

Exterior decks shall be designed for the following live load requirements. USE 40 pounds per square foot LIVE LOAD

**TABLE R301.5
MINIMUM UNIFORMLY DISTRIBUTED LIVE LOADS
(in pounds per square foot)**

| USE | LIVE LOAD |
|--|------------------|
| Uninhabitable attics without storage ^h | 10 |
| Uninhabitable attics with limited storage ^{h,e} | 20 |
| Habitable attics and attics served with fixed stairs | 30 |
| Balconies (exterior) and decks ^c | 40 |
| Fire escapes | 40 |
| Guards and handrails ^d | 200 ^b |
| Guard in-fill components ^f | 50 ^b |
| Passenger vehicle garages ^a | 50 ^a |
| Rooms other than sleeping rooms | 40 |
| Sleeping rooms | 30 |
| Stairs | 40 ^c |

c. Individual stair treads shall be designed for the uniformly distributed live load or a 300-pound concentrated load acting over an area of 4 square inches, whichever produces the greater stresses.

d. A single concentrated load applied in any direction at any point along the top

e. See Section R507.1 for decks attached to exterior walls.

f. Guard in-fill components (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 pounds on an area equal to 1 square foot. This load need not be assumed to act concurrently with any other live load requirement.

**SECTION R507
EXTERIOR DECKS**

R507.1 Decks. Wood-framed decks shall be in accordance with this section or Section R301 for materials and conditions not prescribed herein. Where supported by attachment to an exterior wall, decks shall be positively anchored to the primary structure and designed for both vertical and lateral loads. Such attachment shall not be accomplished by the use of toenails or nails subject to withdrawal. Where positive connection to the primary building structure cannot be verified during inspection, decks shall be self-supporting. For decks with cantilevered framing members connections to exterior walls or other framing members shall be designed and constructed to resist uplift resulting from the full live load specified in Table R301.5 acting on the cantilevered portion of the deck.

R507.2 Deck ledger connection to band joist. Deck ledger connections to band joists shall be in accordance with this section, Tables R507.2 and R507.2.1, and Figures R507.2.1(1) and R507.2.1(2). For other grades, species, connection details and loading conditions, deck ledger connections shall be designed in accordance with Section R301.

R507.2.1 Ledger details. Deck ledgers installed in accordance with Section R507.2 shall be a minimum 2-inch by 8-inch (51 mm by 203 mm) nominal, pressure-preservative treated southern pine, incised pressure-preservative-treated Hem-fir, or approved, naturally durable, No.2 grade or better lumber. Deck ledgers installed in accordance with Section R507.2 shall not support concentrated loads from beams or girders. Deck ledgers shall not be supported on stone or masonry veneer.

R507.2.2 Alternate deck ledger connections. Deck ledger connections not conforming to Table R507.2 shall be designed in accordance with accepted engineering practice. Girders supporting deck joists shall not be supported on deck ledgers or band joists. Deck ledgers shall not be supported on stone or masonry veneer unless specifically designed by a design professional (architect or engineer), or supported by an approved listed and labeled fastening method. (KY Amendments First Edition June 2018)

R507.2.2 Band joist details. Band joists attached by a ledger in accordance with Section R507.2 shall be a minimum 2-inch-nominal (51 mm), solid-sawn, spruce-pine-fir lumber or a minimum 1-inch by 9 1/2-inch (25 mm x 241 mm) dimensional, Douglas fir, laminated veneer lumber. Band joists attached by a ledger in accordance with Section R507.2 shall be fully supported by a wall or sill plate below.

R507.2.3 Ledger to band joist fastener details. Fasteners used in deck ledger connections in accordance with Table R507.2 shall be hot-dipped galvanized or stainless steel and shall be installed in accordance with Table R507.2.1 and Figures R507.2.1(1) and R507.2.1(2).

R507.2.4 Deck lateral load connection. The lateral load connection required by Section R507.1 shall be permitted

to be in accordance with Figure R507.2.3(1) or R507.2.3(2). Where the lateral load connection is provided in accordance with Figure R507.2.3(1), hold-down tension devices shall be installed in not less than two locations per deck, within 24 inches of each end of the deck. Each device shall have an allowable stress design capacity of not less than 1,500 pounds (6672 N). Where the lateral load connections are provided in accordance with Figure R507.2.3(2), the hold-down tension devices shall be installed in not less than four locations per deck, and each device shall have an allowable stress design capacity of not less than 750 pounds (3336 N).

R507.3 Plastic composite deck boards, stair treads, guards, or handrails. Plastic composite exterior deck boards, stair treads, guards and handrails shall comply with the requirements of ASTM D 7032 and the requirements of Section 507.3.

R507.3.1 Labeling. Plastic composite deck boards and stair treads, or their packaging, shall bear a label that indicates compliance to ASTM D 7032 and includes the allowable load and maximum allowable span determined in accordance with ASTM D 7032. Plastic or composite handrails and guards, or their packaging, shall bear a label that indicates compliance to ASTM D 7032 and includes the maximum allowable span determined in accordance with ASTM D 7032.

R507.3.2 Flame spread index. Plastic composite deck boards, stair treads, guards, and handrails shall exhibit a flame spread index not exceeding 200 when tested in accordance with ASTM E 84 or UL 723 with the test specimen remaining in place during the test. Exception: Plastic composites determined to be noncombustible.

R507.3.3 Decay resistance. Plastic composite deck boards, stair treads, guards and handrails containing wood, cellulosic or other biodegradable materials shall be decay resistant in accordance with ASTM D 7032.

R507.3.4 Termite resistance. Where required by Section 318, plastic composite deck boards, stair treads, guards and handrails containing wood, cellulosic or other biodegradable materials shall be termite resistant in accordance with ASTM D 7032.

507.3.5 Installation of plastic composites. Plastic composite deck boards, stair treads, guards and handrails shall be installed in accordance with this code and the manufacturer's instructions.

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.

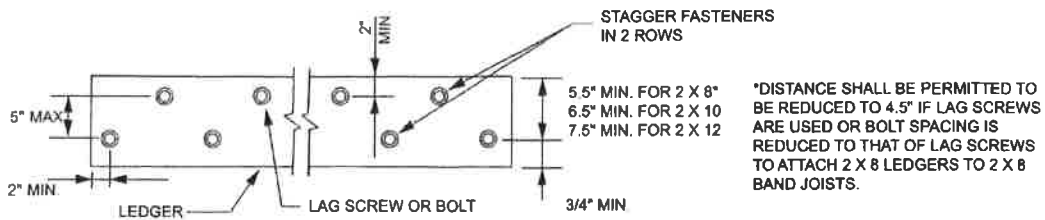
- Ledgers shall be flashed in accordance with Section R703.8 to prevent water from contacting the house band joist.
- Snow load shall not be assumed to act concurrently with live load.
- The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- Sheathing shall be wood structural panel or solid sawn lumber.
- 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.

TABLE 507.2.1
PLACEMENT OF LAG SCREWS AND BOLTS IN DECK LEDGERS AND BAND JOISTS

| | MINIMUM END AND EDGE DISTANCES AND SPACING BETWEEN ROWS | | | |
|-------------------------|---|-------------|-----------------------|---------------------------|
| | TOP EDGE | BOTTOM EDGE | ENDS | ROW SPACING |
| Ledger ^a | 2 inches ^d | 3/4 inch | 2 inches ^b | 1 5/8 inches ^b |
| Band Joist ^c | 3/4 inch | 2 inches | 2 inches ^b | 1 5/8 inches ^b |

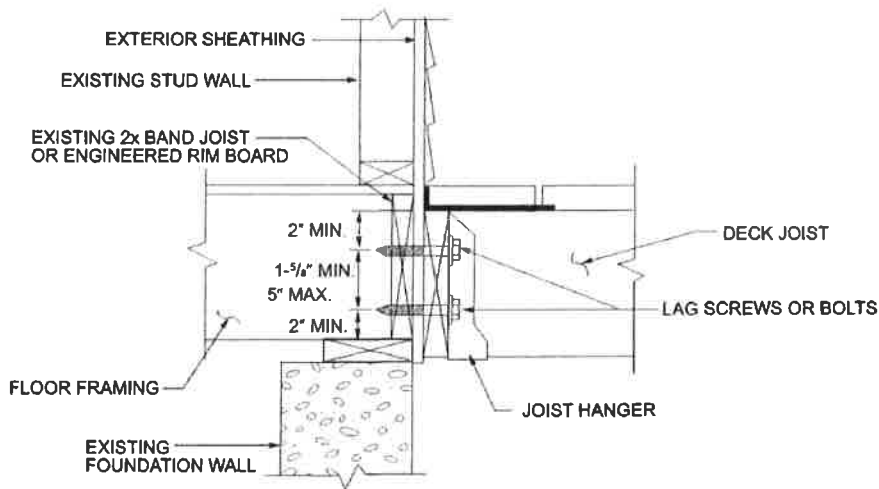
For SI: 1 inch = 25.4 mm.

- Lag screws or bolts shall be staggered from the top to the bottom along the horizontal run of the deck ledger in accordance with Figure R507.2.1(1).
- Maximum 5 inches.
- For engineered rim joists, the manufacturer's recommendations shall govern.
- The minimum distance from bottom row of lag screws or bolts to the top edge of the ledger shall be in accordance with Figure R507.2.1(1).



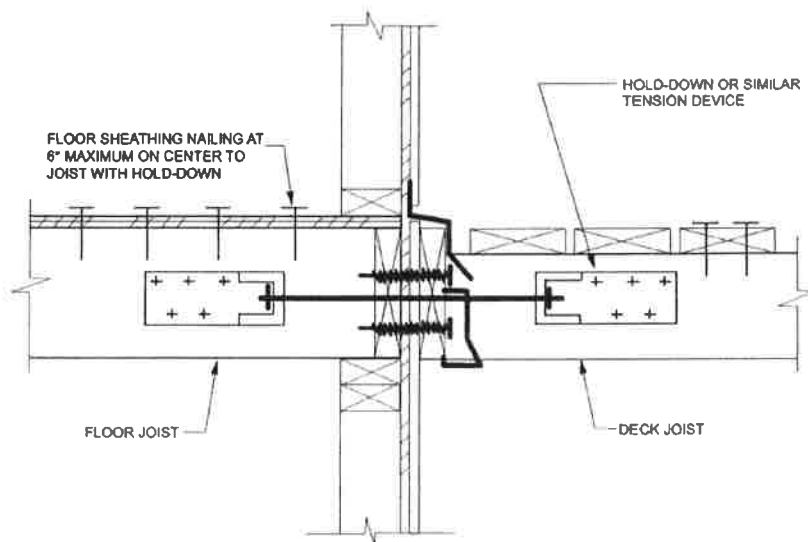
For SI: 1 inch = 25.4 mm.

FIGURE R507.2.1(1)
PLACEMENT OF LAG SCREWS AND BOLTS IN LEDGERS



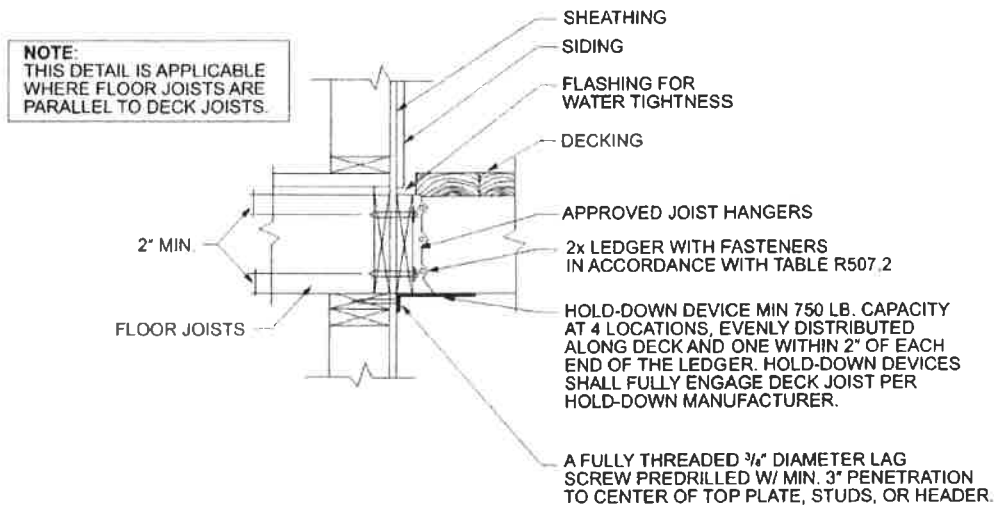
For SI: 1 inch = 25.4 mm.

FIGURE R607.2.1(2)
PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS



For SI: 1 inch = 25.4 mm.

FIGURE 507.2.3(1)
DECK ATTACHMENT FOR LATERAL LOADS



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

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

R507.4 Decking. Maximum allowable spacing for joists supporting decking shall be in accordance with Table R507.4. Wood decking shall be attached to each supporting member with not less than (2) 8d threaded nails or (2) No.8 wood screws.

R507.5 Deck joists. Maximum allowable spans for wood deck joists, as shown in Figure R507.5, shall be in accordance with Table R507.5. Deck joists shall be permitted to cantilever not greater than one-fourth of the actual, adjacent joist span.

R507.5.1 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.

TABLE R507.4
MAXIMUM JOIST SPACING

| MATERIAL TYPE AND NOMINAL SIZE | MAXIMUM ON-CENTER JOIST SPACING | |
|--------------------------------|-----------------------------------|-----------------------------------|
| | Perpendicular to joist | Diagonal to joist ^a |
| 1 1/4-inch-thick wood | 16 inches | 12 inches |
| 2-inch-thick wood | 24 inches | 16 inches |
| Plastic composite | In accordance with Section R507.3 | In accordance with Section R507.3 |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 degree = 0.01745 rad.

a. Maximum angle of 45 degrees from perpendicular for wood deck boards

**TABLE R507.5
DECK JOIST SPANS FOR COMMON LUMBER SPECIES¹ (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 ^c , 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 ^f | 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.

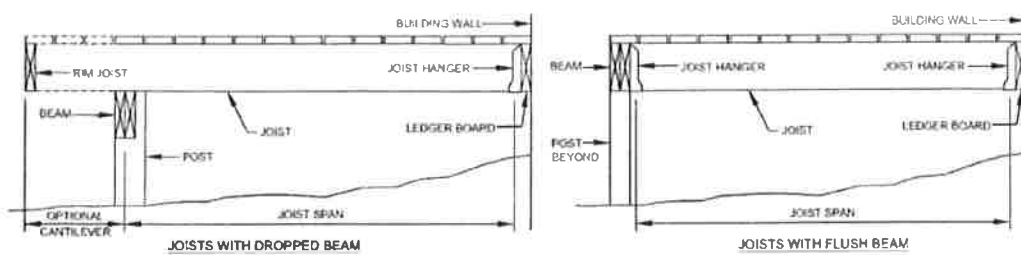
b. Ground snow load, live load = 40 psf, dead load = 10 psf, L/A = 360.

c. Ground snow load, live load = 40 psf, dead load = 10 psf, L/A = 360 at main span, L/A = 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 R507.5
TYPICAL DECK JOIST SPANS**

R507.6 Deck Beams. Maximum allowable spans for wood deck beams, as shown in Figure R507.6, shall be in accordance with Table R507.6. Beam plies shall be fastened with two rows of 10d (3-inch X 0.128-inch) nails minimum at 16 inches (406 mm) 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 interior post locations.

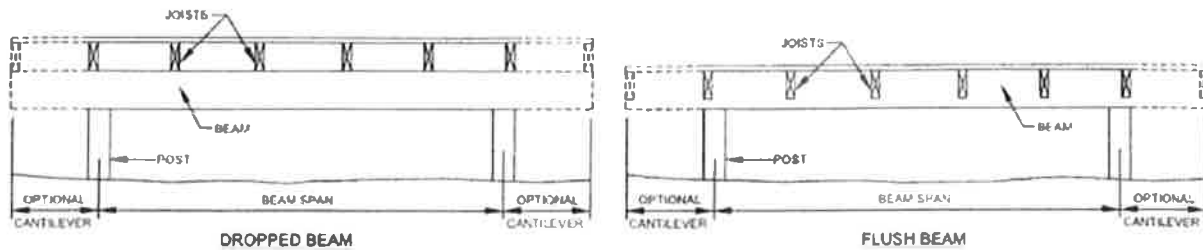
R507.7 Deck joist and deck beam bearing. The ends of each joist and beam shall have not less than 1 1/2 inches (38 mm) of bearing on wood or metal and not less than 3 inches (76 mm) on concrete or masonry for the entire width of the beam. Joist framing into the side of a ledger board or beam shall be supported by approved joist hangers. Joists bearing on a beam shall be connected to the beam to resist lateral displacement.

**TABLE R507.6
DECK BEAM SPAN LENGTHS^{a, b} (ft. - in.)**

| SPECIES ^c | SIZE ^d | DECK JOIST SPAN LESS THAN OR EQUAL TO: (feet) | | | | | | |
|---|----------------------|--|------|------|------|------|------|------|
| | | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| Southern pine | 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 |
| Douglas fir-larch ^e , hem-fir ^f , spruce-pine-fir ^f , redwood, western cedars, ponderosa pine ^f , red pine ^f | 3 x 6 or 2 - 2 x 6 | 5-5 | 4-8 | 4-2 | 3-10 | 3-6 | 3-1 | 2-9 |
| | 3 x 8 or 2 - 2 x 8 | 6-10 | 5-11 | 5-4 | 4-10 | 4-6 | 4-1 | 3-8 |
| | 3 x 10 or 2 - 2 x 10 | 8-4 | 7-3 | 6-6 | 5-11 | 5-6 | 5-1 | 4-8 |
| | 3 x 12 or 2 - 2 x 12 | 9-8 | 8-5 | 7-6 | 6-10 | 6-4 | 5-11 | 5-7 |
| | 4 x 6 | 6-5 | 5-6 | 4-11 | 4-6 | 4-2 | 3-11 | 3-8 |
| | 4 x 8 | 8-5 | 7-3 | 6-6 | 5-11 | 5-6 | 5-2 | 4-10 |
| | 4 x 10 | 9-11 | 8-7 | 7-8 | 7-0 | 6-6 | 6-1 | 5-8 |
| | 4 x 12 | 11-5 | 9-11 | 8-10 | 8-1 | 7-6 | 7-0 | 6-7 |
| | 3 - 2 x 6 | 7-4 | 6-8 | 6-0 | 5-6 | 5-1 | 4-9 | 4-6 |
| | 3 - 2 x 8 | 9-8 | 8-6 | 7-7 | 6-11 | 6-5 | 6-0 | 5-8 |
| | 3 - 2 x 10 | 12-0 | 10-5 | 9-4 | 8-6 | 7-10 | 7-4 | 6-11 |
| | 3 - 2 x 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.



**FIGURE R507.6
TYPICAL DECK BEAM SPANS**

R507.7.1 Deck post to deck beam. Deck beams shall be attached to deck posts in accordance with Figure R507.7.1 or by other equivalent means capable to resist lateral displacement.

Manufactured post-to-beam connectors shall be sized for the post and beam sizes. All bolts shall have washers under the head and nut.

Exception: Where deck beams bear directly on footings in accordance with Section R507.8.1.

R403.1.4 Minimum depth. The minimum depth of all exterior footings and foundation wall systems shall extend not less than the minimum frost-protection depths (MFPD) specified in Table R403.1.4. (NOTE: **Hardin County frost-protection depth is minimum 24"**).

Exception – Decks not supported by a dwelling need not be provided with footings that extend below the frost line. (Minimum 12" required)

**TABLE R403.1.4
MINIMUM FROST PROTECTION DEPTH FOR KENTUCKY**

| County | Frost Depth d_f (in) | County | Frost Depth d_f (in) | County | Frost Depth d_f (in) |
|-----------|------------------------|----------|------------------------|-----------------------|------------------------|
| Bell | 27 | Johnson | 30 | Magoffin | 30 |
| Boone | 30 | Kenton | 30 | Martin | 33 |
| Breathitt | 30 | Knott | 33 | Owsley | 27 |
| Campbell | 30 | Knox | 27 | Perry | 30 |
| Clay | 27 | Lawrence | 27 | Pike | 33 |
| Floyd | 33 | Leslie | 30 | All other KY Counties | 24 |
| Harlan | 30 | Letcher | 33 | | |

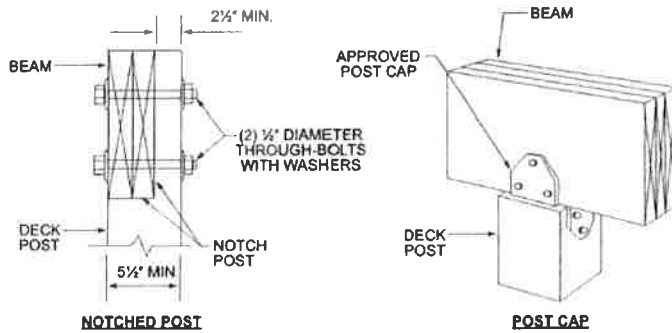
R507.8 Deck posts. For single-level wood-framed decks with beams sized in accordance with Table R507.6, deck post size shall be in accordance with Table R507.8.

**TABLE R507.8
DECK POST HEIGHT***

| DECK POST SIZE | MAXIMUM HEIGHT* |
|----------------|-----------------|
| 4 × 4 | 8' |
| 4 × 6 | 8' |
| 6 × 6 | 14' |

For SI: 1 foot = 304.8 mm.

a. Measured to the underside of the beam.



For SI: 1 inch = 25.4 mm

**FIGURE R507.7.1
DECK BEAM TO DECK POST**

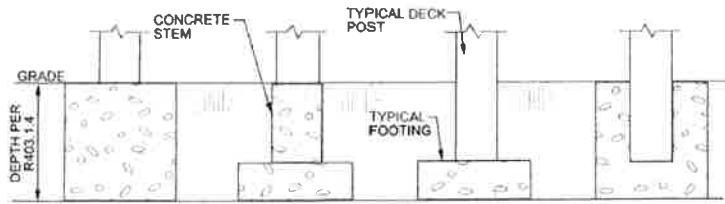
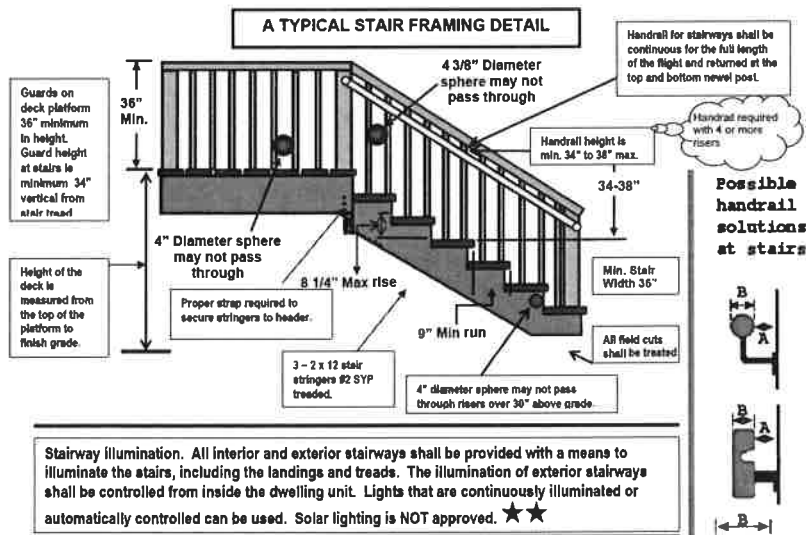


FIGURE R507.8.1
TYPICAL DECK POSTS TO DECK FOOTINGS

For information on how to build stairs refer to the Stairs handout also available.



Reference: City of Lexington Sample: stair framing detail