



Basic Deck Structure

To use this handout as your plan, fill in the blanks and follow directions on this page and following pages.

Only detached decks and landings under 200 sf and under 30" in height are exempt from a building permit.

Any deck or landing supported by an adjacent structure regardless of size requires a building permit.

Roof Cover over Deck?

Yes _____ No _____

If Yes, fill out and attach Roof Covers Handout.

Deck Style: (check one)

Freestanding _____

Attached to structure _____

Note: Decks and Roof Covers for Manufactured Homes must be freestanding.

DECK SIZE: List all decks or portions thereof from Page 2

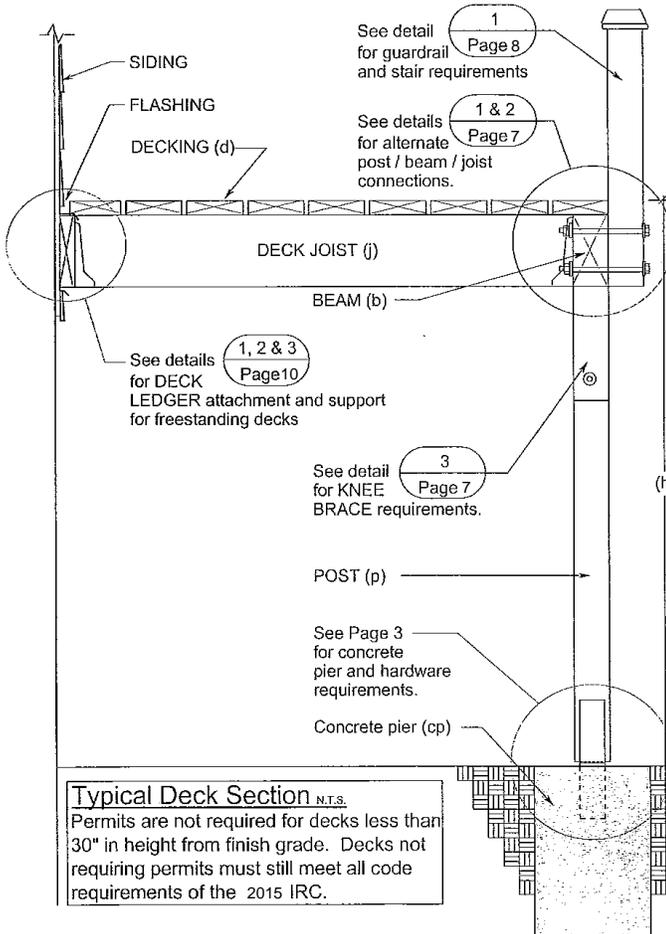
① _____ x _____ = _____ sq.ft.

② _____ x _____ = _____ sq.ft.

③ _____ x _____ = _____ sq.ft.

④ _____ x _____ = _____ sq.ft.

Total Deck Area: _____ sq.ft.



DECK HEIGHT(h): _____
See Post Schedule on Page 3 for allowable height.

DECKING(d): _____

JOIST SIZE(j): _____
See Span Tables on Page 4.

Spacing: _____

Span: _____

BEAM SIZE(b): _____
See Span Tables on Page 4.

Spacing: _____

Span: _____

POST SIZE(p): _____
See Post Schedule on Page 3.

CONCRETE PIERS(cp): _____
See Concrete Pier Schedule on Page 3.

Pier Type: _____

SIZE: _____ "x _____ "deep

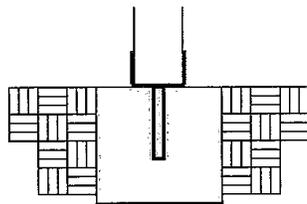
Typical Deck Section N.T.S.
Permits are not required for decks less than 30" in height from finish grade. Decks not requiring permits must still meet all code requirements of the 2015 IRC.

Note: All portions of this handout must be returned as part of your design submittal.

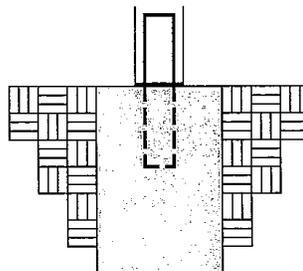
| Deck Post and Concrete Pier Schedule | | | | | | | |
|--------------------------------------|---------------|----------------------|--------------------------|---------------------------|-----------------------------------|--|---|
| Deck Height | Deck Type | Post/Pier Connection | Post Size ⁽¹⁾ | Knee ⁽²⁾ Brace | Post/Pier Hardware ⁽³⁾ | Post/Beam Hardware ⁽³⁾ | Minimum Pier Size ⁽⁵⁾⁽⁶⁾ |
| <30" (permit not required) | Free-standing | Column base Imbedded | 4x4 4x6 | No No | Simpson EPB - | Simpson BC ⁽⁴⁾ Simpson BC ⁽⁴⁾ | 12" x 12" x 12" ⁽⁷⁾ 12" x 12" x 18" |
| | Attached | Column base Imbedded | 4x4 4x6 | No No | Simpson EPB - | Simpson BC ⁽⁴⁾ Simpson BC ⁽⁴⁾ | 12" x 12" x 18" 12" x 12" x 18" |
| 30" - 4'0" | Free-standing | Column base Imbedded | 4x4 4x6 | No No | Simpson EPB - | Simpson BC ⁽⁴⁾ Simpson BC ⁽⁴⁾ | 12" x 12" x 12" ⁽⁷⁾ 12" x 12" x 18" |
| | Attached | Column base Imbedded | 4x4 4x6 | No No | Simpson EPB - | Simpson BC ⁽⁴⁾ Simpson BC ⁽⁴⁾ | 12" x 12" x 18" 12" x 12" x 18" |
| >4'0" - 6'0" | Free-standing | Column base Imbedded | 4x4 4x6 | Yes No | Simpson CB - | Simpson AC Simpson AC | 12" x 12" x 18" 12" x 12" x 18" |
| | Attached | Column base Imbedded | 4x4 4x6 | Yes No | Simpson CB - | Simpson AC Simpson AC | 12" x 12" x 18" 12" x 12" x 18" |
| >6'0" - 8'0" | Free-standing | Column base Imbedded | 4x4 4x6 | Yes No | Simpson CB - | Simpson AC Simpson AC | 18" x 18" x 24" 18" x 18" x 24" |
| | Attached | Column base Imbedded | 4x4 4x6 | Yes No | Simpson CB - | Simpson AC Simpson AC | 18" x 18" x 24" 18" x 18" x 24" |
| >8'0" - 10'0" | Free-standing | Column base Imbedded | 6x6 6x6 | Yes No | Simpson CB - | Simpson AC Simpson AC | 18" x 18" x 24" 18" x 18" x 24" |
| | Attached | Column base Imbedded | 6x6 6x6 | Yes No | Simpson CB - | Simpson AC Simpson AC | 18" x 18" x 24" 18" x 18" x 24" |

Decks Over 10 Feet in Height Done By Design Professional

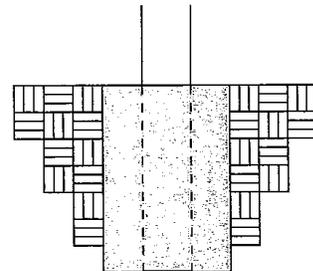
- 1) Minimum nominal postsize required.
- 2) See Detail 3 on Page 6 for knee brace requirements.
- 3) The Simpson hardware listed is required as a minimum or provide equal. All hardware shall be installed with maximum fasteners as per manufacturers specs.
- 4) Additional connection is needed where beam splices occur. This hardware may also be substituted with solid 2x wood gussets.
- 5) Bottom of all frost protected piers must be a minimum of 18" below grade.
- 6) Pier size assumes 2,000 p.s.f. soil bearing pressure.
- 7) These piers are not required to be frost-protected. Precast pier blocks w/saddles may be substituted for these piers



Non-Frost Protected
w/ EPB Column Base⁽¹⁾



Frost-Protected
w/ CB Column Base



Frost-Protected
w/ Post Imbedded

TABLE R507.2

DECK LEDGER CONNECTION TO BAND JOIST^{a, b} (Deck live load = 60 psf, deck dead load = 10 psf, snow load ≤ 60 psf)

| CONNECTION DETAILS | JOIST SPAN | | | | | | |
|--|--------------------------------|------------|--------------------------|--------------|--------------|--------------|--------------|
| | 6' and less | 6'1" to 8' | 8'1" ² to 10' | 10'1" to 12' | 12'1" to 14' | 14'1" to 16' | 16'1" to 18' |
| | On-center spacing of fasteners | | | | | | |
| ½ inch diameter lag screw with ½ inch maximum sheathing ^{c,d} | 22 | 16 | 13 | 11 | 9 | 8 | 7 |
| ½ inch diameter bolt with ½ inch maximum sheathing ^d | 30 | 22 | 18 | 15 | 13 | 11 | 10 |
| ½ inch diameter bolt with 1 inch maximum sheathing ^e | 26 | 19 | 16 | 13 | 11 | 10 | 9 |

For SI: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 pound per square foot = 0.0479 kPa.

- a. Ledgers shall be flashed in accordance with Section R703.4 to prevent water from contacting the house band joist.
- b. Snow load shall not be assumed to act concurrently with live load.
- c. The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- d. Sheathing shall be wood structural panel or solid sawn lumber.
- e. 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 ½-inch of allowable sheathing thickness where combined with wood structural panel or lumber sheathing.

TABLER507.5

DECK JOIST SPANS FOR COMMON LUMBER SPECIES^f (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 | 8-6 | 7-9 | 6-9 | 7-7 | 6-10 | 6-0 |
| | 2 × 8 | 11-2 | 10-2 | 8-11 | 9-10 | 8-11 | 7-9 |
| | 2 × 10 | 14-4 | 13-0 | 10-11 | 15-5 | 13-4 | 10-11 |
| | 2 × 12 | 17-5 | 15-5 | 12-7 | 17-11 | 15-6 | 12-8 |
| Douglas fir-larch ^d , hem-fir ^d spruce-pine-fir ^d | 2 × 6 | 8-1 | 7-0 | 5-9 | 7-5 | 6-9 | 5-9 |
| | 2 × 8 | 10-10 | 9-5 | 7-8 | 9-7 | 8-8 | 7-7 |
| | 2 × 10 | 13-3 | 11-6 | 9-4 | 13-3 | 11-6 | 9-5 |
| | 2 × 12 | 15-4 | 13-4 | 10-10 | 15-5 | 13-4 | 10-11 |
| Redwood, western cedars, ponderosa pine ^e , red pine ^e | 2 × 6 | 7-6 | 6-9 | 5-6 | 6-10 | 6-2 | 5-4 |
| | 2 × 8 | 9-10 | 8-6 | 6-11 | 8-10 | 8-0 | 6-11 |
| | 2 × 10 | 12-0 | 10-5 | 8-6 | 12-1 | 10-6 | 8-7 |
| | 2 × 12 | 13-11 | 12-1 | 9-10 | 14-0 | 12-2 | 9-11 |

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 = 60 psf, dead load = 10 psf, L/Δ = 360.
- c. Ground snow load, live load = 60 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 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.

**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 × 6 | 6-4 | 6-0 | 5-6 | 4-7 | 3-11 | 3-5 | 3-0 |
| | 2 – 2 × 8 | 8-11 | 8-5 | 7-2 | 6-0 | 5-2 | 4-6 | 4-0 |
| | 2 – 2 × 10 | 11-11 | 10-9 | 9-2 | 7-8 | 6-7 | 5-9 | 5-1 |
| | 2 – 2 × 12 | 14-5 | 12-7 | 11-2 | 9-4 | 8-0 | 7-0 | 6-3 |
| | 3 – 2 × 6 | 8-1 | 7-8 | 7-3 | 6-10 | 5-10 | 5-1 | 4-7 |
| | 3 – 2 × 8 | 11-3 | 10-4 | 9-5 | 8-10 | 7-9 | 6-9 | 6-0 |
| | 3 – 2 × 10 | 14-5 | 12-10 | 11-10 | 10-10 | 9-10 | 8-7 | 7-8 |
| | 3 – 2 × 12 | 17-3 | 15-4 | 13-10 | 12-7 | 11-7 | 10-6 | 9-4 |
| Douglas fir-larch ^e , hem-fir ^e , spruce-pine-fir ^e , redwood, western cedars, ponderosa pine ^f , red pine ^f | 3 × 6 or 2 – 2 × 6 | 5-5 | 4-5 | 3-6 | 2-11 | 2-6 | 2-2 | 1-11 |
| | 3 × 8 or 2 – 2 × 8 | 7-3 | 5-9 | 4-8 | 3-10 | 3-4 | 2-11 | 2-7 |
| | 3 × 10 or 2 – 2 × 10 | 8-11 | 7-5 | 5-11 | 4-11 | 4-3 | 3-8 | 3-3 |
| | 3 × 12 or 2 – 2 × 12 | 10-4 | 8-11 | 7-2 | 6-0 | 5-2 | 4-6 | 4-0 |
| | 4 × 6 | 6-3 | 5-11 | 4-11 | 4-1 | 3-6 | 3-1 | 2-9 |
| | 4 × 8 | 8-9 | 7-9 | 6-6 | 5-5 | 4-8 | 4-1 | 3-7 |
| | 4 × 10 | 11-0 | 9-6 | 8-3 | 6-11 | 5-11 | 5-2 | 4-7 |

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DECK BEAM SPAN LENGTHS^{a, b} (ft. - in.) (Continued)

| SPECIES^c | SIZE^d | DECK JOIST SPAN LESS THAN OR EQUAL TO: (feet) | | | | | | |
|----------------------------|-------------------------|--|----------|-----------|-----------|-----------|-----------|-----------|
| | | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| | 4 x 12 | 12-10 | 11-1 | 10-0 | 8-5 | 7-2 | 6-3 | 5-7 |
| | 3 – 2 x 6 | 6-11 | 6-6 | 6-1 | 5-3 | 4-6 | 3-11 | 3-6 |
| | 3 – 2 x 8 | 9-8 | 8-6 | 7-8 | 6-11 | 5-11 | 5-3 | 4-8 |
| | 3 – 2 x 10 | 11-11 | 10-4 | 9-4 | 8-5 | 7-7 | 6-8 | 5-11 |
| | 3 – 2 x 12 | 13-10 | 12-0 | 10-10 | 9-10 | 9-1 | 8-1 | 7-2 |

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.

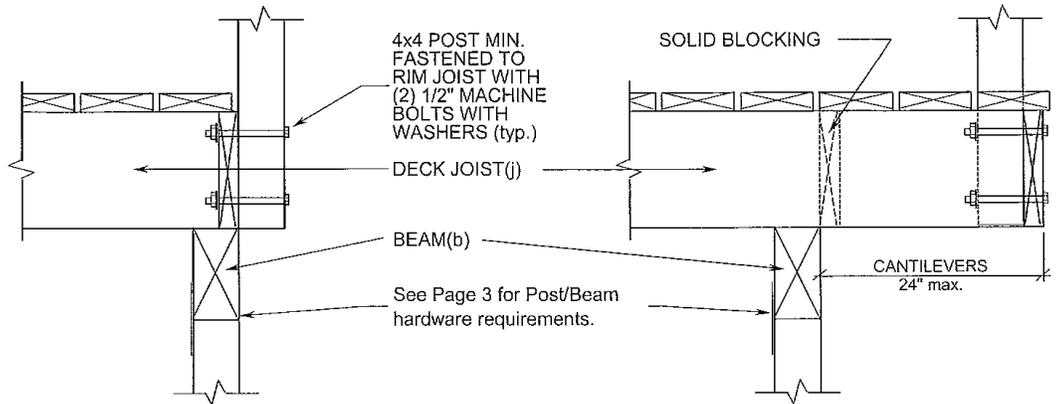
- a. Ground snow load, live load = 60 psf, dead load = 10 psf, L/Δ = 360 at main span, L/Δ = 180 at cantilever with a 220-pound point load applied at the end.
- b. Beams supporting deck joists from one side only.
- c. No. 2 grade, wet service factor.
- d. Beam depth shall be greater than or equal to depth of joists with a flush beam condition.
- e. Includes incising factor.
- f. Northern species. Incising factor not included.

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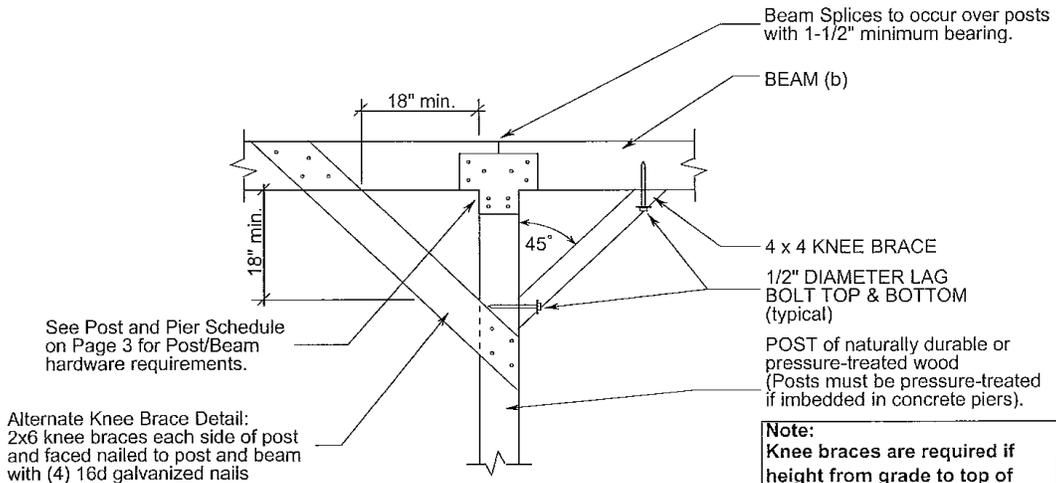
Basic Deck Handout

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1
6 Alternate Joist/Beam and Guardrail Post Connections

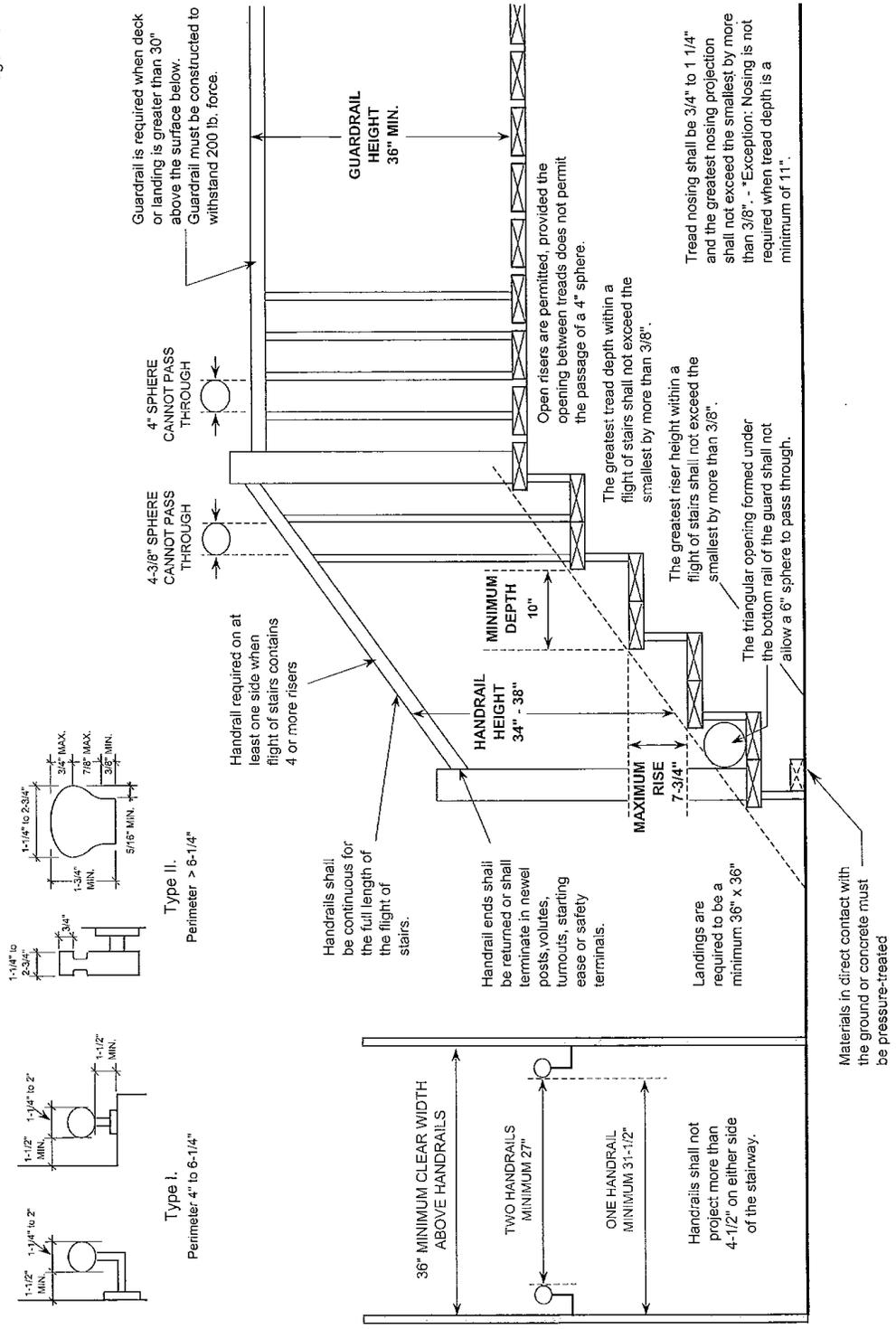
2
6 Alternate Joist/Beam and Guardrail Post Connections



3
6 Post and Knee Brace Detail

When Knee Braces are required on Freestanding decks, they must be installed in both lateral and transverse directions.

Stairs, Handrails and Guardrails Requirements N.T.S.



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TABLE R502.2.2.1
FASTENER SPACING FOR A SOUTHERN PINE OR HEM-FIR DECK LEDGER
AND A 2-INCH NOMINAL SOLID-SAWN SPRUCE-PINE-FIR BAND JOIST^{a, 9}
(Deck live load = 40 psf, deck dead load = 10 psf)

| 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' |
|--|--|------------|-------------|--------------|--------------|--------------|--------------|
| Connection details | On-center spacing of fasteners ^{d, e} | | | | | | |
| 1/2 inch diameter lag screw with 1 5/32 inch maximum sheathing ^a | 30 | 23 | 18 | 15 | 13 | 11 | 10 |
| 1/2 inch diameter bolt with 1 5/32 inch maximum sheathing | 36 | 36 | 34 | 29 | 24 | 21 | 19 |
| 1/2 inch diameter bolt with 1 5/32 inch maximum sheathing and 1/2 inch stacked washers ^{b, h} | 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.

- The tip of the lag screw shall fully extend beyond the inside face of the band joist.
- The maximum gap between the face of the ledger board and face of the wall sheathing shall be 1/2".
- Ledgers shall be flashed to prevent water from contacting the house band joist.
- Lag screws and bolts shall be staggered in accordance with Section R502.2.2.1.1.
- Deck ledger shall be minimum 2x8 pressure-preservative-treated No.2 grade lumber, or other approved materials as established by standard engineering practice.
- When solid-sawn pressure-preservative-treated deck ledgers are attached to a minimum 1 inch thick engineered wood product (structural composite lumber, laminated veneer lumber or wood structural panel band joist), the ledger attachment shall be designed in accordance with accepted engineering practice.
- A minimum 1 x 9/2 Douglas Fir laminated veneer lumber rimboard shall be permitted in lieu of the 2-inch nominal band joist.
- Wood structural panel sheathing, gypsum board sheathing or foam sheathing not exceeding 1 inch in thickness shall be permitted. The maximum distance between the face of the ledger board and the face of the band joist shall be 1 inch.

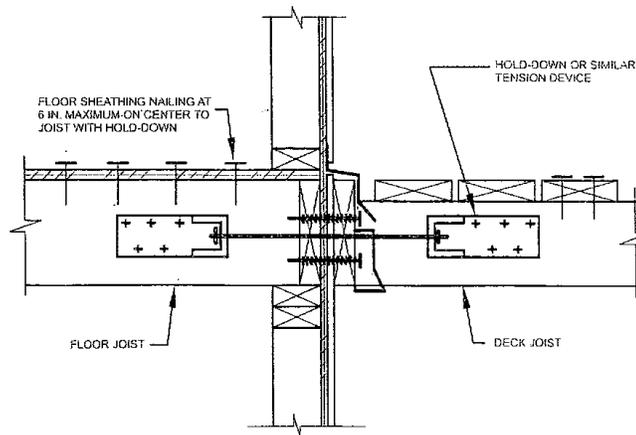


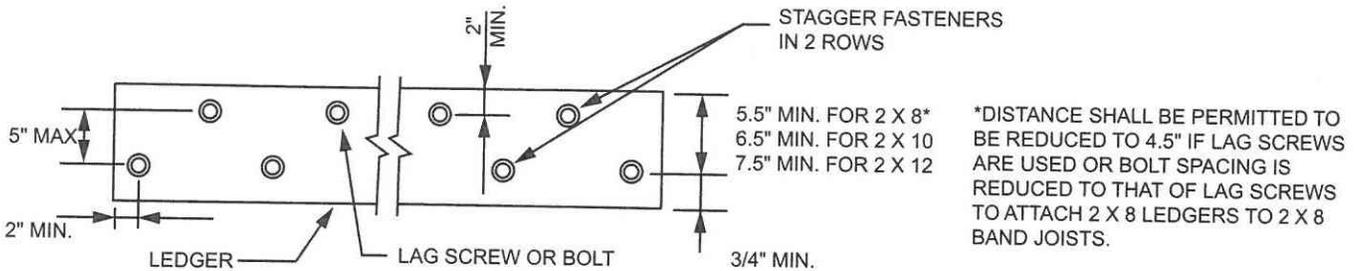
FIGURE 502.2.2.3
DECK ATTACHMENT FOR LATERAL LOADS

**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 ^e | 2 inches ^b | 1 5/8 inches ^b |

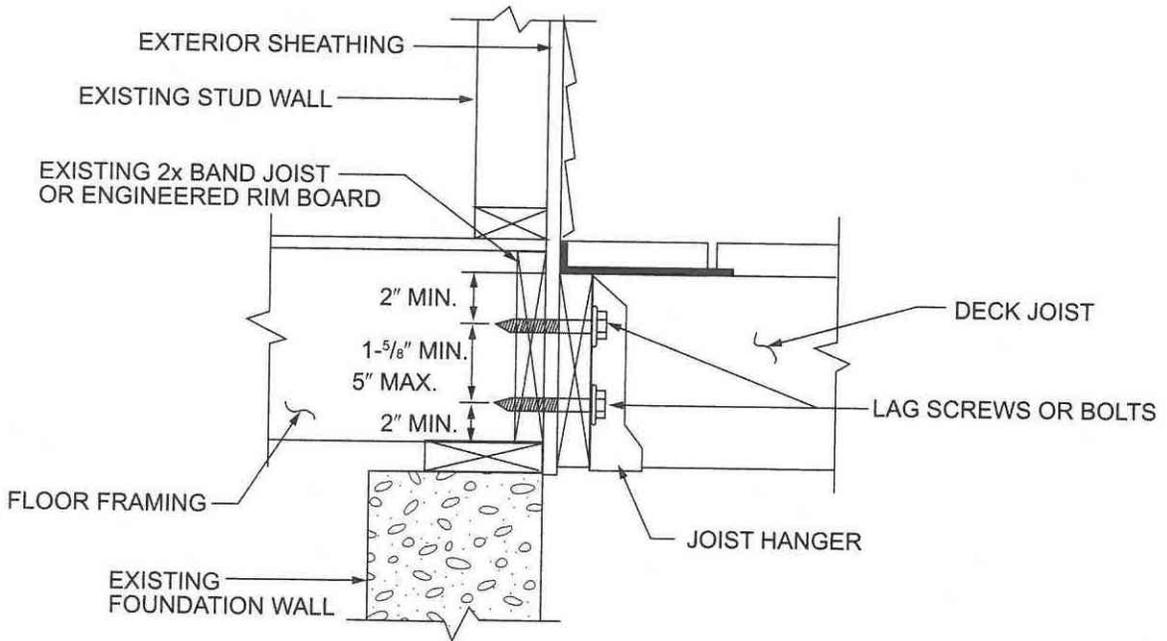
For SI: 1 inch = 25.4 mm

- 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 to the top edge of the ledger shall be in accordance with Figure R507.2.1(1). e. The 2 inches may be reduced to 3/4 inch when the band joist is directly supported by a mudsill, a header or by double top wall plates



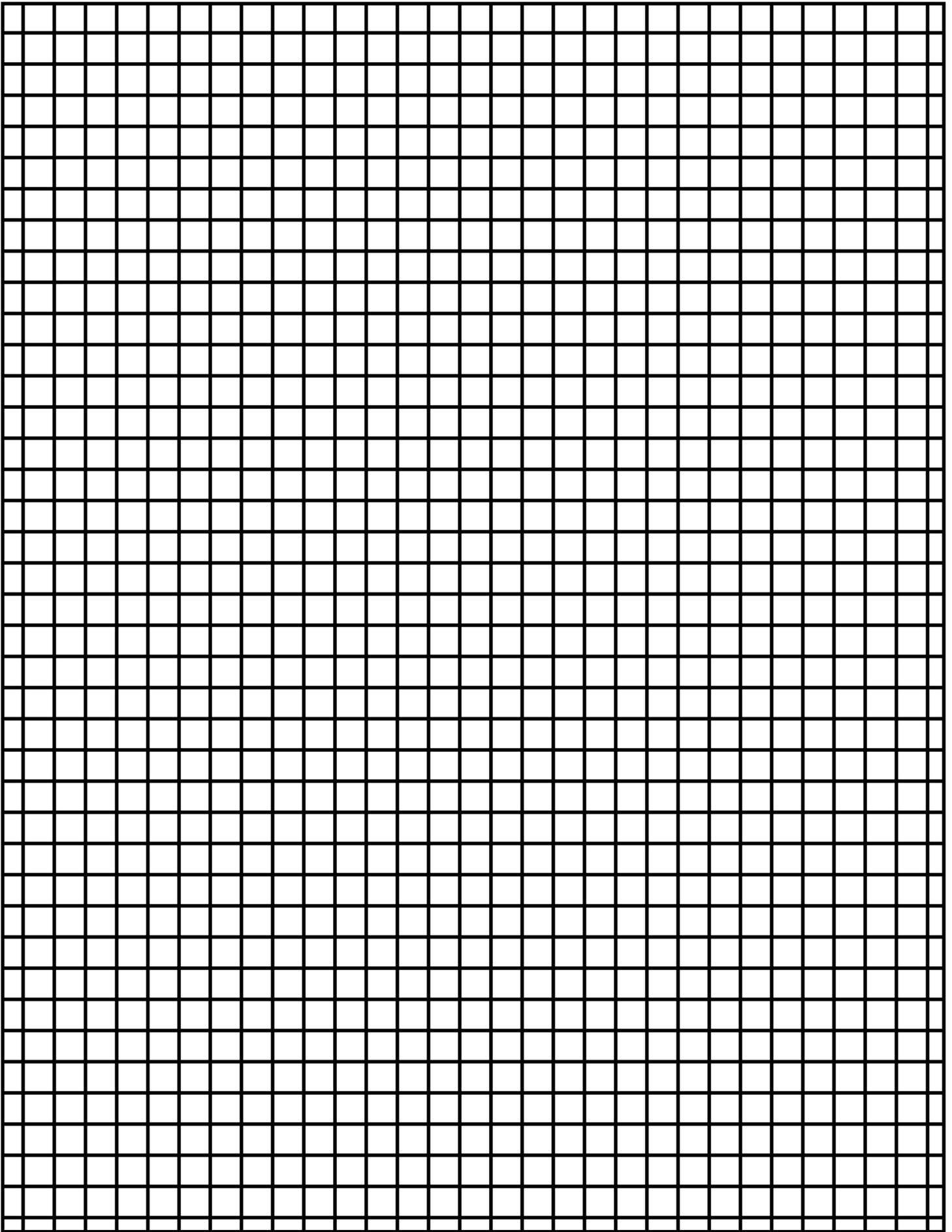
For SI: 1 inch = 25.4 mm.

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



For SI: 1 inch = 25.4 mm.

**FIGURE R507.2.1(2)
PLACEMENT OF LAG SCREWS AND BOLTS IN BAND JOISTS**



Floor Plan of Deck Design Min Scale 1/8" inch = 1 Foot