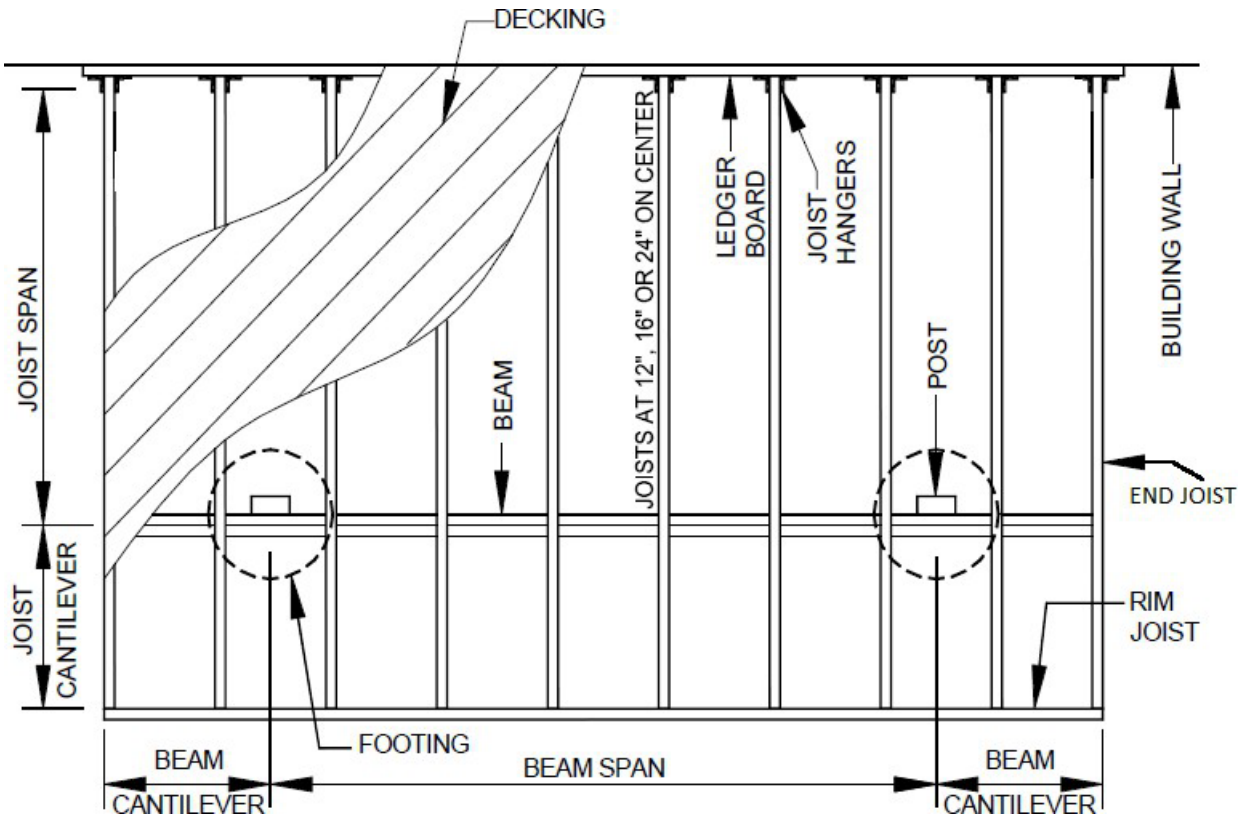
Open Decks

(no additional loads such as roofs or hot tubs)

Examples of Deck Construction and Terminology. All lumber shall be approved pressure treated (P.T.) -or- naturally decay resistant.

Residential: For one and two family dwellings and individual units of multi-family.

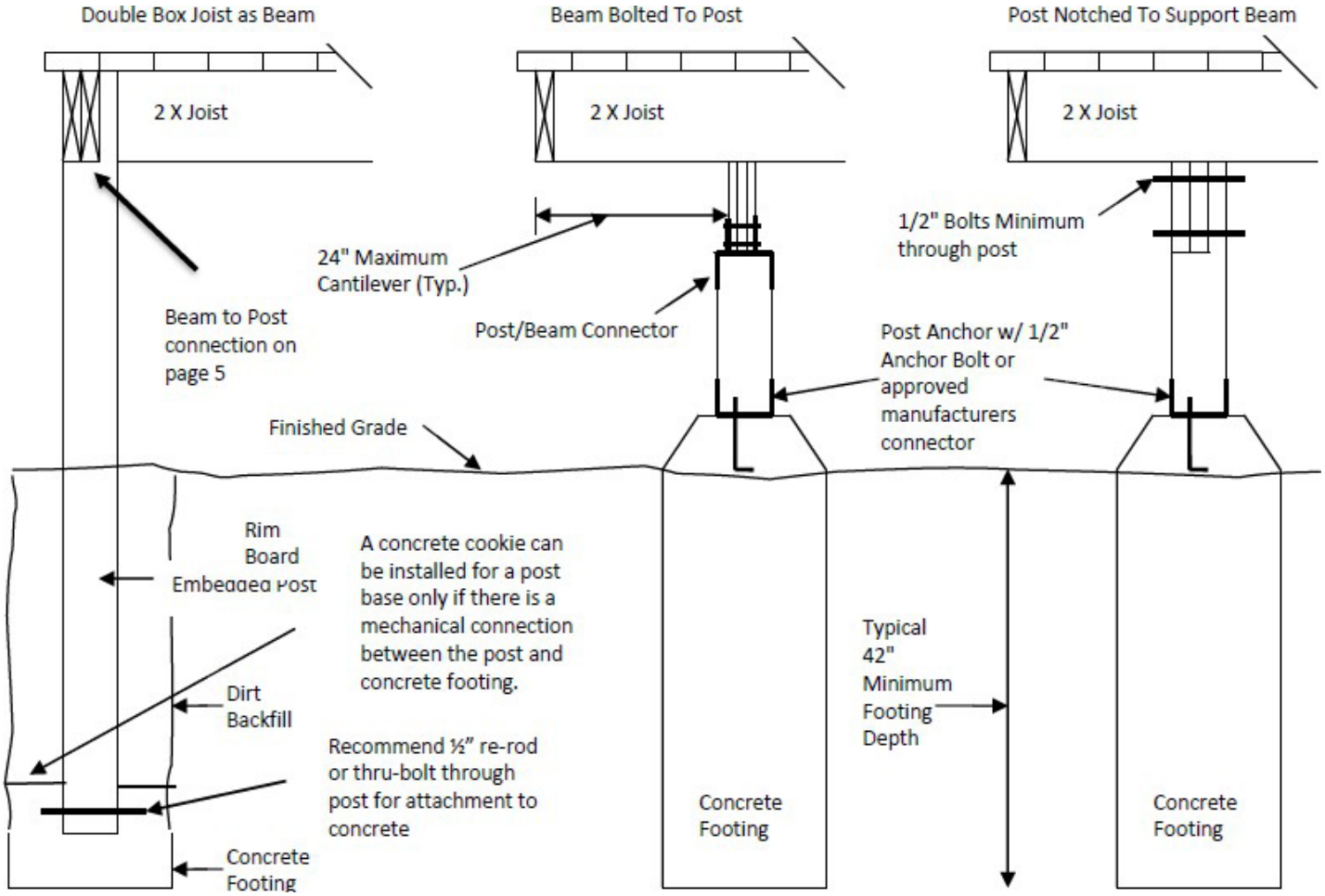


PLEASE NOTE:

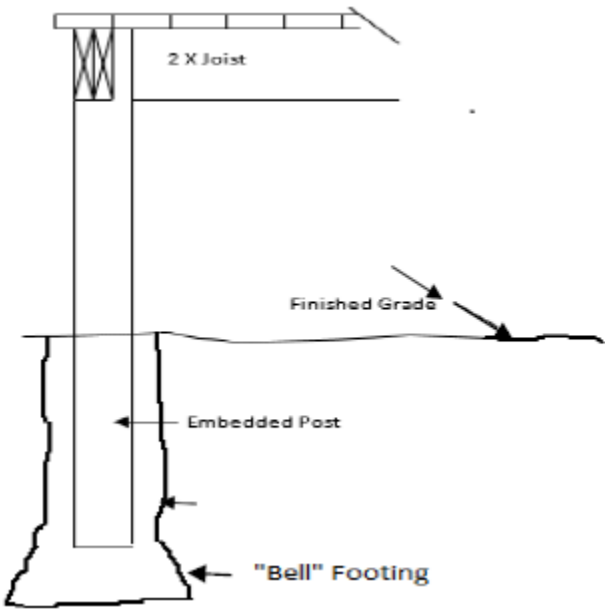
1. THIS HANDOUT DOES NOT INCLUDE ROOF OVER DECK CONSTRUCTION.
2. CONVERTING A DECK TO A PORCH OR ROOM WILL REQUIRE LARGER POSTS/FOOTINGS AS WELL AS ADDITIONAL STRUCTURAL CHANGES TO EXISTING STRUCTURE.
3. THIS HANDOUT DOES NOT COVER PLACEMENT OF HOT TUBS ON DECK STRUCTURE.
4. DECKS ARE NOT ALLOWED TO BE ATTACHED TO HOUSE CANTILEVERS. AN ADDITIONAL BEAM AND POST SYSTEM MUST BE INSTALLED OR PROVIDE STRUCTURAL ENGINEERING.
5. **ATTENTION:** OVERHEAD ELECTRICAL SERVICE POWER LINES SHALL BE AT LEAST 10' ABOVE THE DECK GUARD(S) AND AT LEAST 12' ABOVE ANY WALKING SURFACE.

Residential: **For one and two family dwellings and individual units of multi-family.**

FOOTINGS AND ATTACHMENTS (Footing requirements)



NOTE: All fasteners shall be of hot-dipped galvanized steel, stainless steel, silicon bronze or copper. Exception: ½ inch diameter or greater steel bolts



Additional Footing Notes:
1). The footing hole must be full width of the diameter except when doing the "bell" footing.
2).The bottom 12 inches of the "bell" footing must be full diameter of required footing width. This can be done by auguring the hole then using a spade or post hole digger to widen the bottom out to the required width.
3). All footings are required to be 42 inch minimum below grade.
4). **No "V" shaped footing holes are allowed**.

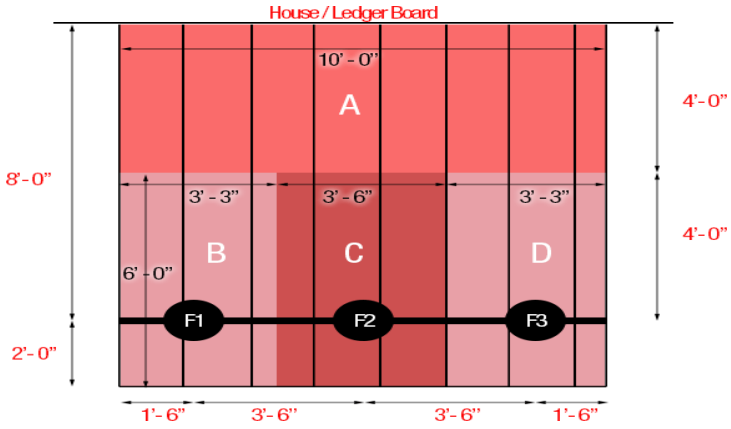
PLEASE NOTE: No other footing designs are allowed unless prior approval from staff is obtained.

Residential: **For one and two family dwellings and individual units of multi-family.**

Footing

Pier Diameter	Square footage of deck that can be supported
8 inch	14
10 inch	20
12 inch	32
14 inch	40
16 inch	56
18 inch	72
20 inch	88
22 inch	104
24 inch	126

Based on 2000 psf soil bearing



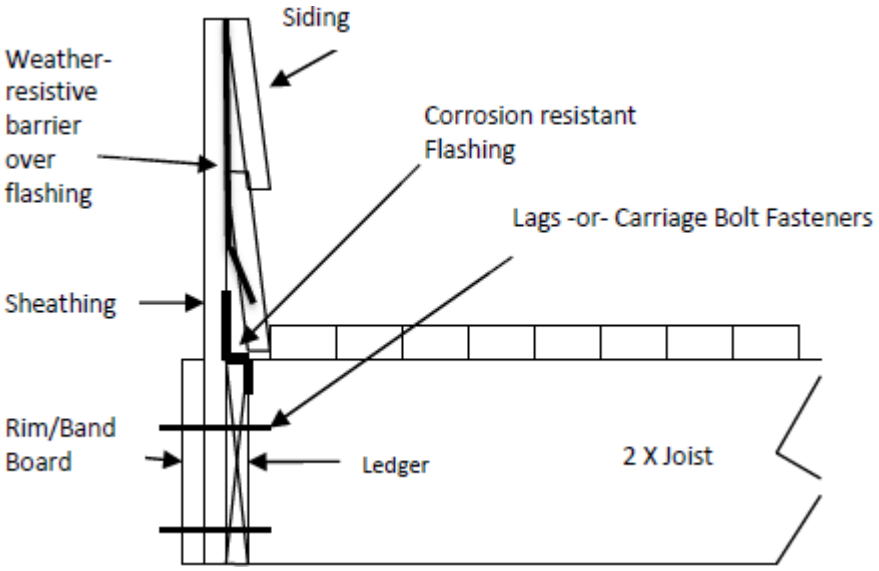
Example Footing F1 (AREA B) – The width of area B is 3 feet 3 inches and the length is 6 feet. This equates to 19.5 square feet in area (3.25 x's 6 = 19.5). The total imposed loading for the deck is 40 pounds live and 10 pounds dead for a total of 50 pounds per square foot. Since the area of the deck supported is less than 20 square feet per the table above the footing dimension would be 10 inches.

Since AREA D has the same dimension footing F3 would also be 10 inches.

Example Footing F2 (AREA C) – As you can see Area C is larger thus a bigger footing is required. The width is 3 feet 6 inches and the length is 6 feet. This equates to 21 square feet in area (3.5 x's 6 = 21). Since the area of the deck supported is more than 20 square feet per the table above the footing dimension would be 12 inches.

- Decks not supported by a dwelling and not greater than thirty inches (30 inches) above grade plane need not be provided with footings that extend below the frost line.

LEDGER ATTACHMENT (Deck and Rim/band board requirements)



Fasten the ledger board to the house framing or the foundation. Fasteners shall be hot-dipped galvanized or stainless steel

Flash the ledger board to keep water from seeping behind the ledger and infiltrating the wall.

Decks may not be supported from cantilevers unless specifically designed for it.

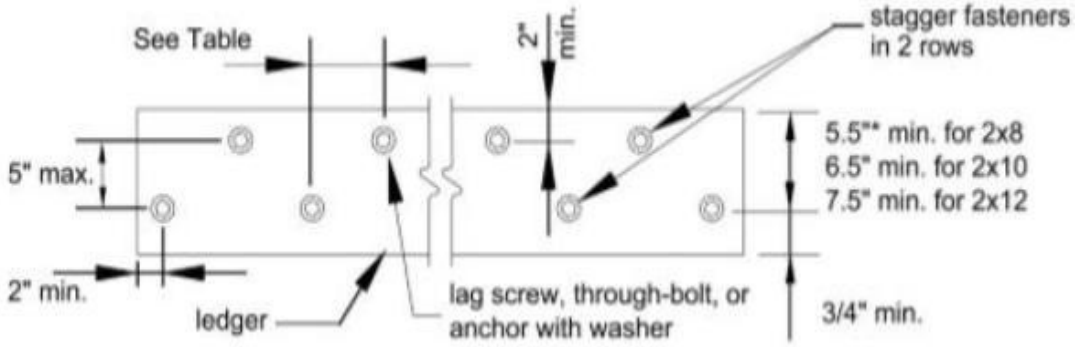
Deck ledgers shall not be attached/supported on stone or masonry veneer. Deck ledgers shall not be installed over siding.

Residential: **For one and two family dwellings and individual units of multi-family.**

Deck Ledger Fastening to House

Joist Span	6' or less	6'1" – 8'	8'1' – 10'	10'1" – 12'	12'1" – 14'	14'1" – 16'	16'1" - 18'
Construction details	**On-center spacing of fasteners**						
½" diameter lag[3] with ½" max sheathing[4]	30	23	18	15	13	11	10
½" diameter bolt with ½" max sheathing[4]	36	36	34	29	24	21	19

1) Deck ledger shall be minimum 2X8 (No. 2 grade or better Pressure Treated Southern Pine, Hem-Fir or other approved material)
2) Rim/band joist shall be fully supported by a wall or sill plate below.
3) The tip of the lag screw shall fully extend beyond the inside face of the band joist
4) Sheathing shall be wood structural panel or solid sawn lumber



Distance can be reduced to 4.5 inches if lag screws are used or bolt spacing is reduced to that of lag screws to attach 2x8 ledges to 2x8 band joists.

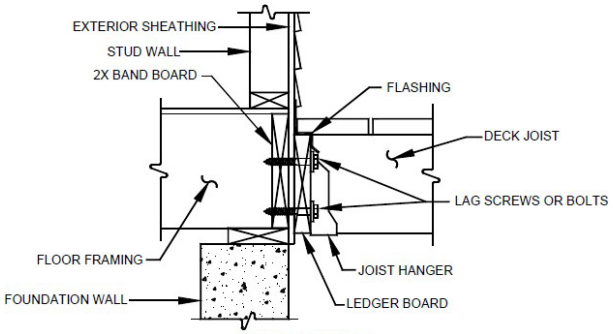


FIGURE R507.9.1.1
LEDGER BOARD TO BAND BOARD ATTACHMENT

Additional Notes:
1). Other Fasteners may be used. Must follow manufacturer's guidelines and must have information available to inspection staff upon request.
2). Engineered I-joists must follow manufacturer's guidelines
3). Not applicable to wood floor trusses. Must get with staff if floor system is such.

BEAM DETAILS (Typical beam construction and beam to post connections)

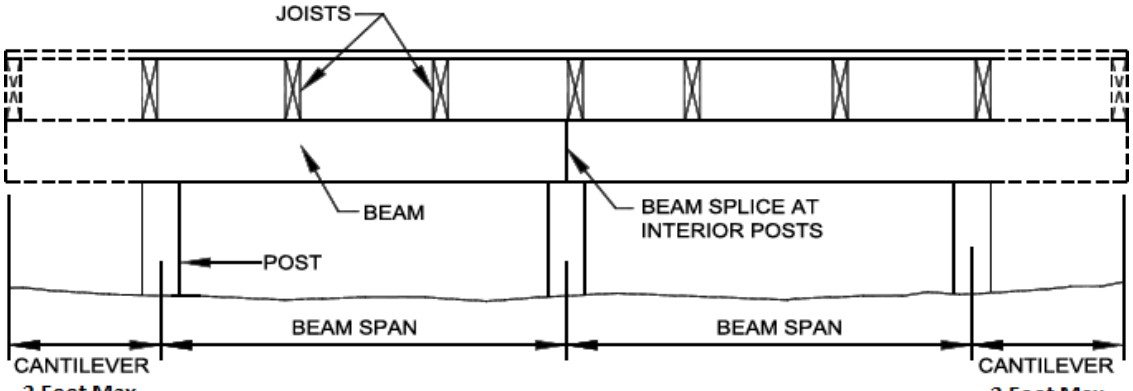


FIGURE R507.6
DECK BEAM SPANS

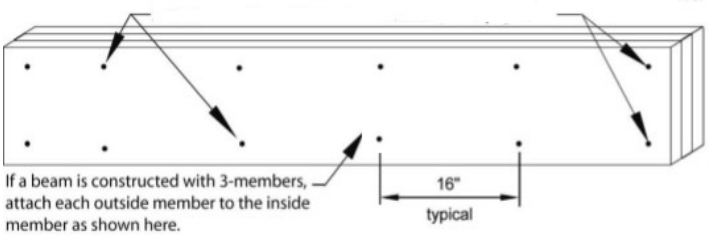
Residential: **For one and two family dwellings and individual units of multi-family.**

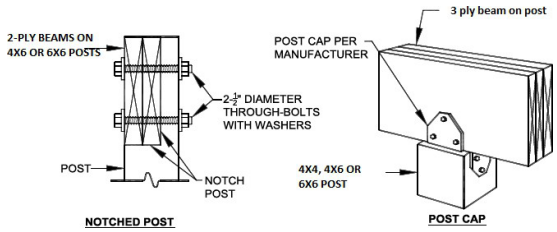
Deck Beam Span Lengths (ft. – in.)[1,2]

Species[3]	Size	Deck Joist Span Less Than or Equal To: (feet)						
		6	8	10	12	14	16	18
Southern Pine	2-2x6	6-11	5-11	5-4	4-10	4-6	4-3	4-0
	2-2x8	8-9	7-7	6-9	6-2	5-9	5-4	5-0
	2-2x10	10-4	9-0	8-0	7-4	6-9	6-4	6-0
	2-2x12	12-2	10-7	9-5	8-7	8-0	7-6	7-0
	3-2x6	8-2	7-5	6-8	6-1	5-8	5-3	5-0
	3-2x8	10-10	9-6	8-6	7-9	7-2	6-8	6-4
	3-2x10	13-0	11-3	10-0	9-2	8-6	7-11	7-6
	3-2x12	15-3	13-3	11-10	10-9	10-0	9-4	8-10
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir, redwood, western cedars, ponderosa pine, red pine	3 x 6 or 2-2x6	5-5	4-8	4-2	3-10	3-6	3-1	2-9
	3 x 8 or 2-2x8	6-10	5-11	5-4	4-10	4-6	4-1	3-8
	3 x 10 or 2-2x10	8-4	7-3	6-6	5-11	5-6	5-1	4-8
	3 x 12 or 2-2x12	9-8	8-5	7-6	6-10	6-4	5-11	5-7
	4x6	6-5	5-6	4-11	4-6	4-2	3-11	3-8
	4x8	8-5	7-3	6-6	5-11	5-6	5-2	4-10
	4x10	9-11	8-7	7-8	7-0	6-6	6-1	5-8
	4x12	11-5	9-11	8-10	8-1	7-6	7-0	6-7
	3-2x6	7-4	6-8	6-0	5-6	5-1	4-9	4-6
	3-2x8	9-8	8-6	7-7	6-11	6-5	6-0	5-8
	3-2x10	12-0	10-5	9-4	8-6	7-10	7-4	6-11
	3-2x12	13-11	12-1	10-9	9-10	9-1	8-6	8-1

1). Beam depth shall be greater than or equal to depth of joists with a flush beam condition.
2). Beams supporting deck joists from one side only.
3). No. 2 grade, wet service factor.

10d (3" by 0.128") nails 16" on center along each edge and at each end of beam





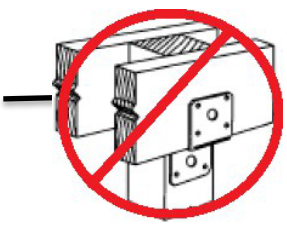
Additional Beam Notes:
1). Beams are permitted to cantilever 2 feet each end.
2). Splices of multi-span beams shall be located at interior post locations.
3). Beams shall have full bearing at their ends of at least 1.5" on wood and 3" on concrete or masonry.

Deck Post Height
(For single-level wood framed decks)

Deck Post Size	Maximum Height
4x4	8 inches
4x6	8 inches
6x6	14 inches

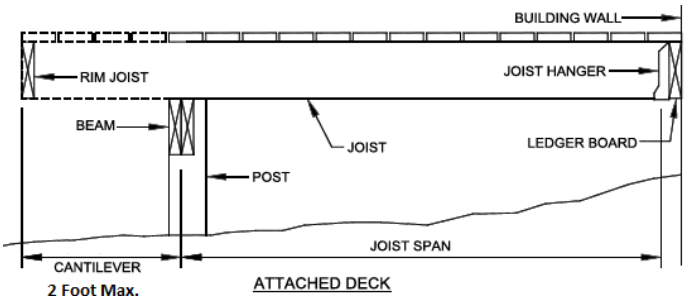
1). Measured to the underside of the beam.
2). **Tall posts may require sway bracing.**

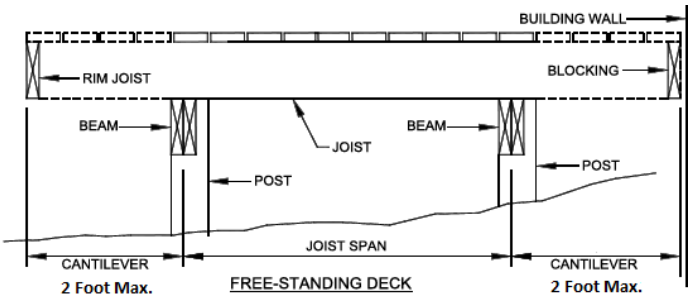
⚠ **ATTENTION:** Box Beams/Sandwiched beams are not allowed



Residential: For one and two family dwellings and individual units of multi-family.

JOIST DETAILS (Typical joist construction, spans and connections)





Typical Deck Joist Spans

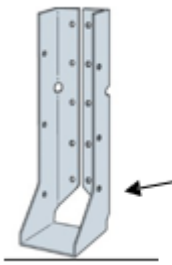
DECK JOIST SPANS FOR COMMON LUMBER SPECIES (ft – in)

Species	Size	Spacing of Deck Joists with NO cantilever (inches)			Spacing of Deck Joists with Cantilevers (inches)		
		12	16	24	12	16	24
Southern 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
Douglas Fir-Larch, Hem-Fir, Spruce-Pine-Fir	2x6	9-6	8-8	7-2	6-3	6-3	6-3
	2x8	12-6	11-1	9-1	9-5	9-5	9-1
	2x10	15-8	13-7	11-1	13-7	13-7	11-1
	2x12	18-0	15-9	12-10	18-0	15-9	12-10
Redwood, Western Cedars, Ponderosa Pine, Red Pine	2x6	8-10	8-0	7-0	5-7	5-7	5-7
	2x8	11-8	10-7	8-8	8-6	8-6	8-6
	2x10	14-11	13-0	10-7	12-3	12-3	10-7
	2x12	17-5	15-1	12-4	16-5	15-1	12-4

1) Cantilevered spans 2 feet maximum are permitted
2) No. 2 grade with wet service factor.

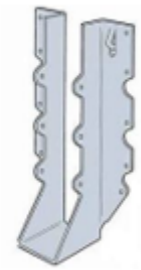
Additional Joist Notes:

1). Joist are permitted to cantilever 2 feet maximum.
2). Joists shall have full bearing at their ends of at least 1.5” on wood and 3” on concrete or masonry.



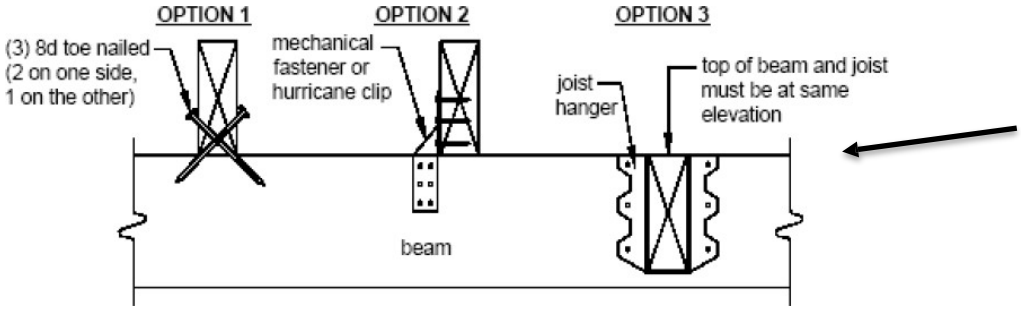
Example of joist hanger for joist to beam connection.

Concealed Flange hanger is used for Edge joists.



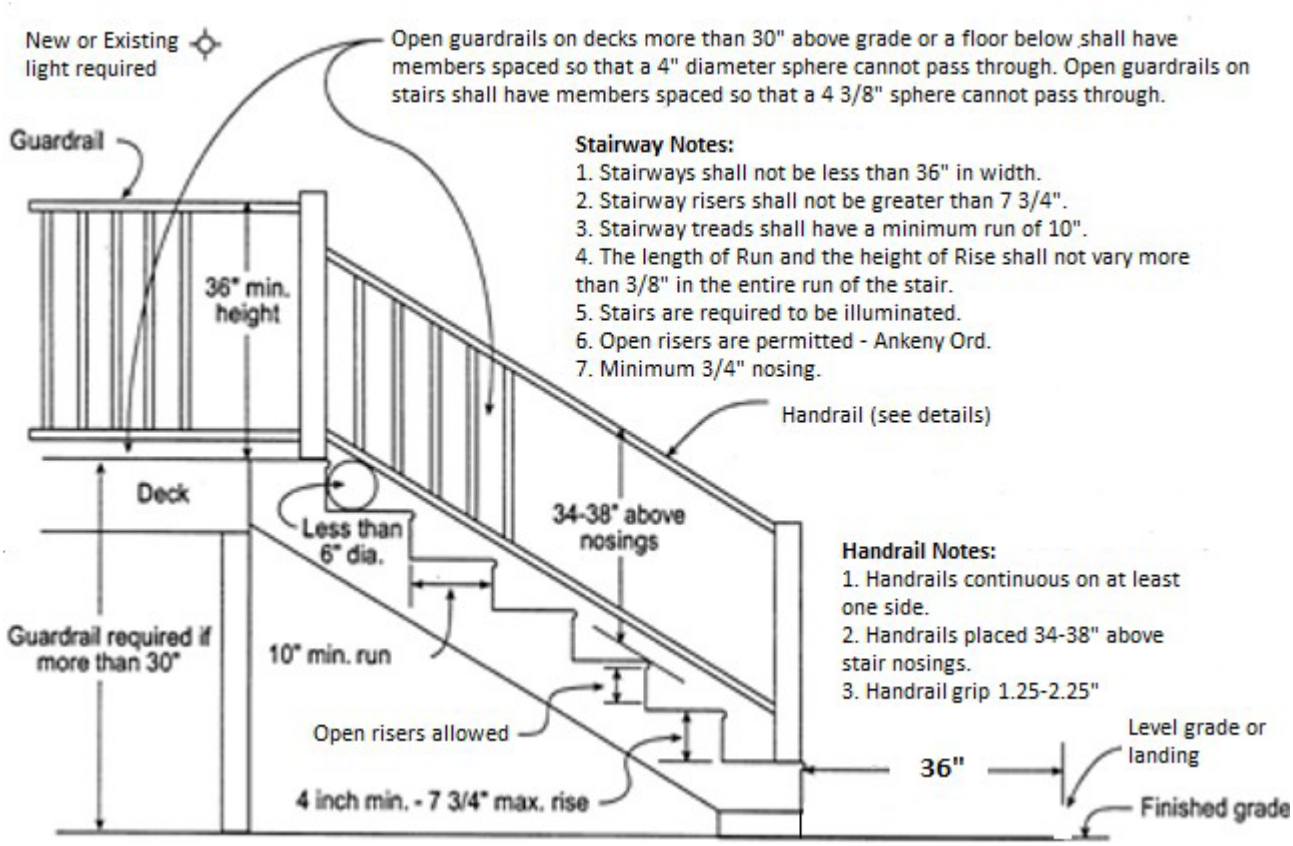
WARNING – Must use proper fasteners. Screws are **NOT** allowed.

Residential: For one and two family dwellings and individual units of multi-family.



Examples of Joist to beam connections

STAIR DETAILS (Landings, rise and run, etc.) & GUARD/HANDRAIL DETAILS (Height, spindle spacing, etc.)



Additional Stair Notes:

1). A minimum 3' by 3' landing is required at the top and bottom of the stairs. **EXCEPTION:** A landing is not required at the top of the stairs if the door doesn't swing over the steps, is not the exit door (front door) and the interior floor is not more than 30" above the exterior finished grade.

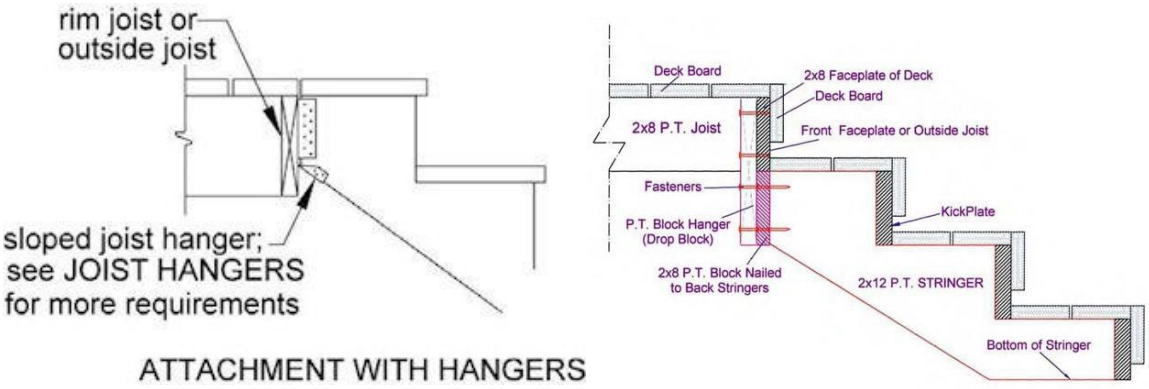
2).The maximum height from the top of exterior door threshold to the surface of the adjacent landing shall not exceed 7 ¾".

3).The landings and stairs shall not exceed more than ¼" per foot slope.

4). Four (4) or more risers (including the step up into the dwelling unit) requires a handrail to be installed on one side of the steps.

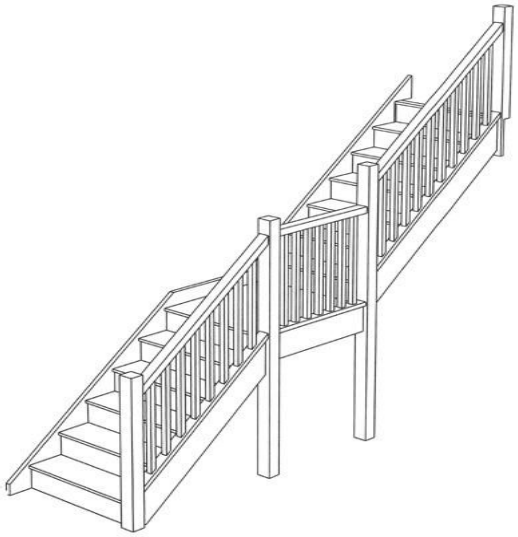
Residential: For one and two family dwellings and individual units of multi-family.

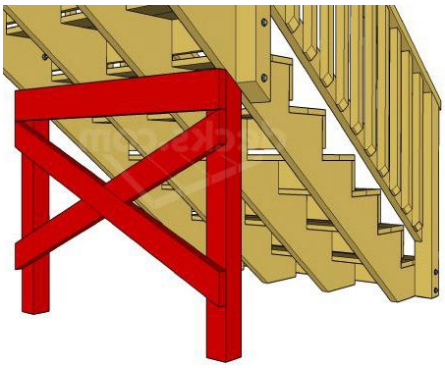
Stair stringer to deck attachment



ATTACHMENT WITH HANGERS

P.T. means Pressure Treated Lumber



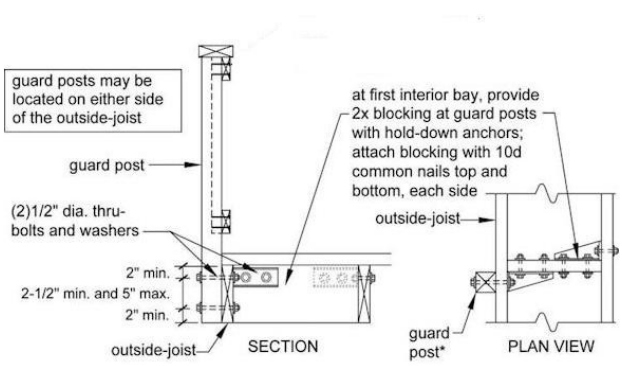


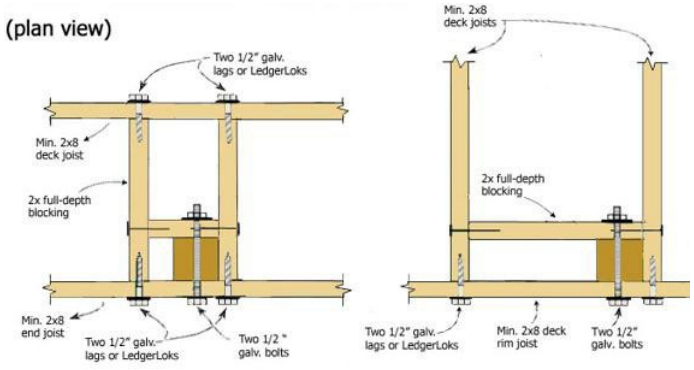
NOTE: If the stairs do not appear to be stable or if "wobbly" then a mid-point brace such as pictured above may need to be installed. This usually tends to be when the stair has a height difference between the ground and the deck of over 6 feet or more.

- **If Stair is over 12.25 feet between the ground and the deck platform than a mid-landing is required to be installed. The landing width would be the minimum width of the stair with a run not having to exceed 36". The mid-landing in most cases would meet the necessity of a mid-point brace.**

GUARD RAIL SYSTEMS

***Guard rail posts can be installed in numerous ways. The following are just examples of proper guard post attachment to deck systems.

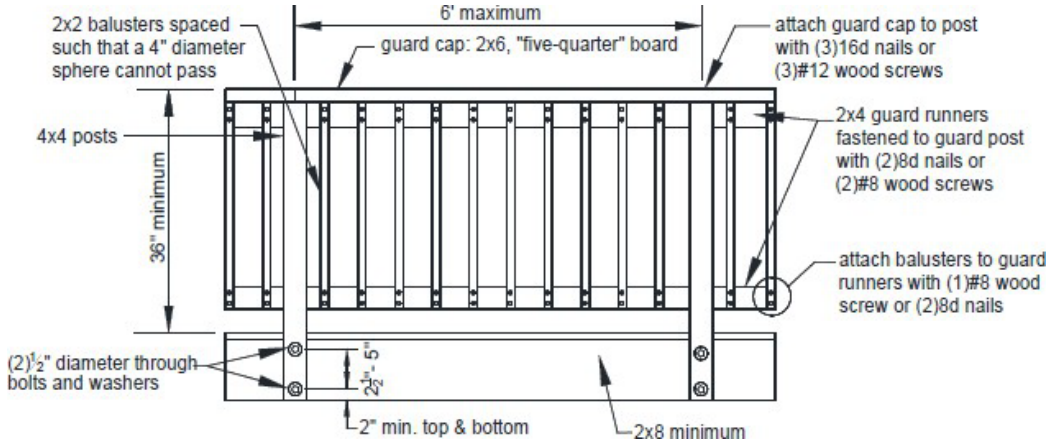




⚠ As long as the guard rail is capable of resisting a 200 pound single concentrated load in any direction at any point along the top

Residential: For one and two family dwellings and individual units of multi-family.

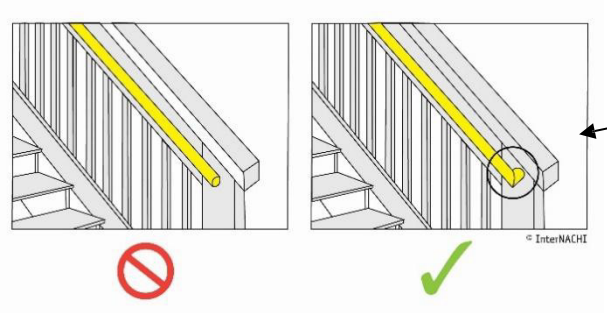
*There are numerous Guard rail systems. Below are examples. The main items for guard rails is that they are 36" above the walking surface/deck platform (if deck platform is more than 30" above adjoining grade) and the openings between the balusters does not allow a sphere of 4 inches to pass through.



Examples of deck guardrails with balusters and no posts

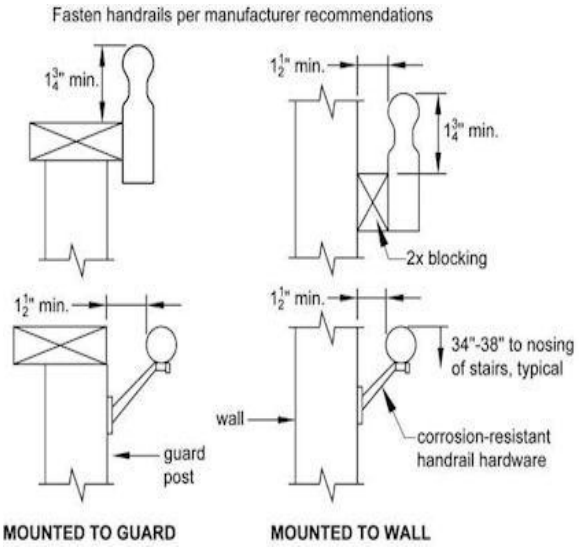
⚠ The guard infill components (balusters, rails, panels, etc.) shall be capable of resisting a normally applied horizontal load of 50 pounds on an area equal to 1 square foot.

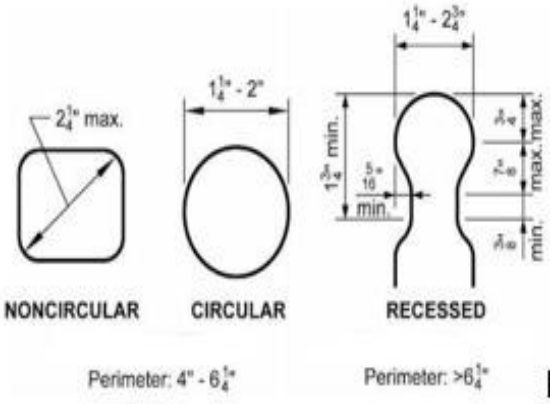
Handrails – Handrails are designed to assist in the ascent and descent when traversing stairs. When four (4) or more risers are provided (including the step up into the dwelling unit) then a handrail is required to be provided on one side of the stair.



Handrails shall return or terminate in newel posts, safety terminals or wall. Handrails shall not encroach into the stair width more than 4 1/2".

Residential: For one and two family dwellings and individual units of multi-family.

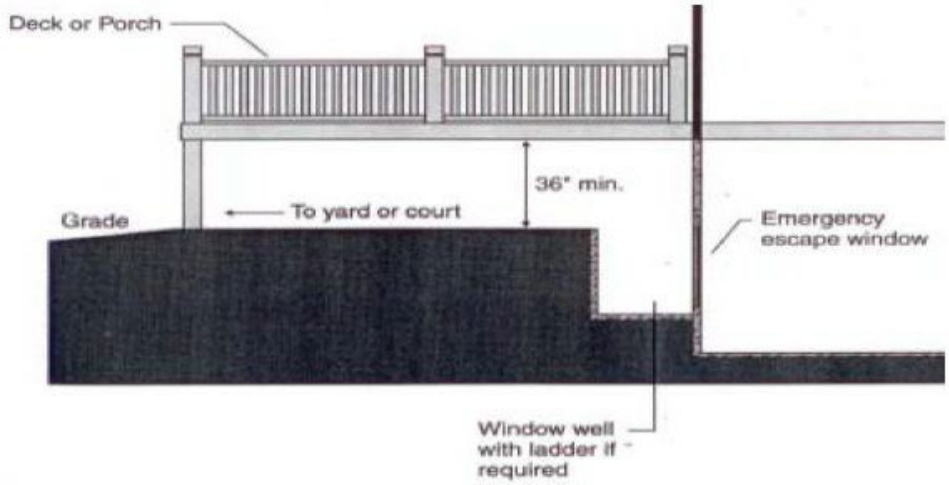




General handrail requirements.

BASEMENT EGRESS WINDOW UNDER DECK PLATFORM

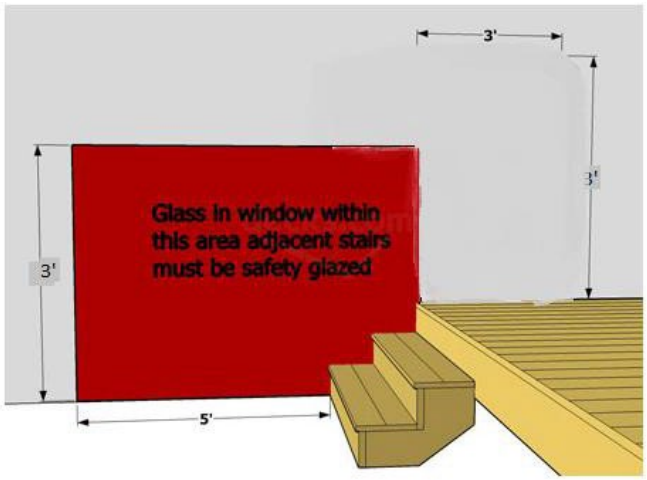
Examples of Deck Handrails meeting the general provisions.

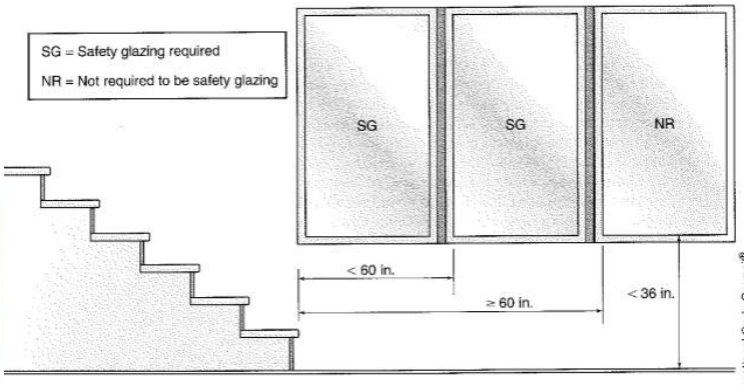


NOTE: A path of 36" in height shall be provided from the egress window well to the yard.

Residential: For one and two family dwellings and individual units of multi-family.

GLAZING ADJACENT TO STAIRS





NOTE: Glazing adjacent to the deck stairs where the bottom exposed edge of the glazing is less than 36” above the plane of the adjacent walking surface of stairways shall be safety glazed (tempered glass). Exception is if glass is more than 36” away from stairs measured horizontally or where a railing is installed (discuss with staff).

NOTE: Glazing adjacent to the bottom stair landing less than 36” above the landing and within 60” horizontally from the bottom tread nosing shall be safety glazed. (tempered glass). Exception is if guard is installed (discuss with staff).