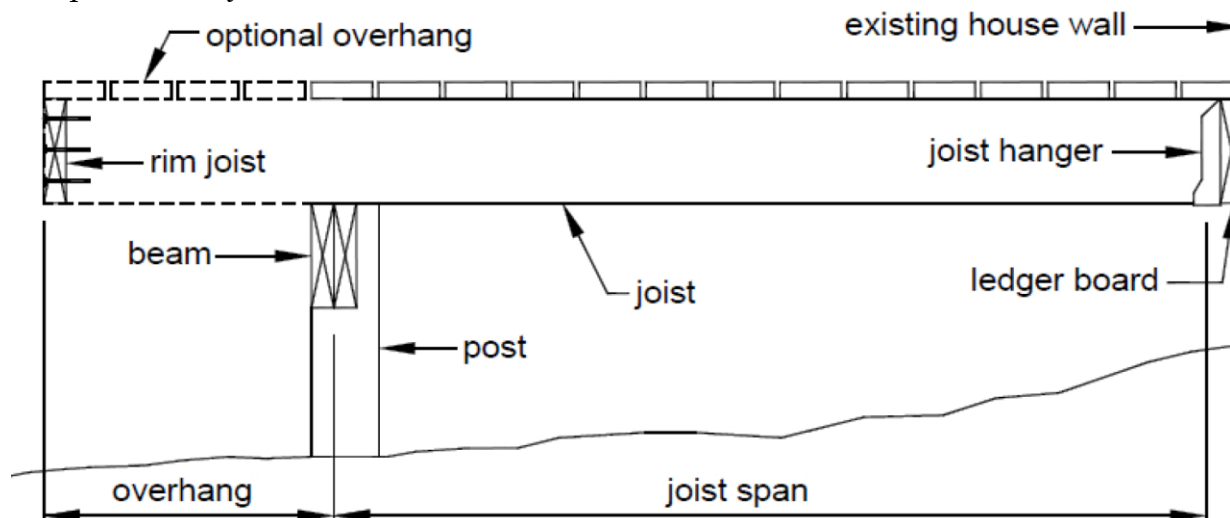
- Lumber shall be southern pine, grade #2 or better and shall be pressure treated per AWPA U1.
- Framing hardware and fasteners (joist hangers, cast-in-place anchors, mechanical fasteners) shall be hot-dipped galvanized (1.85 oz/sf of zinc, G-185 coating) or stainless steel. Use products such as “Zmax” from Simpson Strong-Tie or “Triple Zinc” and Gold Coat” from USP.
- **Decks shall not be attached to:** house overhangs, cantilevered bay windows, brick or stone veneers, exterior finishes, or chimneys without the approval of a PA registered architect or professional engineer.
- Inspections for decks include footing (prior to pouring concrete), framing and final. Framing and final inspections may be combined if the deck is elevated a minimum of 36” above grade.
- Electrical work performed in conjunction with deck projects is subject to the applicable provisions of Chapters 34-40 of the International Residential Code. Electrical work is to be inspected at the rough (prior to concealment) and final stages.
- **Decks shall not be used or occupied until all final inspection approvals are obtained.**
- Every existing structure to which a street number has been assigned shall display such numbers (numerals only) in a position easily observable and easily readable from the roadway or street fronting the property. The numbers shall be of contrasting color with their background and permanent in nature. Street numbers shall be at least 4” inches shall be installed at least 18 inches above finished grade

PLAN REQUIREMENTS Draw to scale or include dimensions on plans

DECK FRAMING PLAN: Submit three (3) copies of a deck framing plan. For simple, single span decks, use the “Typical Deck Framing Plan” below making note of ledger size/connections, beam span and beam size, joist size/span and o.c. spacing.



DECK CROSS SECTION: Submit three (3) copies of a deck construction cross section. Make note of ledger type, existing house wall materials/connection details, post to beam connection details and post/beam/joist sizes.



Deck joists shall be permitted to cantilever not greater than one-fourth (1/4) of the adjacent joist span

DECK LEDGER REQUIREMENTS

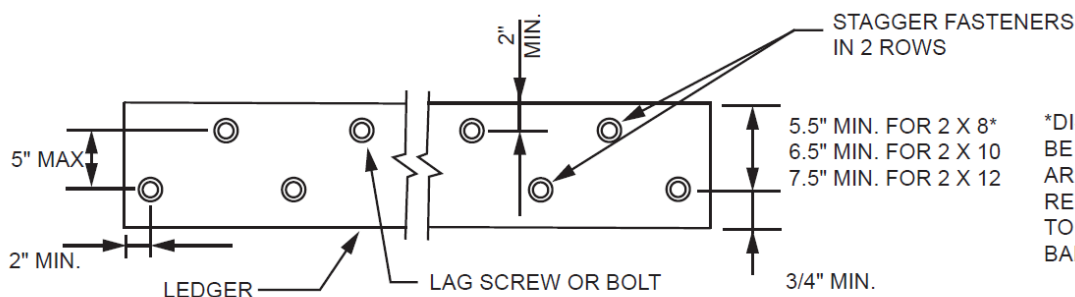
Ledger boards shall be attached to the existing house/structure in accordance with the following:

- The depth of a ledger board shall be no less than 2" x 8" PT or equal to the depth of the floor joists. IRC R507.2
- The band board of the existing structure shall be capable of supporting the new deck. If the structure band joist is not structurally adequate to support the new deck, a freestanding deck shall be constructed. IRC R507.2
- Wood I-joist floor systems may not accommodate connection of a deck ledger. If a 1" or thicker engineered band joist is not installed, a freestanding deck shall be constructed.
- **Ledger Flashing** - Remove exterior finishes prior to installing the ledger board. Install flashing where ledgers are secured to existing construction. BOTH back flashing (behind ledger) and cap flashing (shingle style flashing over ledger board) are to be provided at deck connections. Approved flashing materials include galvanized steel, UV resistant plastics/rubber self-adhered materials, stainless steel and copper. IRC R703.4
- Flashing at a door threshold shall be installed to prevent water infiltration. IRC R703.4
- Deck ledgers shall not support concentrated loads from beams or girders. IRC R507.2.1
- Deck ledgers shall not be supported on stone or masonry. IRC R507.2.1
- **Lateral Load Connectors** shall be installed when the deck is not self-supporting. They are to be installed in compliance with one of the following methods:
 - Minimum of two (2) lateral load connectors located within 24" of each end of deck. Each device shall have allowable capacity of not less than 1500 pounds.
 - Minimum of four (4) lateral load connectors each with an allowable capacity of not less than 750 pounds.
- Deck ledgers shall be installed per IRC Tables R507.2 & R507.2.1:

FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGER

JOIST SPAN	6' and Less	6'1"-8'	8'1"-10'	10'1"-12'	12'1"-14'	14'1"-16'	16'1"-18'
Connection Details	On-center spacing of fasteners						
1/2" diameter lag screws	30	23	18	15	13	11	10
1/2" diameter bolts	36	36	34	29	24	21	19
1/2" diameter bolts with 1/2" stacked washers	36	36	29	24	21	18	16

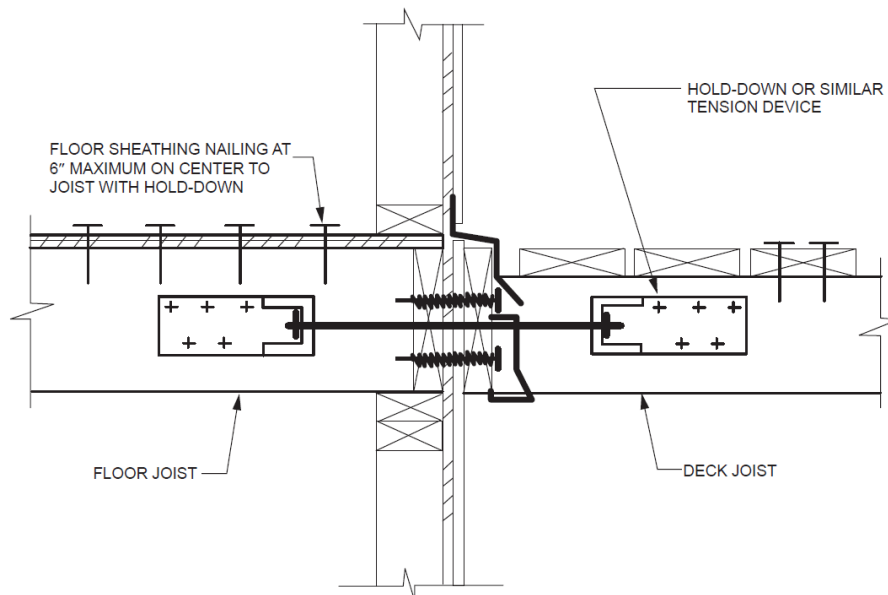
PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGER BOARDS



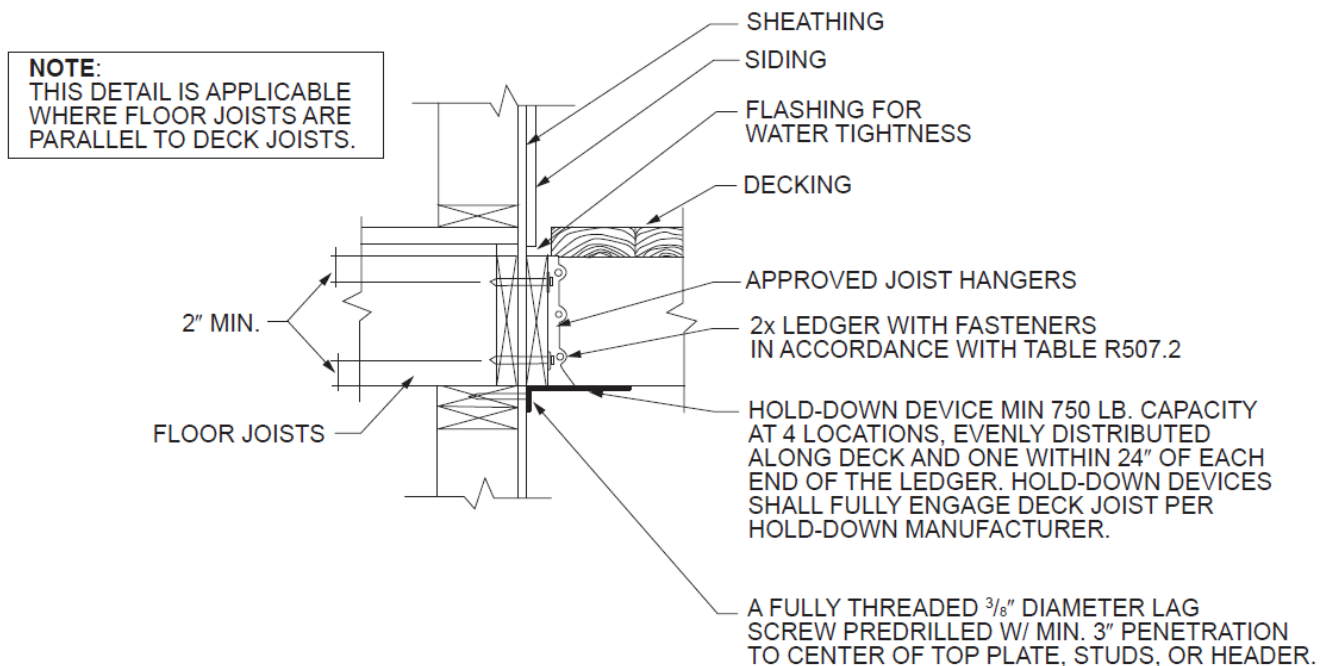
*DISTANCE SHALL BE PERMITTED TO BE REDUCED TO 4.5" IF LAG SCREWS ARE USED OR BOLT SPACING IS REDUCED TO THAT OF LAG SCREWS TO ATTACH 2 X 8 LEDGERS TO 2 X 8 BAND JOISTS.

DECK LEDGER REQUIREMENTS

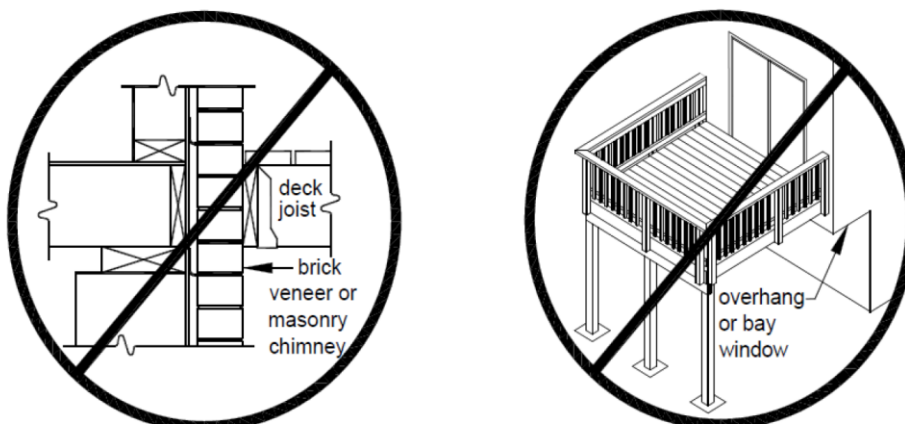
LATERAL LOAD CONNECTORS – TWO (2) 1500 POUND CONNECTORS



LATERAL LOAD CONNECTORS – FOUR (4) 750 POUND CONNECTORS



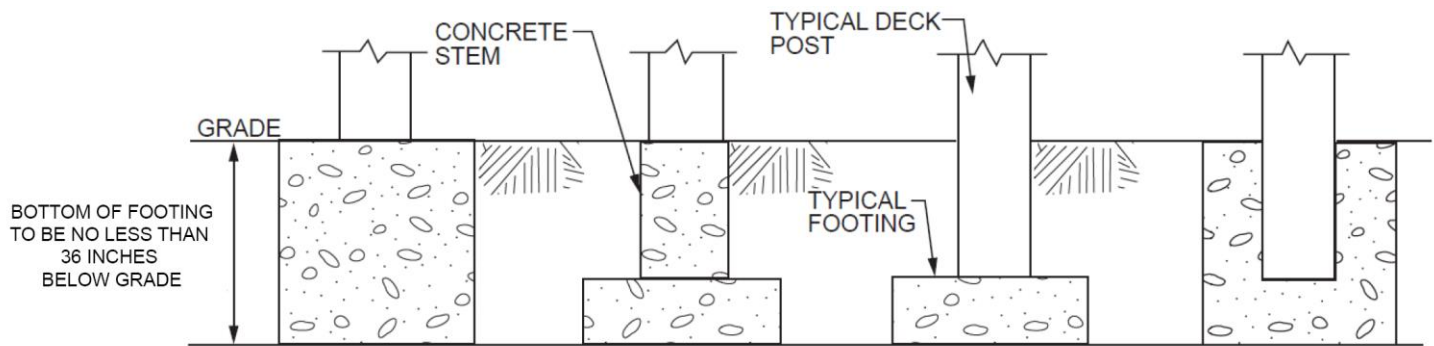
PROHIBITED DECK LEDGER ATTACHMENTS



FOOTING REQUIREMENTS

Deck footings are to be installed in accordance with the following requirements:

- Concrete footings shall have a minimum compressive strength of 3000 psi per IRC R402.2
- Precast concrete footings are permitted for deck construction.
- Footings shall bear on solid ground and be dug to a depth not less than the frost depth of 36"
- A minimum footing size of 18" diameter round or 16" x 16" square will cover most simple decks. However, for some decks, the footing may need to be larger. Footing sizes should be calculated by calculating the post load via tributary loads carried by the footing, and using the formulas:
Square Footing: Each side of square footing (in inches) = $12 * \sqrt{(\text{Post Load} / \text{Soil Bearing Capacity})}$
Round Footing: Diameter (in inches) = $12 * \sqrt{[(4 * \text{Post Load}) / (\pi * \text{Soil Bearing Capacity})]}$
- Footings depths less than 36" are permitted and will be verified on a case-by-case basis when rock or other condition exist that warrant footings less than 36" deep.
- Posts shall be restrained to prevent lateral displacement at the bottom support. 12 inches of soil or an approved post base connector is needed to prevent displacement at post to footing connections. IRC R507.8.1
- Post anchors shall be approved galvanized or stainless steel connectors.
- Deck footings within the house foundation overdig are to extend down to virgin soil at the depth of the house footings.
- Deck footings are not to be installed over utility lines or piping of any kind. Footings are to be arranged not to interfere with existing underground utilities and piping.



- Prior to starting deck project, contact PA One Call to have all underground utilities identified. Call 811 before you dig. <http://www.pa1call.org/pa811>



**Know what's below.
Call before you dig.**

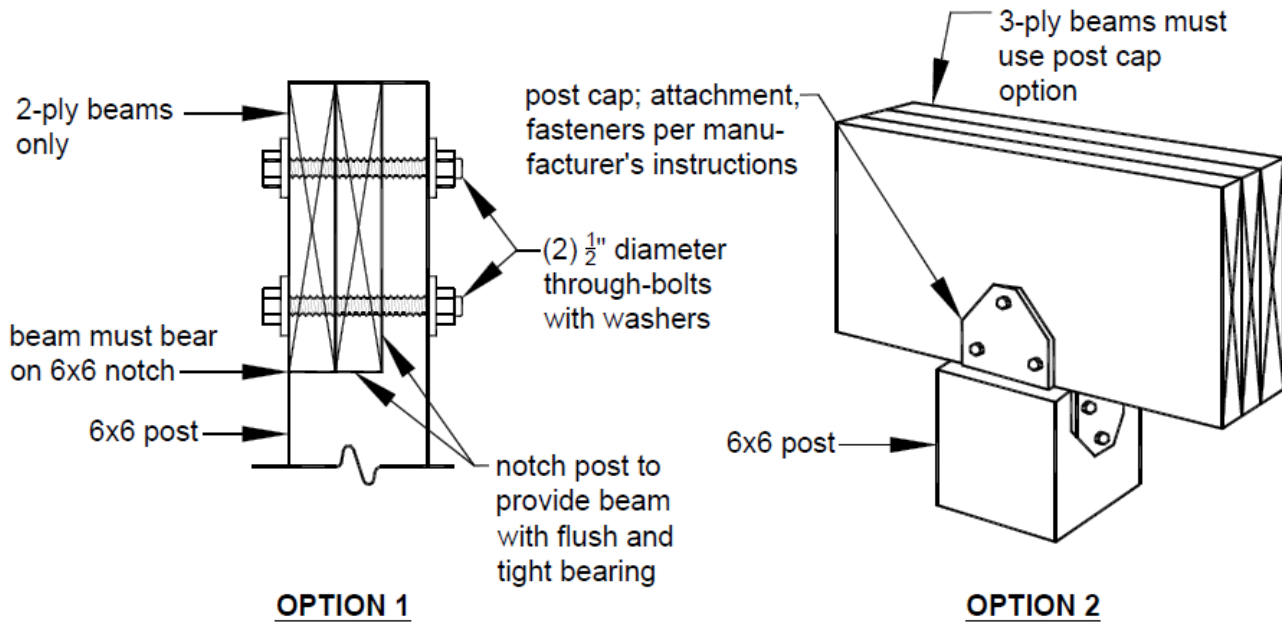
POST REQUIREMENTS

Deck posts are to be sized and installed in accordance with the following requirements:

- Single level wood framed decks are to be supported with posts sized per IRC Table R507.8

DECK POST HEIGHT	MAXIMUM POST HEIGHT
4X4	8 FEET
4X6	8 FEET
6X6	14 FEET

- Deck beams shall be attached to deck posts in accordance with the noted diagrams.
- Manufactured post-to-beam connectors shall be sized for the post and beam sizes.
- Post to beam connectors are to be approved galvanized or stainless steel connectors.
- All bolted connections to be with $\frac{1}{2}$ " galvanized bolts with washers under the head and nut.



FLOOR JOIST REQUIREMENTS

Floor joists are to be sized and installed in accordance with the following requirements:

- Joist span is measured between the centerline of bearing at each end of the joist and does not include overhangs.
- Deck joists shall be permitted to cantilever not greater than one-fourth (1/4) of the actual adjacent joist span. IRC R507.5
- Floor joist ends and bearing locations shall be provided with lateral restraint. Joist hangers, blocking between joists or rim joists shall be used for lateral restraint. IRC R507.5.1
- Rim joists shall be secured to the ends of each joist with not less than (3) 10d galvanized nails or (3) No. 10 x 3 inch wood screws. IRC R507.5.1
- The ends of each joist shall have not less than 1 1/2 inch of bearing. Joist framing into the side of a ledger board or beam shall be supported by approved joist hangers. IRC R507.7
- Plastic composite deck boards are to be installed per IRC Section R507.3 and manufacturer's installation instructions.

FLOOR JOIST REQUIREMENTS

MAXIMUM JOIST SPACING

MATERIAL TYPE AND NOMINAL SIZE	MAXIMUM ON-CENTER JOIST SPACING	
	Perpendicular to joist	Diagonal to joist
1 ¼ inch thick wood	16 inches	12 inches
2 inch thick wood	24 inches	16 inches
Plastic composite	In accordance with IRC R507.3	In accordance with IRC R507.3

MAXIMUM DECK JOIST SPANS (FEET-INCHES)

Species	Size	Spacing of Deck Joists – No Cantilever			Spacing of Deck Joists with Cantilever		
		12"	16"	24"	12"	16"	24"
Southern Yellow Pine	2x6	9-11	9-0	7-7	6-8	6-8	6-8
	2x8	13-1	11-10	9-8	10-1	10-1	9-8
	2x10	16-2	14-0	11-5	14-6	14-0	11-5
	2x12	18-0	16-6	13-6	18-0	16-6	13-6

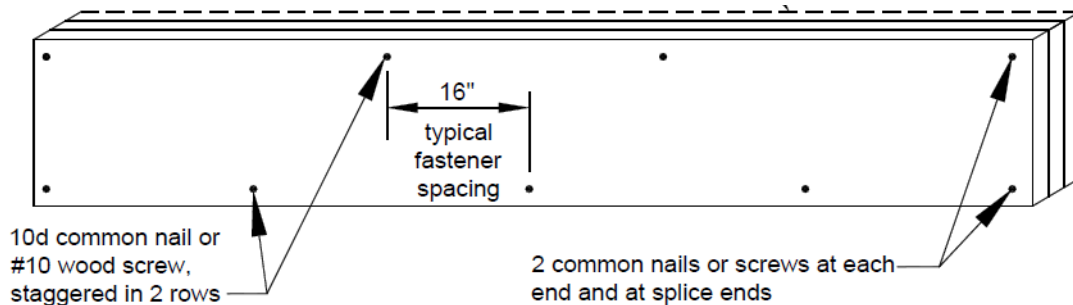
*IRC Table R507.5. Spans are based on 40 PSF live load and 10 PSF dead load

*This table is not applicable for decks supporting hot tubs or other concentrated loads

BEAM REQUIREMENTS

Deck beams are to be sized and installed in accordance with the following:

- Beam plies shall be fastened with minimum of two (2) rows of 3" – 10d nails spaced 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 multispan beams shall be located at the interior post locations.



DECK BEAM SPAN LENGTHS (FEET-INCHES)

Species	Size	Deck Joist Span Less than or equal to: (feet)						
		6	8	10	12	14	16	18
Southern Yellow Pine	1 – 2 X 6	4-11	4-0	3-7	3-3	3-0	2-10	2-8
	1 – 2 X 8	5-11	5-1	4-7	4-2	3-10	3-7	3-5
	1 – 2 X 10	7-0	6-0	5-5	4-11	4-7	4-3	4-0
	1 – 2 X 12	8-3	7-1	6-4	5-10	5-5	5-0	4-9
	2 – 2 X 6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2 – 2 X 8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2 – 2 X 10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2 – 2 X 12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3 – 2 X 6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3 – 2 X 8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3 – 2 X 10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
	3 – 2 X 12	15-3	13-3	11-10	10-9	10-0	9-4	8-10

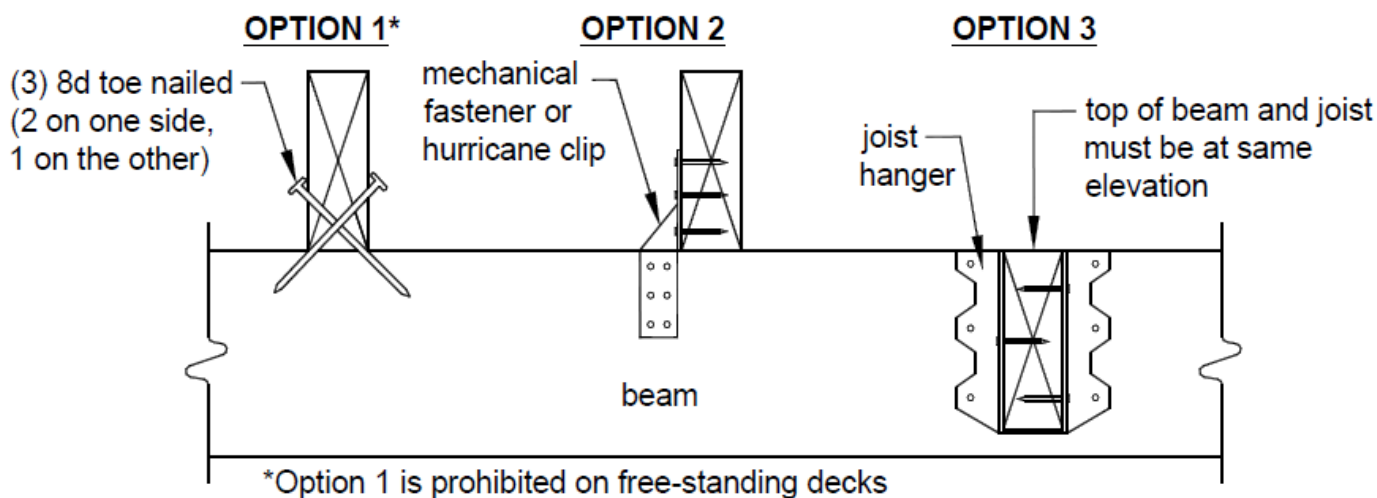
* Per PA UCC 2018 IRC Table R507.5 Spans are based on 40 PSF live load and 10 PSF dead load

*Beam sizes are based on single span floor joists extending from ledger board. This table is not applicable for beams carrying floor joist loads from two directions.

*This table is not applicable for decks supporting hot tubs or other concentrated loads.

JOIST-TO-BEAM CONNECTIONS

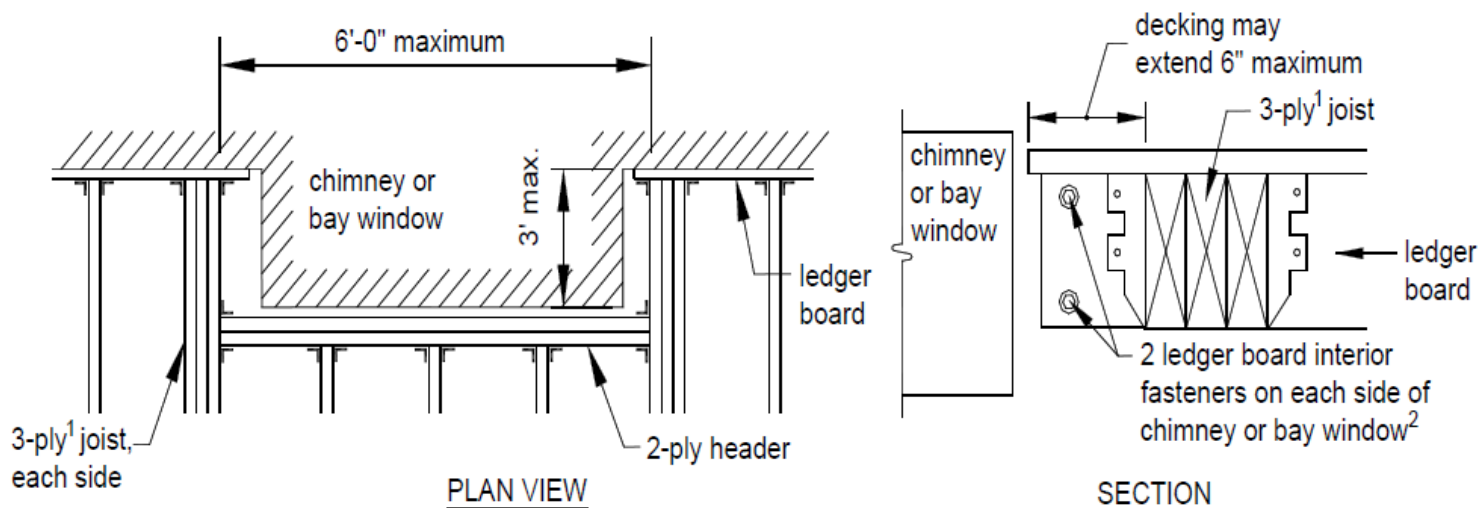
Joist to beam connections are to be installed in accordance with the following:



FRAMING AT CHIMNEY OR BAY WINDOW

Deck framing at chimney or bay window projections is to be in accordance with the following:

- Header sizes shall equal the floor joist sizes
- When the chimney or bay window is deeper than 3'0", install a 6" x 6" post with footing below each triple joist at the location of the header connection
- When the header is longer than 6'0", install a 6"x6" post with footing below the header to reduce the span to less than 6'0".
- Joist hangers shall be specifically designed to accommodate the number of plies.



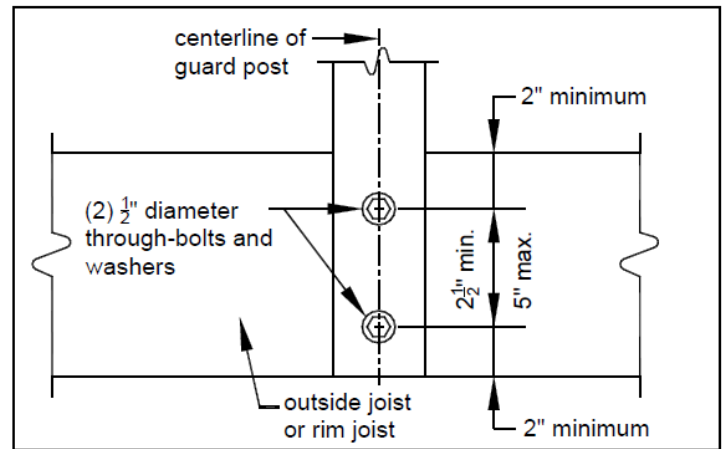
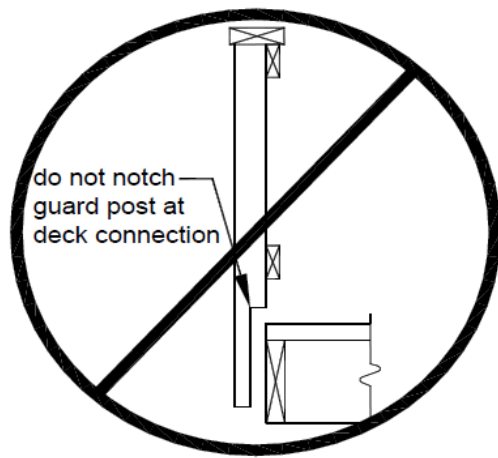
Note: joist hangers shall be sized for the number of plies supported

Guardrails, whether required or not, shall be constructed in accordance with the following:

-
- Diagram illustrating the required height of a guardrail. The height is measured from the grade elevation point to the deck floor elevation, which is greater than 30 inches ($>30''$). The horizontal distance from the edge of the deck to the vertical line of measurement is 36 inches (36'').

- Guard posts must be fastened to the floor framing to ensure the entire guard can resist a minimum of 200 pound lateral load placed along the top of the guardrail assembly.
- Guard posts maybe attached to either side of the rim joist or outside joist.
- **Guard posts are not to be notched at the connection to the deck framing.**

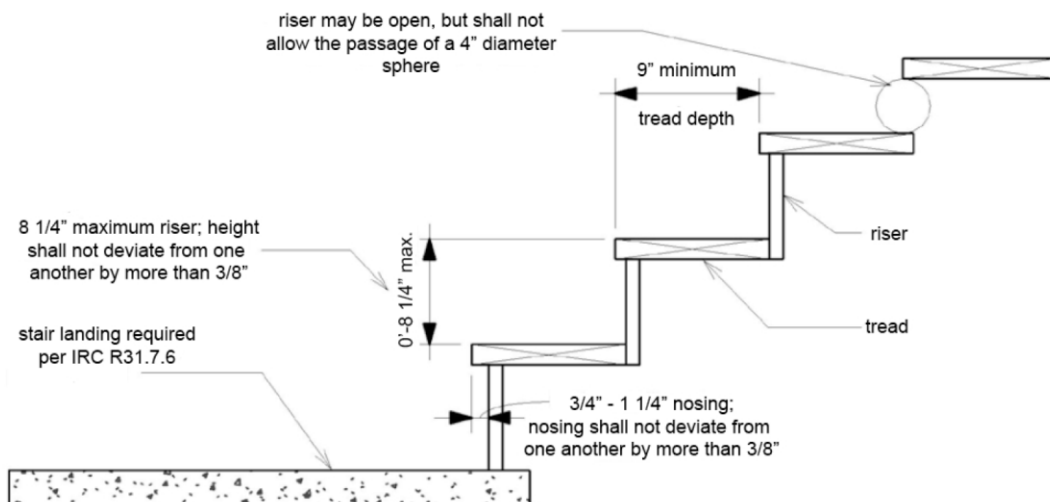




STAIRWAY REQUIREMENTS

- Stairways shall not be less than 36" in clear width. Handrails may project into the clear width by no more than 4 1/2" on either side of the stairway. Clear width at and below the handrail height, shall not be less than 31.5" where a handrail is installed on one side and 27" where handrails are provided on both sides. IRC R311.7.1
- Stairway riser heights are not to exceed 8 1/4" with no more than a 3/8 inch variation in riser heights within a flight of stairs. The minimum tread depth is 9 inches measured from tread nosing to tread nosing. The greatest tread depth within any flight of stairs may not exceed the smallest by more than 3/8 inch. IRC R311.7.5 per PA UCC 403.21(2) **Risers may be open, but shall not allow the passage of a 4 inch diameter sphere on stairs with a total rise of 30 inches or more.**
- A tread nosing not less than 3/4" but not more than 1 1/4" shall be provided on stairways with solid risers. Nosings are not required with a tread depth of 10" or more. IRC R311.7.5.3
- A floor or landing is needed at the top and bottom of each stairway per IRC R311.7.6. Stairway landings are to be as wide as or wider than the stairway and extend in the direction of travel no less than 36 inches.
- Exterior stairs shall be provided with an artificial light source located at the top landing of the stairway. IRC R303.8

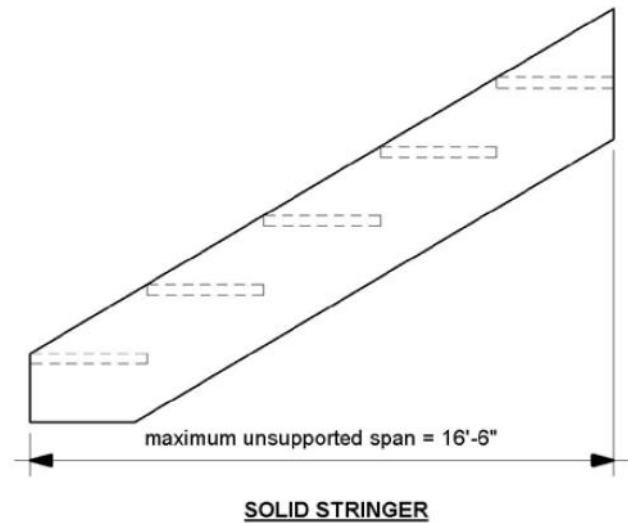
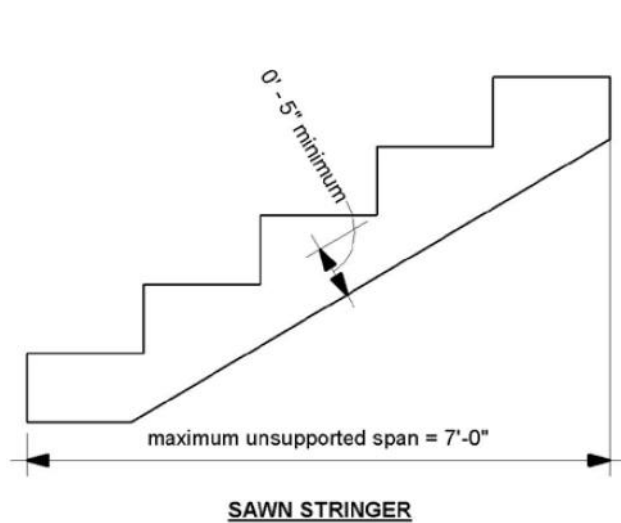
STAIRWAY DETAIL



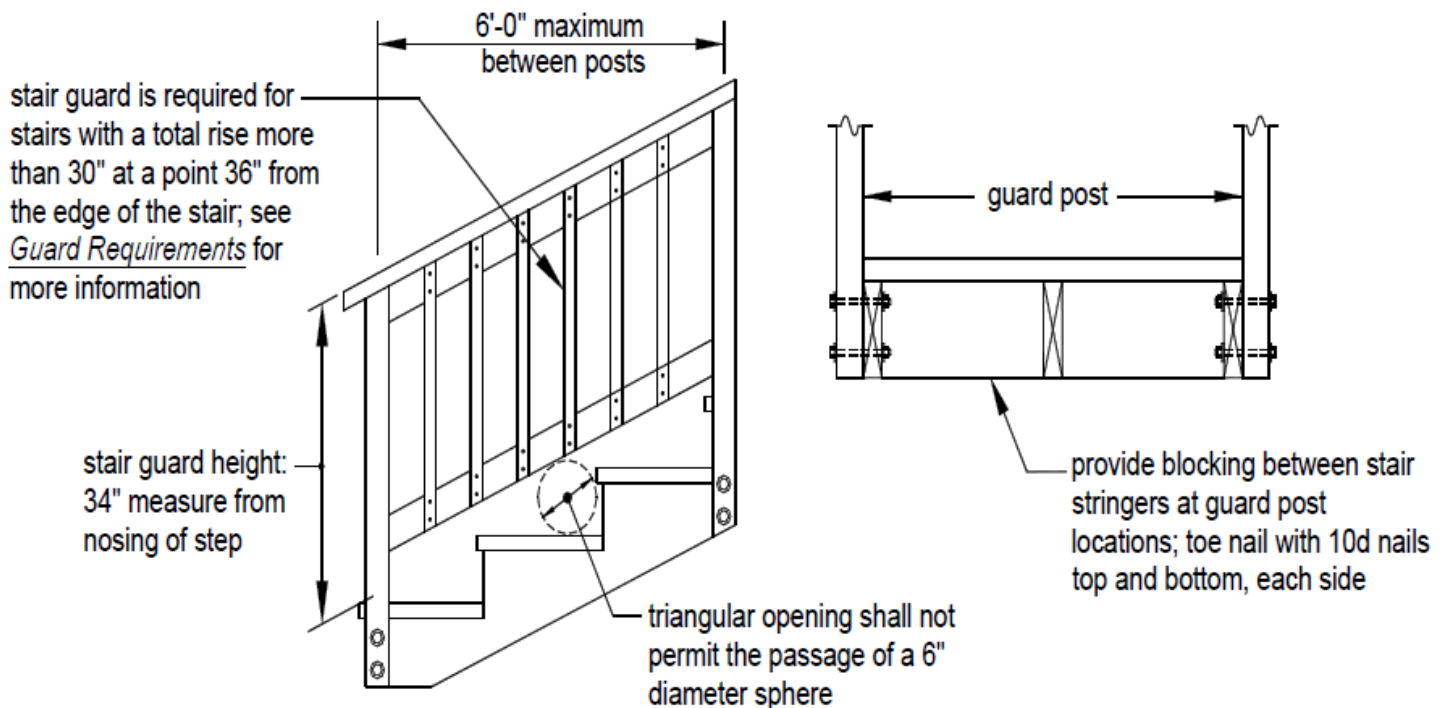
STAIR STRINGER REQUIREMENTS

Stair Stringers shall be constructed in accordance with the following:

- Stringers shall be continuous sawn or solid 2" x 12" meeting the noted stair geometry.
- Stringers shall be spaced at a maximum of 18" on center.
- Stringers with spans greater than 7 feet for sawn or 16'6" for solid shall be supported by minimum 4" x 4" posts to create multiple compliant spans. The 4" x 4" posts shall be notched and bolted to the stringer with two (2) ½" diameter galvanized through bolts. Posts shall be supported on frost protected footings.
- Intermediate landings may be installed to shorten stringer spans.

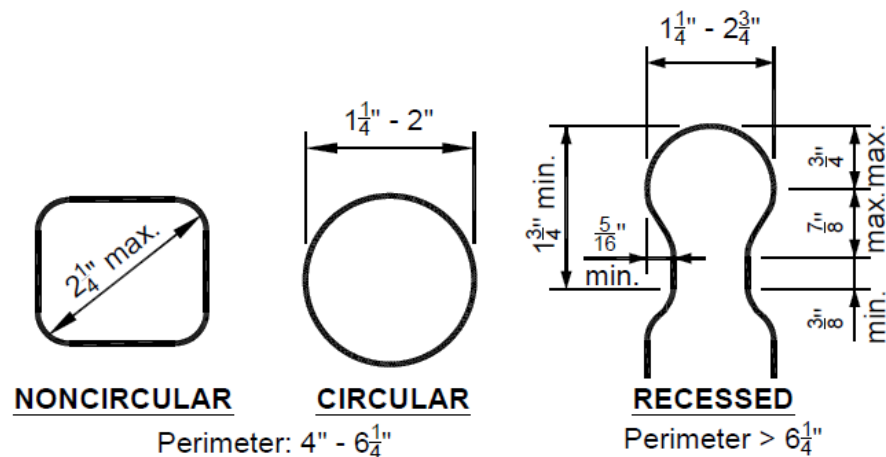


STAIRWAY GUARDRAIL REQUIREMENTS

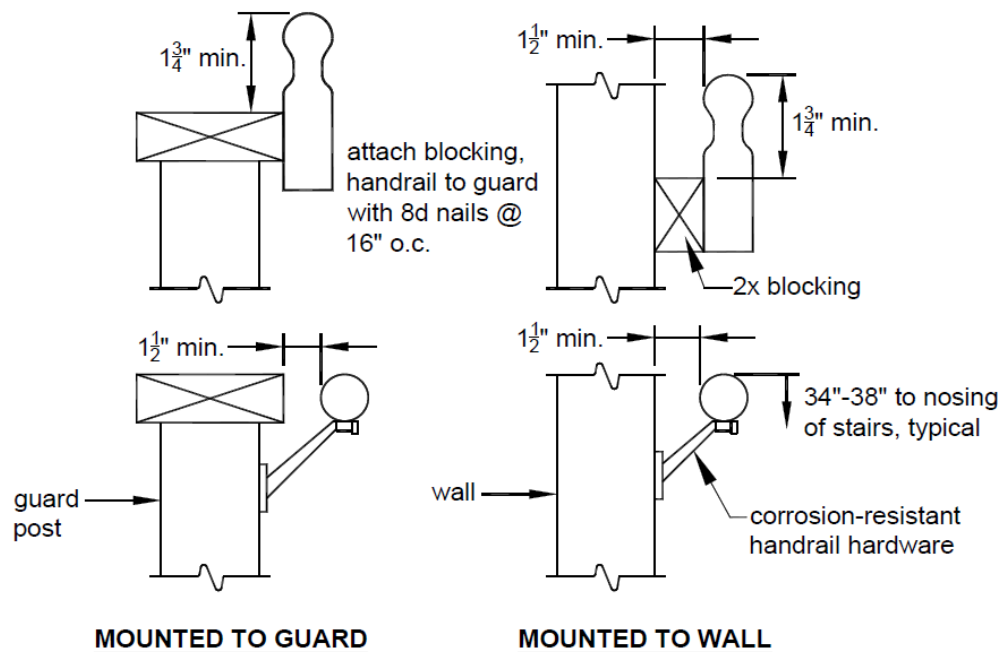


HANDRAIL REQUIREMENTS

- Handrails shall be provided on not less than one side of each continuous stairway with **four or more risers**. Handrail height, measured vertically from the sloped plane adjoining tread nosings shall be not less than 34 inches and not more than 38 inches. IRC Section IRC R311.7.8.1
- Handrails shall be continuous the full length of the stairs. Handrail ends shall be returned or shall terminate in newel posts. IRC R311.7.8.2
- Handrails may be interrupted by guard posts only at a turn in the stair at a landing.
- Handrails adjacent to a wall or guardrail shall have a space not less than 1 ½" between the wall/guardrail and the handrail. IRC Section IRC R311.7.8.2
- Handrails shall be graspable and shall be constructed of decay-resistant and/or corrosion resistant material. Circular handrails shall be between 1 ¼" – 2" in diameter. Non-circular handrails with a perimeter dimension greater than 6 ¼" shall provide a graspable finger recess area on both sides of the profile. The width of the handrail above the recess shall be between 1 ¼"-2 ¾". IRC R311.7.8.3
- All shapes shall have a smooth surface with no sharp edges.



HANDRAIL GRASPABILITY TYPES / GEOMETRY



HANDRAIL MOUNTING REQUIREMENT