

## APPENDIX M

# WOOD DECKS

This appendix is a North Carolina addition and not part of the 2015 *International Residential Code*.  
There will be no underlined text.

(The provisions contained in this appendix are adopted as part of this code.)

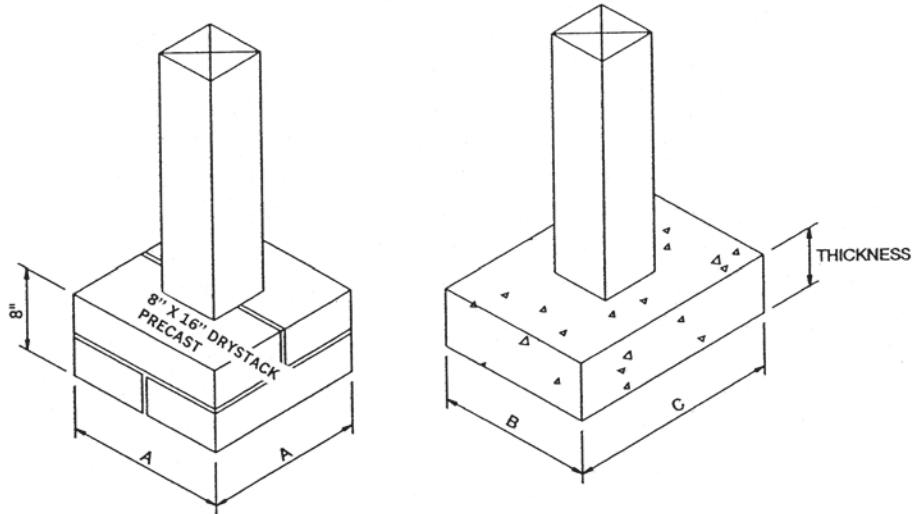
### SECTION AM101 GENERAL

**AM101.1 General.** A deck is an exposed exterior wood floor structure that is permitted to be attached to the structure or freestanding. Roofed porches (open or screened-in) are permitted to be constructed using these provisions.

**AM101.2 Deck design.** Computer deck design programs are permitted to be accepted by the code official.

### SECTION AM102 FOOTINGS

**AM102.1 Footings.** Support posts shall be supported by a minimum footing in accordance with Figure AM102.1(1) and Table AM102.1. Minimum footing depth shall be 12 inches (305 mm) below finished grade in accordance with Section R403.1.4. Tributary area is calculated as shown in Figure AM102.1(2).



**FIGURE AM102.1(1)**  
**SUPPORT POST FOOTING**

**TABLE AM102.1**  
**FOOTING TABLE<sup>a, b, c</sup>**

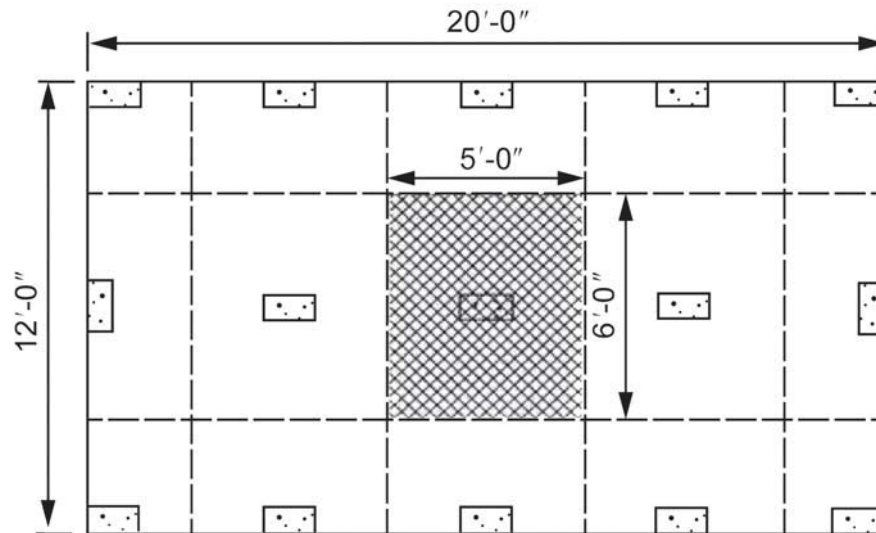
SIZE (inches)		TRIBUTARY AREA (square feet)	THICKNESS (inches)	
A x A	B x C		Precast	Cast-In-Place
8 x 16	8 x 16	36	4	6
12 x 12	12 x 12	40	4	6
16 x 16	16 x 16	70	8	8
—	16 x 24	100	—	8
—	24 x 24	150	—	8

For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m<sup>2</sup>.

a. Footing values are based on single floor and roof loads.

b. Support post must rest in center one-third of footing.

c. Top of footing shall be level for full bearing support of post.



For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m<sup>2</sup>.

**Note:** Tributary area of shaded section on the free standing deck shown is 5' × 6' = 30 square feet (2.79 m<sup>2</sup>). Code will require a minimum footing of 8" × 16" (203 mm × 406 mm) in accordance with Table AM102.1.

**FIGURE AM102.1(2)**  
**CALCULATED TRIBUTARY AREA**

### SECTION AM103 FLASHING

**AM103.1 Flashing.** When attached to a structure, the structure to which it is attached shall have a treated wood band for the length of the deck, or corrosion-resistant flashing shall be used to prevent moisture from coming in contact with the untreated framing of the structure. Aluminum flashing shall not be used in conjunction with deck construction. The deck band and the structure band shall be constructed in contact with each other except on brick veneer structures and where plywood sheathing is required and properly flashed. Siding shall not be installed between the structure and the deck band. If attached to a brick structure, neither the flashing nor a treated band for brick structure is required. In addition, the treated deckband shall be constructed in contact with the brick veneer. Flashing shall be installed in accordance with Figure AM103.1.

### SECTION AM104 DECK ATTACHMENT

**AM104.1 Deck attachment.** When a deck is supported at the structure by attaching the deck to the structure, Tables AM104.1(1) and AM104.1(2) shall apply for attaching the deck band to the structure.

**AM104.1.1 Masonry ledge support.** If the deck band is supported by a minimum of  $\frac{1}{2}$  inch (13 mm) masonry ledge along the foundation wall,  $\frac{5}{8}$ -inch (16 mm) hot-dip galvanized bolts with washers spaced at 48 inches (1219 mm) o.c. are permitted to be used for support.

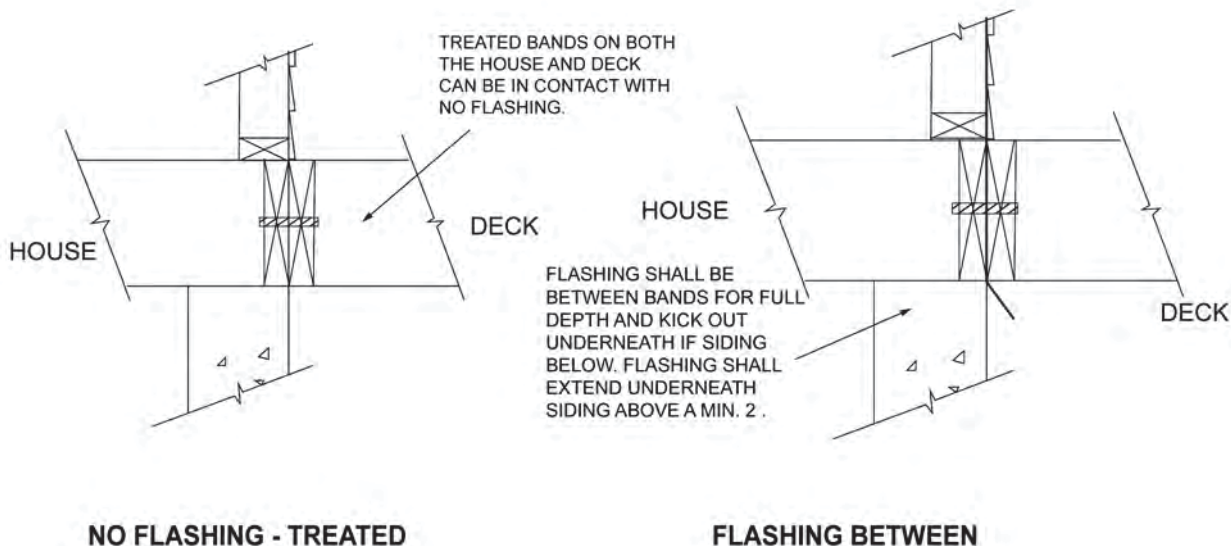
**AM104.1.2 Other means of support.** Joist hangers or other means of attachment are permitted to be connected to the house band and shall be properly flashed.

### SECTION AM105 GIRDER SUPPORT AND SPAN

**AM105.1 General.** Girders shall bear directly on the support post with the post attached at top to prevent lateral displacement or be connected to the side of the posts with two  $\frac{5}{8}$ -inch (16 mm) hot-dip galvanized bolts with nut and washer. Girder support is permitted to be installed in accordance with Figure AM105.1(1) for top mount; Figure AM105.1(2) for side mount and Figure AM105.1(3) for split girders. See Figure AM105.1(4) for cantilevered girders.

**AM105.2 Girder span for uncovered porches and decks.** Maximum allowable spans for wood deck girders, as shown in Figure AM105.2, shall be in accordance with Table AM105.2. Girder 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. Girders 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 interior post locations.

**AM105.3 Girder span for roofed porches and decks.** Girder spans for covered decks shall be in accordance with Tables R602.7(1) and (2).



For SI: 1 inch = 25.4 mm

**FIGURE AM103.1  
FLASHING FOR DECK ATTACHED TO STRUCTURE**

**TABLE AM104.1(1)  
DECK ATTACHMENT FOR ALL STRUCTURES EXCEPT BRICK VENEER**

FASTENERS	8' MAX JOIST SPAN <sup>a</sup>	16' MAX JOIST SPAN <sup>a</sup>
<sup>5</sup> / <sub>8</sub> " Hot-dip galvanized bolts with nut and washer <sup>b</sup> <b>and</b> 12d Common hot-dip galvanized nails <sup>c</sup>	1 @ 3'-6" o.c. <b>and</b> 2 @ 8" o.c.	1 @ 1'-8" o.c. <b>and</b> 3 @ 6" o.c.
<b>OR</b>		
Self-drilling screw fastener <sup>d</sup>	12" o.c. staggered	6" o.c. staggered

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

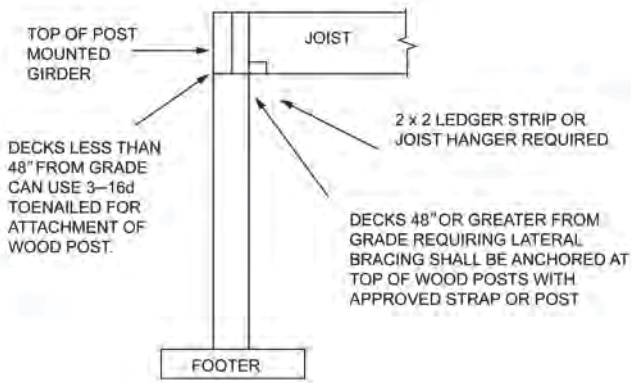
- a. Attachment interpolation between 8 foot and 16 foot joists span is allowed.
- b. Minimum edge distance for bolts is 2<sup>1</sup>/<sub>2</sub> inches.
- c. Nails must penetrate the supporting structure band a minimum of 1<sup>1</sup>/<sub>2</sub> inches.
- d. Self-drilling screw fastener having a minimum shank diameter of 0.195 inches and a length long enough to penetrate through the supporting structure band. The structure band shall have a minimum depth of 1<sup>1</sup>/<sub>8</sub> inches. Screw shall be evaluated by an approved testing agency for allowable shear load for Southern Pine to Southern Pine lumber of 250 pounds and shall have a corrosion-resistant finish equivalent to hot dip galvanized. Minimum edge distance for screws is 1<sup>7</sup>/<sub>16</sub> inches. A maximum of 1<sup>1</sup>/<sub>2</sub> inch thick wood structural panel is permitted to be located between the deck ledger and the structure band.

**TABLE AM104.1(2)  
DECK ATTACHMENT FOR BRICK VENEER STRUCTURES**

FASTENERS	8' MAX JOIST SPAN <sup>a</sup>	16' MAX JOIST SPAN <sup>a</sup>
<sup>5</sup> / <sub>8</sub> " Hot-dip galvanized bolts with nut and washer <sup>b</sup>	1 @ 2'-4" o.c.	1 @ 1'-4" o.c.

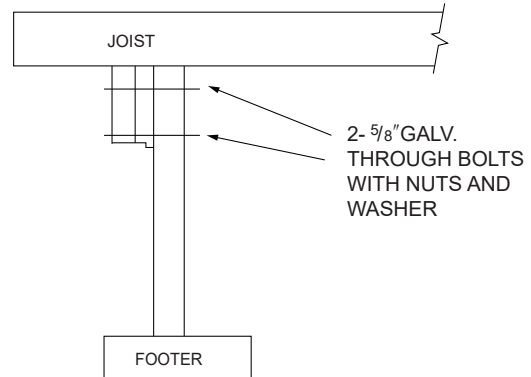
For SI: 1 inch = 25.4, 1 foot = 304.8 mm.

- a. Attachment interpolation between 8 foot and 16 foot joist span is allowed.
- b. Minimum edge distance for bolts is 2<sup>1</sup>/<sub>2</sub> inches.



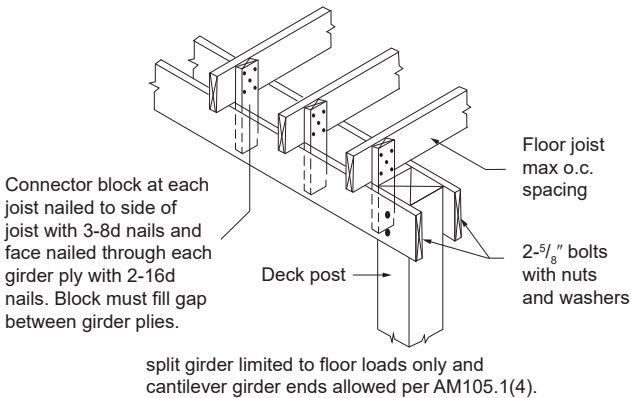
For SI: 1 inch = 25.4 mm.

**FIGURE AM105.1(1)  
TOP MOUNT/FLUSH GIRDER**



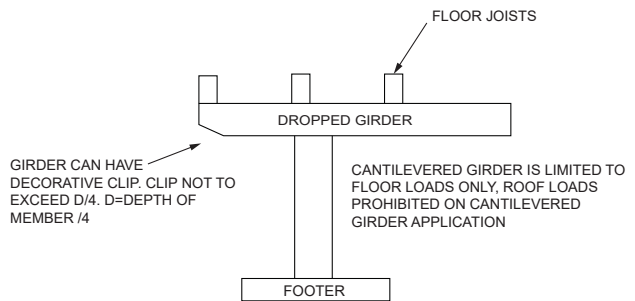
For SI: 1 inch = 25.4 mm

**FIGURE AM105.1(2)  
SIDE MOUNT DROPPED GIRDER**



For SI: 1 inch = 25.4 mm.

**FIGURE AM105.1(3)  
SPLIT GIRDER**



For SI: 1 inch = 25.4 mm.

**FIGURE AM105.1(4)  
CANTILEVERED DROPPED GIRDER**

**SECTION AM106  
JOIST SPANS AND CANTILEVERS**

**AM106.1 Joist spans for uncovered porches and decks.** Maximum allowable spans for wood deck joists, as shown in Figure AM106.1, shall be in accordance with Table AM106.1. Deck joists shall be permitted to cantilever not greater than one-fourth of the actual, adjacent joist span.

**AM106.1.1 Lateral restraint at supports.** Joist ends and bearing locations shall be provided with lateral restraint 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 less than (3) 10d (3-inch x 0.128-inch) nails or (3) No. 10 x 3-inch (76 mm) long wood screws.

**AM106.2. Roofed porches and decks.** Joists spans shall be in accordance with Table R502.3.1(2) with 40-pounds per-square-foot live load and 10-pounds per-square-foot dead load. Cantilevered floor joists shall be in accordance with Table R502.3.3(1).

**TABLE AM105.2  
DECK GIRDER SPAN LENGTHS<sup>a, b</sup>  
(feet – inches)**

SPECIES <sup>c</sup>	SIZE <sup>d</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
Douglas fir-larch <sup>e</sup> , hem-fir <sup>e</sup> , spruce-pine-fir <sup>e</sup> , redwood, western cedars, ponderosa pine <sup>f</sup> , red pine <sup>f</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

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.

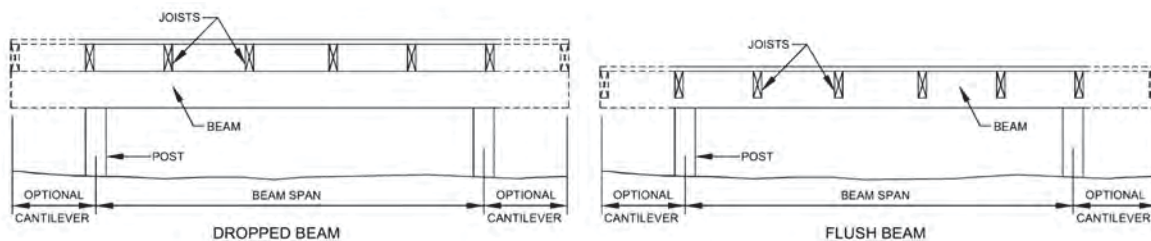
b. Girders supporting deck joists from one side only.

c. No. 2 grade, wet service factor.

d. Girder 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.



**FIGURE AM105.2  
TYPICAL DECK GIRDER SPANS**

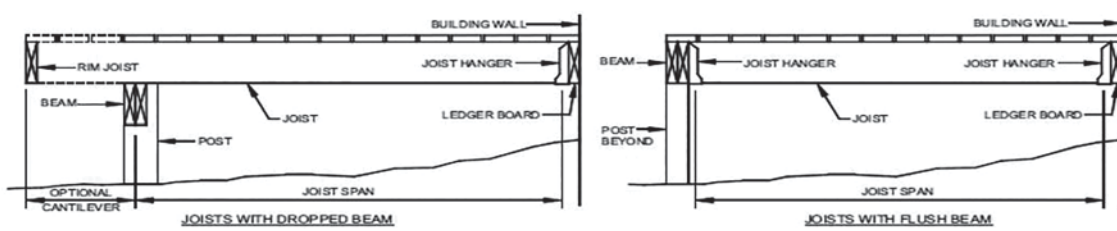
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**TABLE AM106.1  
DECK JOIST SPANS FOR COMMON LUMBER SPECIES<sup>f</sup>  
(feet – inches)**

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 × 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 <sup>d</sup> , hem-fir <sup>d</sup> , spruce-pine-fir <sup>d</sup>	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 <sup>e</sup> , red pine <sup>e</sup>	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,  $L/\Delta = 360$ .
- c. Ground snow load, live load = 40 psf, dead load = 10 psf,  $L/\Delta = 360$  at main span,  $L/\Delta = 180$  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 AM106.1  
TYPICAL DECK JOIST SPANS**

**SECTION AM107  
FLOOR DECKING**

**AM107.1 Floor decking.** Floor decking shall be No. 2 grade treated Southern Pine or equivalent. The minimum floor decking thickness shall be in accordance with Table AM107.1.

**TABLE AM107.1  
FLOOR DECKING THICKNESS**

SPACING	DECKING (nominal)
12" o.c.	1" S4S
16" o.c.	1" T&G
19.2" o.c.	1 <sup>1</sup> / <sub>4</sub> " S4S
24"-36" o.c.	2" S4S

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

**SECTION AM108  
POST HEIGHT**

**AM108.1 Post height.** Maximum height of deck support posts shall be in accordance with Table AM108.1.

**TABLE AM108.1  
DECK SUPPORT POST HEIGHT**

POST SIZE <sup>a</sup>	MAXIMUM POST HEIGHT <sup>b, c</sup>
4" x 4"	8'-0"
6" x 6"	20'-0"

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

- a. This table is based on No. 2 Southern Pine posts.
- b. From top of footing to bottom of girder.
- c. Decks with post heights exceeding these requirements shall be designed by a registered design professional.

**SECTION AM109  
DECK BRACING**

**AM109.1 Deck bracing.** Decks shall be braced to provide lateral stability. Lateral stability shall be provided in accordance with one of the methods in Sections AM109.1.1 through AM109.1.5.

**AM109.1.1 Lateral bracing not required.** When the deck floor height is less than 4 feet (1219 mm) above finished grade as shown in Figure AM109.1(1) and the deck is attached to the structure in accordance with Section AM104, lateral bracing is not required. Lateral bracing is not required for freestanding decks with a deck floor height 30 inches (762 mm) or less above finished grade.

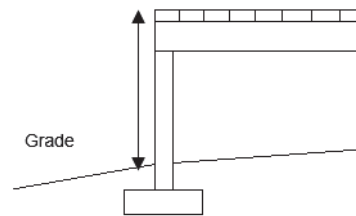
**AM109.1.2. Knee bracing.** 4 x 4 wood knee braces are permitted to be provided on each column in both directions. The knee braces shall attach to each post at a point not less than 1/3 of the post length from the top of the post, and the braces shall be angled between 45 degrees (0.79 rad) and 60 degrees (1.05 rad) from the horizontal. Knee braces shall be bolted to the post and the girder/double band with one 5/8-inch (16 mm) hot-dip galvanized bolt with nut and washer at both ends of the brace as shown in Figure AM109.1(2)

**AM109.1.3. Post embedment.** For free standing decks without knee braces or diagonal bracing, lateral stability is permitted to be provided by embedding the post in accordance with Figure AM109.1(3) and Table AM109.1.

**TABLE AM109.1  
POST EMEBEDMENT FOR FREE STANDING DECKS**

POST SIZE	MAXIMUM TRIBUTARY AREA	MAXIMUM POST HEIGHT	EMPEMENT DEPTH	CONCRETE DIAMETER
4" x 4"	48 SF	4'-0"	2'-6"	1'-0"
6" x 6"	120 SF	6'-0"	3'-6"	1'-8"

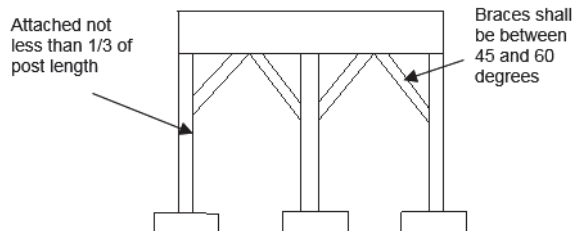
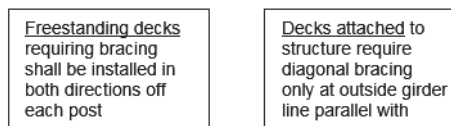
For SI: 1 inch = 25.4 mm, 1 square foot = 0.0929 m<sup>2</sup>.



Less than 4' (decking to grade) and attached to structure no bracing required

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

**FIGURE AM109.1(1)  
NO LATERAL BRACING**



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

**FIGURE AM109.1(2)  
KNEE BRACING**



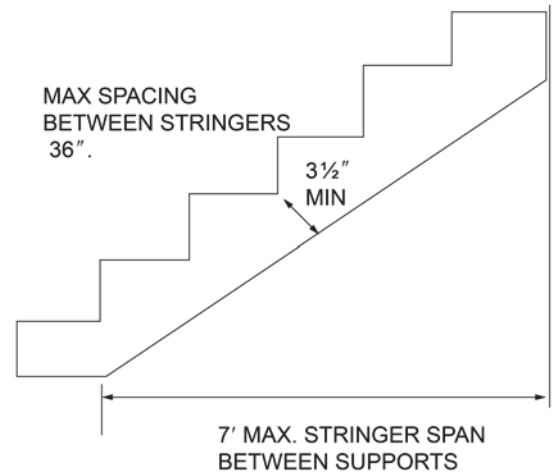
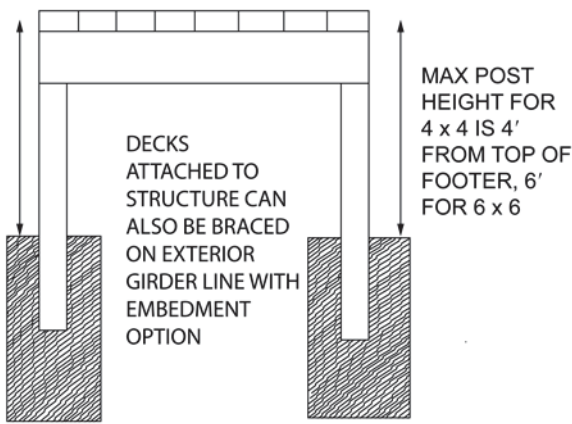
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**AM109.1.4. Cross bracing.** 2 × 6 diagonal vertical cross bracing is permitted to be provided in two perpendicular directions for free standing decks or parallel to the structure at the exterior column line for attached decks. The 2 × 6 bracing shall be attached to the posts with one 5/8-inch (16 mm) hot-dip galvanized bolt with nut and washer at each end of each bracing member in accordance with Figure AM109.1(4).

**AM109.1.5. Piles in coastal regions.** For embedment of piles in coastal regions, see Chapter 46.

**SECTION AM110  
STAIRS**

**AM110.1 Stair construction.** Stringer spans shall be no greater than 7 feet (2134 mm) between supports. Spacing between stringers shall be based upon decking material used in accordance with AM107.1. Each stringer shall have a minimum of 3 1/2 inches (89 mm) between step cut and back of stringer. If used, suspended headers shall be attached with 3/8-inch (9.5 mm) galvanized bolts with nuts and washers to securely support stringers at the top. See Figure AM 110.1.

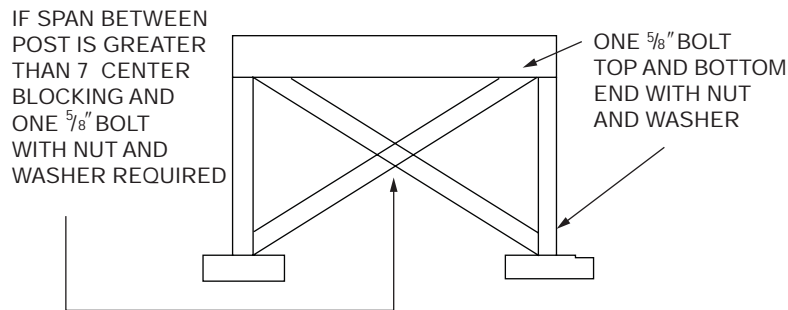


For SI: 1 inch = 25.4, 1 foot = 304.8 mm.

**FIGURE AM109.1(3)  
POST EMBEDMENT**

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

**FIGURE AM110.1  
STAIR STRINGER**



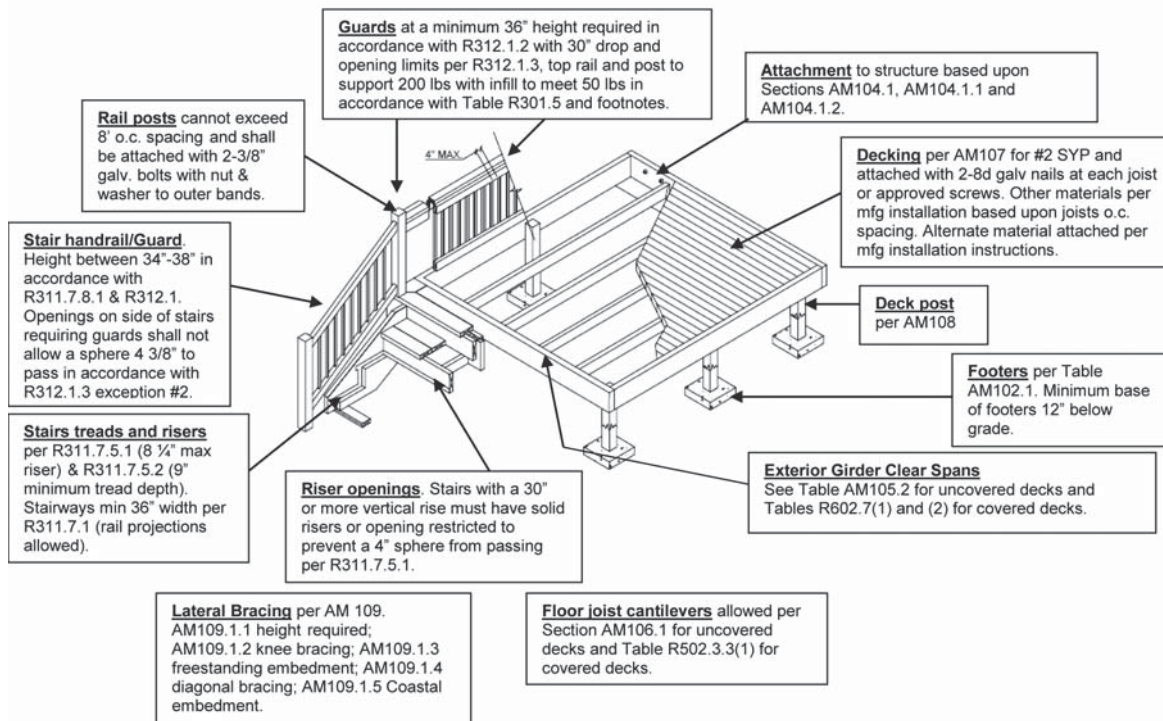
For SI: 1 inch = 25.4, 1 foot = 304.8 mm.

**FIGURE AM109.1(4)  
CROSS BRACING**



**SECTION AM111  
HANDRAILS, GUARDS AND GENERAL**

**AM111.1 Handrails, guards and general.** Deck handrails, guards and general construction shall be as shown in Figure AM111.1.



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

**FIGURE AM111.1  
DECK CONSTRUCTION**

2. The headroom for spiral stairways shall be in accordance with Section R311.7.10.1.

**R311.7.3 Vertical rise.** A flight of stairs shall not have a vertical rise larger than 147 inches (3734 mm) between floor levels or landings.

**R311.7.4 Walkline.** Deleted.

**R311.7.5 Stair treads and risers.** Stair treads and risers shall meet the requirements of this section. For the purposes of this section, dimensions and dimensioned surfaces shall be exclusive of carpets, rugs or runners.

**R311.7.5.1 Risers.** The riser height shall be not more than  $8\frac{1}{4}$  inches (210 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  $\frac{3}{8}$  inch (9.5 mm). The top and bottom riser of interior stairs shall not exceed the smallest riser within that stair run by more than  $\frac{3}{4}$  inch (19 mm). The height of the top and bottom riser of the interior stairs shall be measured from the permanent finished surface (carpet excluded). Where the bottom riser of an exterior stair adjoins an exterior walk, porch, driveway, patio, garage floor, or finish grade, the height of the riser may be less than the height of the adjacent risers.

**R311.7.5.2 Treads.** The minimum 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  $\frac{3}{8}$  inch (9.5 mm).

**R311.7.5.2.1 Winder treads.** Winder treads shall have a tread depth of not less than 9 inches (229 mm) measured between the vertical planes of the foremost projection of adjacent treads at the intersections with the walkline. Winder treads shall have a tread depth of not less than 4 inches (102 mm) at any point within the clear width of the stair. Within any flight of stairs, the largest winder tread depth at the walkline shall not exceed the smallest winder tread by more than  $\frac{3}{8}$  inch (9.5 mm).

**R311.7.5.3 Nosings.** The radius of curvature at the nosing shall be not greater than  $\frac{9}{16}$  inch (14 mm). A nosing projection not less than  $\frac{3}{4}$  inch (19 mm) and not more than  $1\frac{1}{4}$  inches (32 mm) shall be provided on stairways with solid risers. The greatest nosing projection shall not exceed the smallest nosing projection by more than  $\frac{3}{8}$  inch (9.5 mm) between two stories, including the nosing at the level of floors and landings. Beveling of nosings shall not exceed  $\frac{1}{2}$  inch (12.7 mm).

**Exceptions:**

1. A nosing projection is not required where the tread depth is not less than 11 inches (279 mm).
2. The opening between adjacent treads is not limited on stairs with a total rise of 30 inches (762 mm) or less.

**R311.7.5.4 Exterior plastic composite stair treads.** Plastic composite exterior stair treads shall comply with the provisions of this section and the requirements of ASTM D7032.

**R311.7.6 Landings for stairways.** There shall be a floor or landing at the top and bottom of each stairway. A flight of stairs shall not have a vertical rise larger than 12 feet 3 inches (3734 mm) between floor levels or landings. The width of each landing shall not be less than the width of the stairway served. Every landing shall have a minimum dimension of 36 inches (914 mm) measured in the direction of travel.

**Exception:** A floor or landing is not required at the top of an interior flight of stairs, including stairs in an enclosed garage, provided that a door does not swing over the stairs

**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-per-cent slope).

**R311.7.8 Handrails.** Handrails shall be provided on not less than one side of each continuous run of treads or flight 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).

**Exceptions:**

1. The use of a volute, turnout or starting easing shall be allowed over the lowest tread.
2. Where handrail fittings or bendings are used to provide continuous transition between flights, transitions at winder treads, the transition from handrail to *guard*, or used at the start of a flight, the handrail height at the fittings or bendings shall be permitted to exceed 38 inches (956 mm).

**R311.7.8.2 Continuity.** Handrails for stairways 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. Handrails adjacent to a wall shall have a space of not less than  $1\frac{1}{2}$  inches (38 mm) between the wall and the handrails.

**Exceptions:**

1. Handrails shall be permitted to be interrupted by a newel post at the turn.
2. The use of a volute, turnout, starting easing or starting newel shall be allowed over the lowest tread.
3. Two or more separate rails shall be considered continuous if the termination of the rails occurs within 6 inches (152 mm) of each other. If transitioning between a wall-mounted handrail and

a guardrail/handrail, the wall-mounted rail shall return into the wall.

**R311.7.8.3 Grip-size.** Required handrails shall be of one of the following types or provide equivalent graspability.

1. Type I. Handrails with a circular cross section shall have an outside diameter of not less than 1<sup>1</sup>/<sub>4</sub> inches (32 mm) and not greater than 2 inches (51 mm). If the handrail is not circular, it shall have a perimeter dimension of not less than 4 inches (102 mm) and not greater than 6<sup>1</sup>/<sub>4</sub> inches (160 mm) with a cross section of dimension of not more than 2<sup>1</sup>/<sub>4</sub> inches (57 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).
2. Type II. Handrails with a perimeter greater than 6<sup>1</sup>/<sub>4</sub> inches (160 mm) shall have a graspable finger recess area on both sides of the profile. The finger recess shall begin within a distance of 3<sup>3</sup>/<sub>4</sub> inch (19 mm) measured vertically from the tallest portion of the profile and achieve a depth of not less than 5<sup>5</sup>/<sub>16</sub> inch (8 mm) within 7<sup>7</sup>/<sub>8</sub> inch (22 mm) below the widest portion of the profile. This required depth shall continue for not less than 3<sup>3</sup>/<sub>8</sub> inch (10 mm) to a level that is not less than 1<sup>3</sup>/<sub>4</sub> inches (45 mm) below the tallest portion of the profile. The width of the handrail above the recess shall be not less than 1<sup>1</sup>/<sub>4</sub> inches (32 mm) and not more than 2<sup>3</sup>/<sub>4</sub> inches (70 mm). Edges shall have a radius of not less than 0.01 inch (0.25 mm).

**Exception:** Exterior handrails (garages and areas exposed to the weather) shall not be more than 3<sup>1</sup>/<sub>2</sub> inches (89 mm) in cross-section dimension.

**R311.7.8.4 Exterior plastic composite handrails.** Plastic composite exterior handrails shall comply with the requirements of ASTM D7032.

**R311.7.9 Illumination.** Stairways shall be provided with illumination in accordance with Section R303.7.

**R311.7.10 Special stairways.** Spiral stairways, bulkhead enclosure stairways and bowed tread stairways shall comply with the requirements of Section R311.7 except as specified in Sections R311.7.10.1 through R311.7.10.3.

**R311.7.10.1 Spiral stairways.** Spiral stairways are permitted, provided that the clear width at and below the handrail is not less than 26 inches (660 mm) and the walkline radius is not greater than 24<sup>1</sup>/<sub>2</sub> inches (622 mm). Each tread shall have a depth of not less than 6<sup>3</sup>/<sub>4</sub> inches (171 mm) at the walkline. All treads shall be identical, and the rise shall be not more than 9<sup>1</sup>/<sub>2</sub> inches (241 mm). Headroom shall be not less than 6 feet 6 inches (1982 mm).

**R311.7.10.2 Bulkhead enclosure stairways.** Stairways serving bulkhead enclosures, not part of the required building egress, providing access from the outside *grade* level to the *basement* shall be exempt from the requirements of Sections R311.3 and R311.7 where the height from the *basement* finished floor level to

*grade* adjacent to the stairway is not more than 8 feet (2438 mm) and the *grade* level opening to the stairway is covered by a bulkhead enclosure with hinged doors or other *approved* means.

**R311.7.10.3 Bowed tread stairways.** Bowed tread stairways are permitted provided they are uniform in bowed tread depth along the entire width of the tread with not more than 3<sup>3</sup>/<sub>8</sub>-inch (9.5 mm) variance from greatest to smallest tread in the stairway flight. At no point shall the tread be less than 9 inches (229 mm) with a nosing as listed in Sections R311.7.5.2 and R311.7.5.3, respectively.

**R311.7.10.3.1 Standard stairway application.** The bottom three treads in a standard straight run stairway application as listed under Section R311.7.5.2 are permitted to bow provided that, at no point along the width of the tread, they are less than 9 inches (229 mm) as measured under Section R311.7.5.2 and each bowed tread is uniform with other bowed treads with no more than 3<sup>3</sup>/<sub>8</sub>-inch (9.5 mm) variance from greatest to least. Nosing is required as listed in Section R311.7.5.3.

**R311.7.10.3.2 Bowed tread circular stairways.** Bowed treads in a circular stairway are permitted provided they are uniform, as per winder treads as listed in Section R311.7.5.2, measured at a point 12 inches (305 mm) from the side where the treads are narrower. At this walk line, bowed treads must be uniform with other circular stairway treads with the greatest tread not to exceed the smallest by more than 3<sup>3</sup>/<sub>8</sub> inch (9.5 mm). Nosing is required as listed in Section R311.7.5.3.

**R311.7.11 Alternating tread devices.** Deleted.

**R311.7.12 Ships ladders.** Ships ladders shall not be used as an element of a means of egress. Ships ladders shall be permitted provided that a required means of egress stairway or ramp serves the same space at each adjoining level or where a means of egress is not required. The clear width at and below the handrails shall be not less than 20 inches.

**R311.7.12.1 Treads of ships ladders.** Treads shall have a depth of not less than 5 inches (127 mm). The tread shall be projected such that the total of the tread depth plus the nosing projection is not less than 8<sup>1</sup>/<sub>2</sub> inches (216 mm). The riser height shall be not more than 9<sup>1</sup>/<sub>2</sub> inches (241 mm).

**R311.7.12.2 Handrails of ships ladders.** Handrails shall be provided on both sides of ships ladders and shall comply with Sections R311.7.8.2 to R311.7.8.4. Handrail height shall be uniform, not less than 30 inches (762 mm) and not more than 34 inches (864 mm).

**R311.8 Ramps.**

**R311.8.1 Maximum slope.** Ramps serving the egress door required by Section R311.2 shall have a slope of not more than 1 unit vertical in 12 units horizontal (8.3-percent slope). All other ramps shall have a maximum slope of 1 unit vertical in 8 units horizontal (12.5 percent).

## B. Encroachments into Required Yards

Unless otherwise regulated within this Ordinance, the following encroachment standards shall apply:

**Commentary:** [Easements](#), other ordinances, or other legally established restrictions may limit encroachments otherwise allowed by this Ordinance.

1. Chimneys, pre-fabricated chimneys, flues, or smokestacks can extend into [yard](#) spaces but shall not occupy more than 30 square feet of the required yard space.
2. Fire escapes can project up to eight feet into any required [yard](#). Fire escapes in the [DD](#) District are permitted to extend beyond the property line.
3. Cornices, eaves, ornamental features, and awnings can extend up to five feet into any required [yard](#), but shall remain at least two feet from the property line, except on [zero lot line](#) homes.
4. [Marquee signs](#) can extend into [yard](#) spaces in conformance with standards found in the Sec. [11.6](#), Signs Requiring Permits.
5. Pedestrian bridges, breezeways, and supports of these [structures](#) can extend into required [yards](#) for transit access.
6. Security gates and guard stations can be located within any required [yard](#).
7. For residential uses: decks, [uncovered](#) terraces, and at-grade patios can extend up to four feet into any required [side yard](#), or up to eight feet into any required [street yard](#), or within four feet of a rear property line. For nonresidential uses, such features can be located within any [yard](#).
8. Surface parking and associated lighting, [uncovered](#) steps, and handicapped access ramps can be located within any [yard](#).