



*City of Belvidere*  
**BUILDING DEPARTMENT**  
401 Whitney Blvd. Suite 300 Belvidere, IL 61008 (815)-547-7177

## **Building Decks & Ramps**

These are some helpful tips for the process of building decks and ramps. Although this is not the entire code book and not all of the code sections are covered, these are some of the more important points. Please feel free to contact the City of Belvidere Building Department at 815-547-7177 if you have any questions.

### **Requirements for Deck & Ramp Permits**

1. Construction drawings
  - Dimensions of proposed deck/ramp
  - Site plan showing deck/ramp in relation to property lot lines
  - Dimensions of lumber used for beams, joists, and posts
  - Dimensions from the deck/ramp to the property lines
  - Building plans illustrating how deck/ramp is to be constructed (Joist spacing, decking layout, handrail height, etc.)
2. Owner's Name, Address, and Phone Number
3. Contractor(s) Name, Address, and Phone Number
4. Value of Construction

### **Required Inspections for Decks and Ramps**

1. Footing inspection (prior to concrete pour)
2. Rough Framing inspection (When the construction of deck framing is completed)
3. Final building inspection (when all construction is finished, i.e. handrails, stairs, etc.)



# Footings

The required depth of footings for decks, ramps, and porches depends on whether or not the structure is attached to the house.

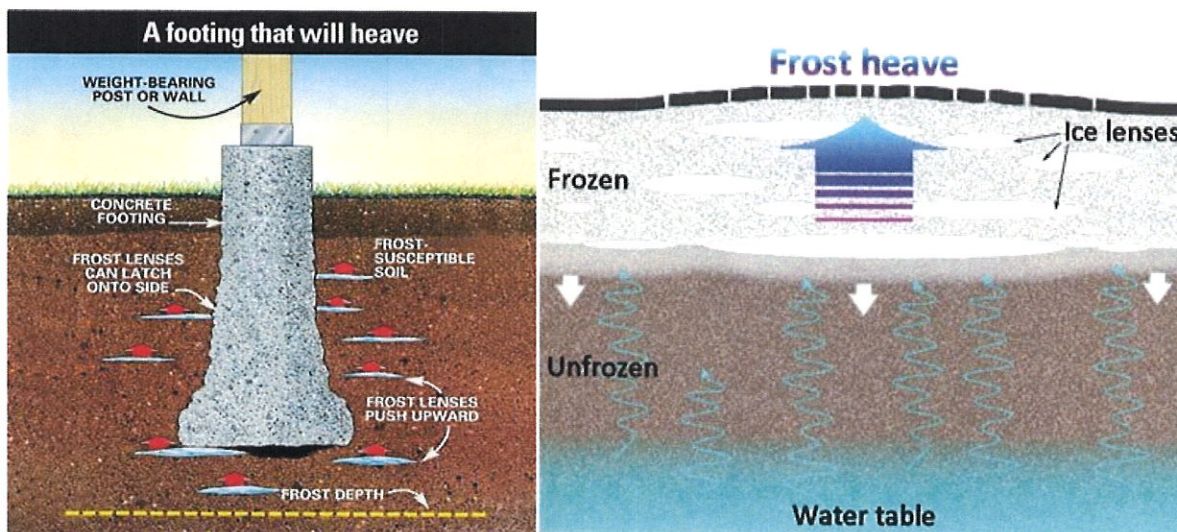
Free standing decks and ramps require a footing depth of 36 inches below grade.

Decks and ramps attached to the house require a footing depth of 42 inches below grade.



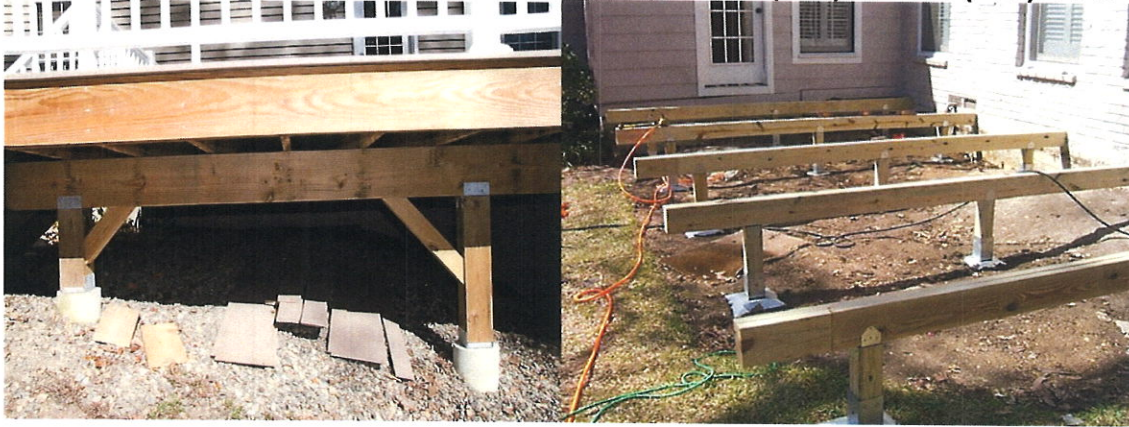
In the winter, the ground freezes from the top of the soil downward.

In Belvidere, the frost depth is 42 in. Water in the surrounding soil collects and freezes into thin layers of frost called “ice lenses.” When water freezes, it expands about 9 percent. Ice exerts a pressure of about 50,000 lbs. per square inch. That is enough force to lift a large building. .



## Deck Posts

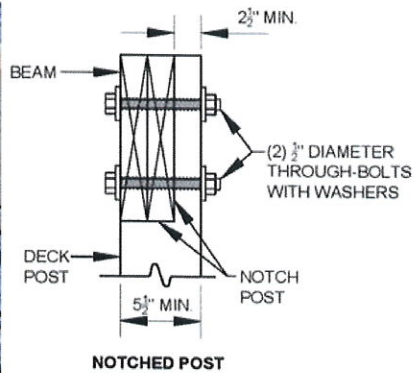
Deck posts must bear directly onto footings. Posts must be a minimum 4x4 inch  
Maximum post heights are as follows: (4x4) 8ft (4x6) 8ft (6x6) 14 ft



Deck beams must bear directly on posts or footings.



6x6 Posts can be notched

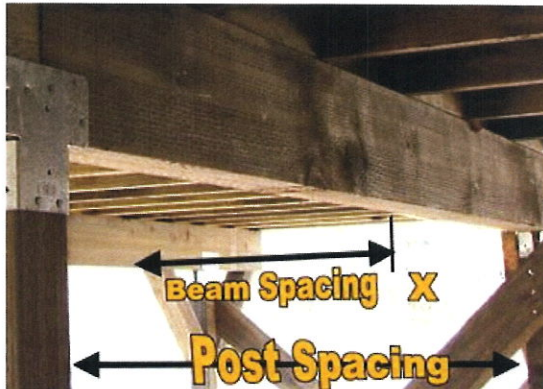


# Deck Framing Beams



DECK BEAM SPAN LENGTHS<sup>a, b</sup> (ft. - in.)

SPECIES <sup>c</sup>	SIZE <sup>a</sup>	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 <sup>d</sup> , hem-fir <sup>e</sup> , spruce-pine-fir <sup>f</sup> , redwood, western cedars, ponderosa pine <sup>g</sup> , red pine <sup>h</sup>	3 × 6 or 2 - 2 × 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



# Deck Framing Joists

DECK JOIST SPANS FOR COMMON LUMBER SPECIES<sup>1</sup> (ft. - in.)

SPECIES <sup>a</sup>	SIZE	SPACING OF DECK JOISTS WITH NO CANTILEVER <sup>b</sup> (inches)			SPACING OF DECK JOISTS WITH CANTILEVERS <sup>c</sup> (inches)		
		12	16	24	12	16	24
Southern pine	2 x 6	9-11	9-0	7-7	6-8	6-8	6-8
	2 x 8	13-1	11-10	9-8	10-1	10-1	9-8
	2 x 10	16-2	14-0	11-5	14-6	14-0	11-5
	2 x 12	18-0	16-6	13-6	18-0	16-6	13-6
Douglas fir-larch <sup>d</sup> , hem-fir <sup>d</sup> spruce-pine-fir <sup>d</sup>	2 x 6	9-6	8-8	7-2	6-3	6-3	6-3
	2 x 8	12-6	11-1	9-1	9-5	9-5	9-1
	2 x 10	15-8	13-7	11-1	13-7	13-7	11-1
	2 x 12	18-0	15-9	12-10	18-0	15-9	12-10
Redwood, western cedars, ponderosa pine <sup>e</sup> , red pine <sup>e</sup>	2 x 6	8-10	8-0	7-0	5-7	5-7	5-7
	2 x 8	11-8	10-7	8-8	8-6	8-6	8-6
	2 x 10	14-11	13-0	10-7	12-3	12-3	10-7
	2 x 12	17-5	15-1	12-4	16-5	15-1	12-4

Deck Joists are supported directly by the beams.

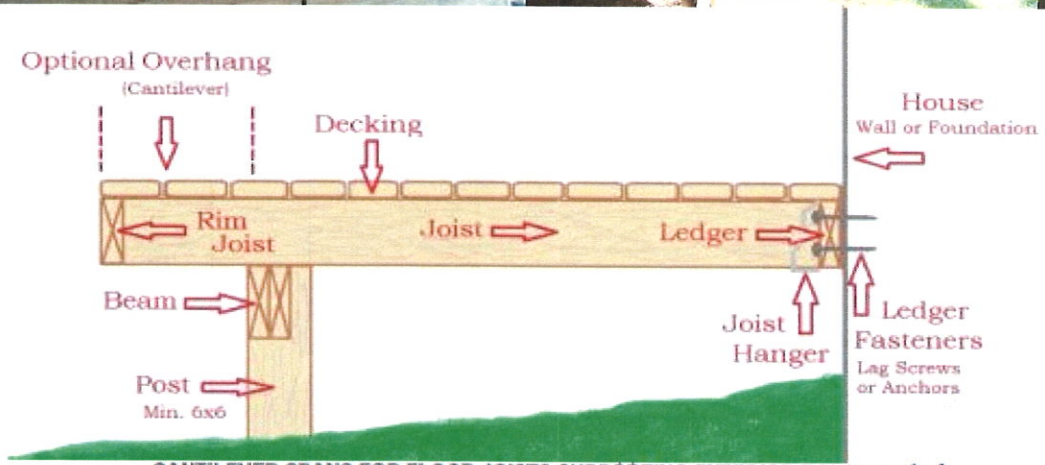


Deck Framing can be supported by Joist hangers attaching to beams



## Deck Framing Cantilever

When the ends of floor joists extend beyond a beam, or the end of a beam extends out beyond the supporting post below, the structure is said to be cantilevered. Joists must be attached to the beam with hurricane ties to reduce uplift forces from wind.



**CANTILEVER SPANS FOR FLOOR JOISTS SUPPORTING EXTERIOR BALCONY<sup>1,2,3,4,7</sup>**

Member Size	Spacing	Maximum Cantilever Span (Uplift Force at Backspan Support in lb) <sup>4,5</sup>		
		Ground Snow Load		
		≤ 30 psf	50 psf	70 psf
2 × 8	12"	42" (139)	39" (156)	34" (165)
2 × 8	16"	36" (151)	34" (171)	29" (180)
2 × 10	12"	61" (164)	57" (189)	49" (201)
2 × 10	16"	53" (180)	49" (208)	42" (220)
2 × 10	24"	43" (212)	40" (241)	34" (255)
2 × 12	16"	72" (228)	67" (260)	57" (268)
2 × 12	24"	58" (279)	54" (319)	47" (330)



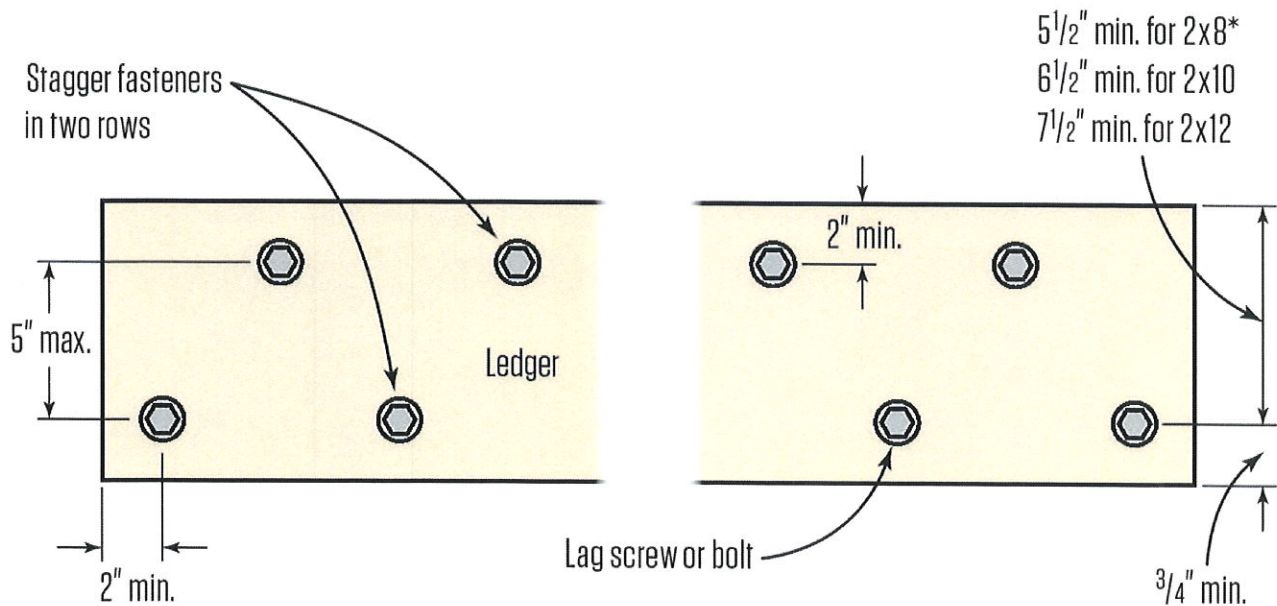
## Ledger Attachment

For attached decks the ledger supports the deck at one end. (A free-standing deck does not have a ledger.) Flashing must be applied over the ledger board as shown in the photographs below.



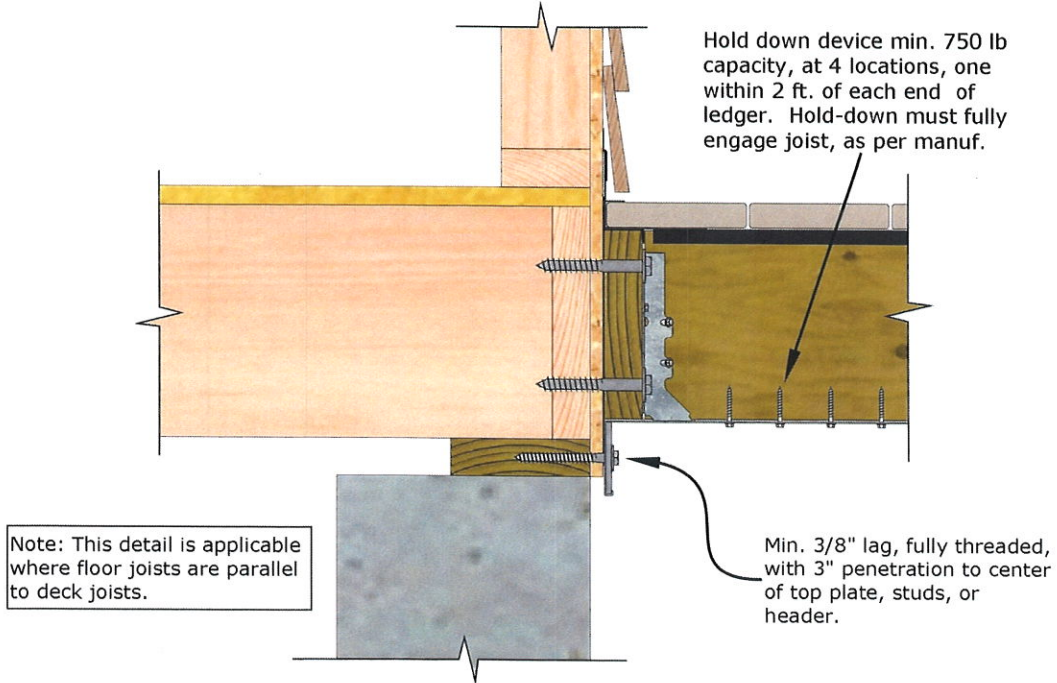
Ledger boards must be attached to the structure by lag screws or bolts that are either hot-dipped galvanized or stainless steel.

### Placement of Lag Screws and Bolts in Ledgers

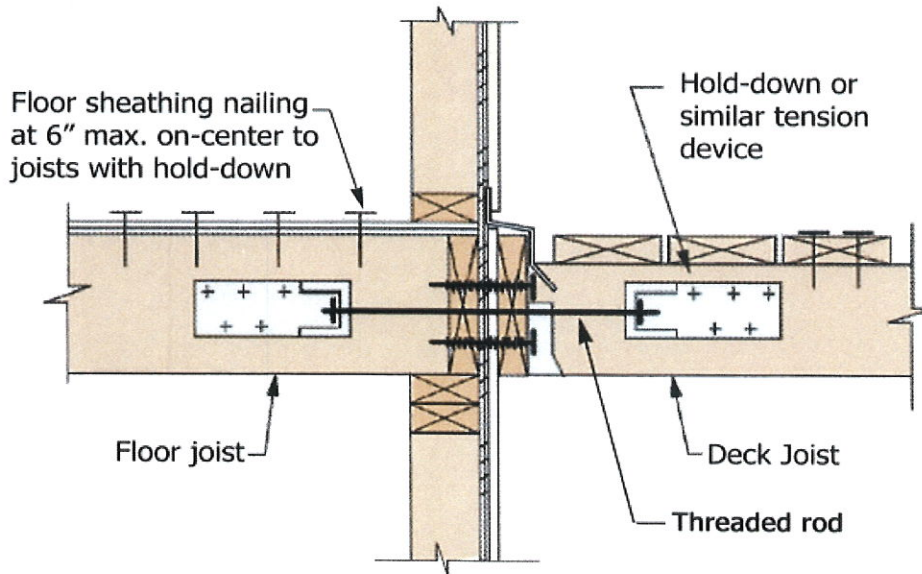


## Ledger Attachment continued

The 2015 International Residential Code for one and two family dwellings (IRC 2015) requires the installation of lateral load connectors at the deck/ledger board interface.



## Deck Lateral-Load Bracing (Joists Parallel to Deck Joists)





## Guardrails and Balusters

The minimum deck guardrail height is 36 inches above deck level. Decks 30 inches above grade or lower do not require the use of guardrails. Guards at bare minimum must be able to sustain a 200-pound force.

If you decide to construct a guard on a deck low enough that it doesn't require guards, these guards must still meet the guardrail requirements.

Balusters are required to be 4 inches apart or less. Balusters and in-fill rails must sustain a minimum of 50 pounds or a minimum testing force of 125 pounds.



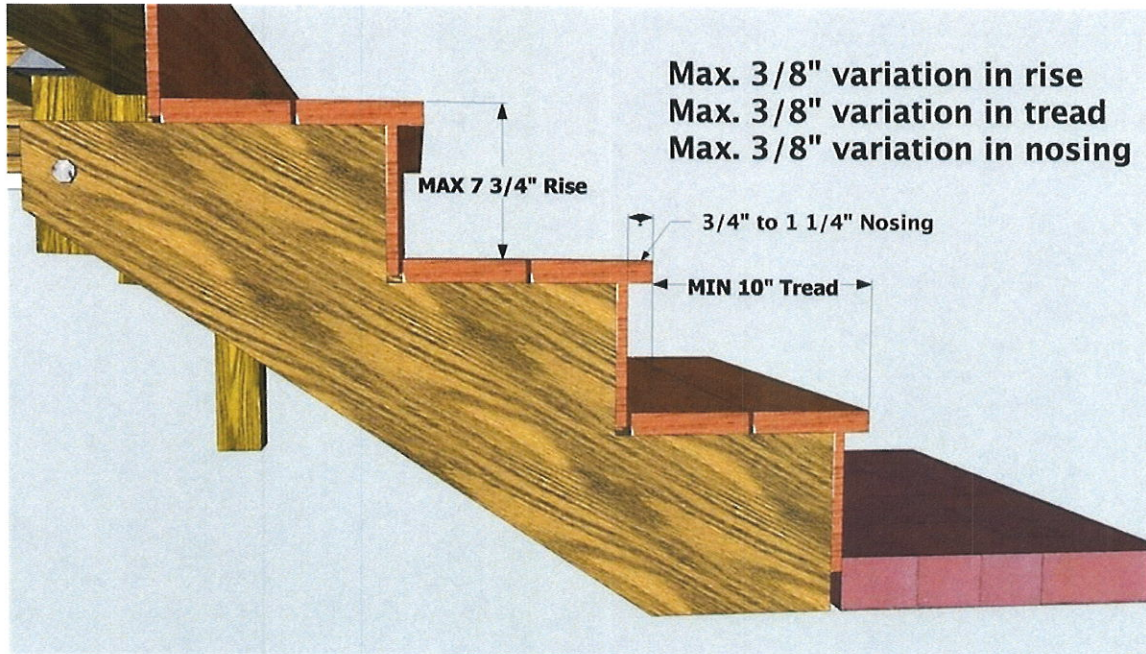
## Handrails

Handrails shall be provided on no less than one side of each continuous run of treads or flight with four or more risers. They must be between 34 inches and 38 inches high. Handrails must be graspable and continuous for the full length of the flight of stairs from a point directly above the top riser to a point directly above the lowest riser. Handrails shall terminate into newel posts or safety terminals.



## Stairs

Treads must be at least 10 inches deep from tip of nosing to tip of nosing. The rise, or the vertical distance from one tread to the next, can be no more than 7 3/4 inches high. Treads must be at least 36 inches wide.

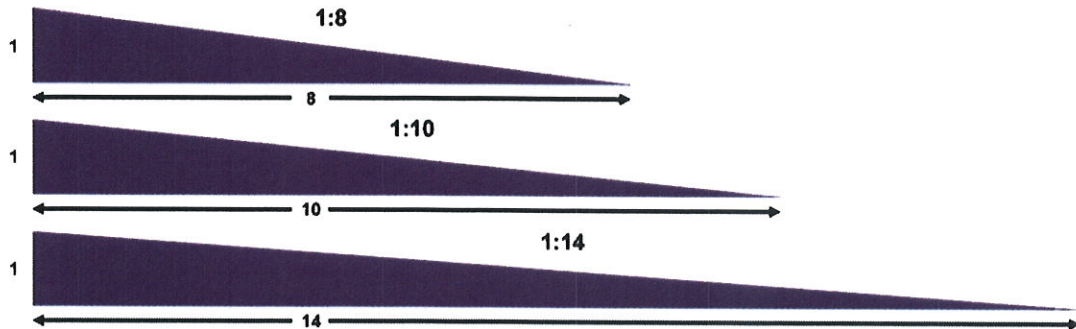


Stair risers can be open so long as they don't allow the passage of a 4 inch orb.



# Ramps

Deck ramps serving a required egress door shall have a slope of not more than 1 unit vertical in 12 units horizontal. All other ramps shall have a maximum slope of 1 unit vertical in 8 units horizontal.



Floor landings are required at the top and bottom of each ramp when the ramp opens to a door or changes direction. These landings must be 36 inches wide minimum.



Handrails shall be required on at least one side of any ramp exceeding 1 vertical unit in 12 units horizontal. Ramp handrails must meet the same guidelines as that of stair handrails (34-38 inches in height and graspable). Spacing between balusters must not exceed 4 inches. Handrails where required on ramps, shall be continuous for the full length of the ramp.

