



Thermal Studs

BARENAKED TSTUD™ CONSTRUCTION MANUAL

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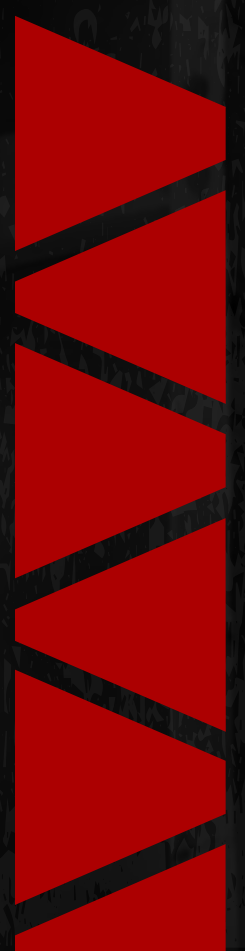


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Product Description

BareNaked Tstud™ is made from two (2) 2x3 or 2x4 No. 2 Spruce Pine Fir (SPF) members and wooden dowels. The overall depths of the BareNaked Tstuds™ are 5½" or 7¼". A flange and spline oriented perpendicular to one another to form an L-shape (see Figure 1 below). The lumber is placed in a form that leaves a gap of approximately 1½" between members. Wooden dowels are installed through one member into the other at opposing angles, forming a web-like pattern. Dowels are spaced evenly at a distance not to exceed 6½" o.c. (2 per 12") and glued in place.

This construction manual should be used in conjunction with ESR-5357 for the US.

Overall Sizes:

- 2 ½" x 5 ½" (2x3 flange and 2x3 spline)
- 2 ½" x 7 ¼" (2x3 flange and 2x4 spline)
- 3 ½" x 7 ¼" (2x4 flange and 2x4 spline)

Lumber:

- Grade: No. 2 SPF
- Member Thickness: 1½" (38 mm)
- Width: 2½" (63 mm) or 3 ½" (89 mm)
- Depth: 5½" (140 mm) or 7¼" (185 mm)
- Max Wall Height: up to 12' (3.7 m) for 5½" and 16' for 7¼" (4.9 m)
- Flange member has dowels entering the wide face
- Spline member has dowels entering the narrow face

Dowels:

- Grade: No. 2 SPF
- Diameter: 11/16" (17.5 mm)

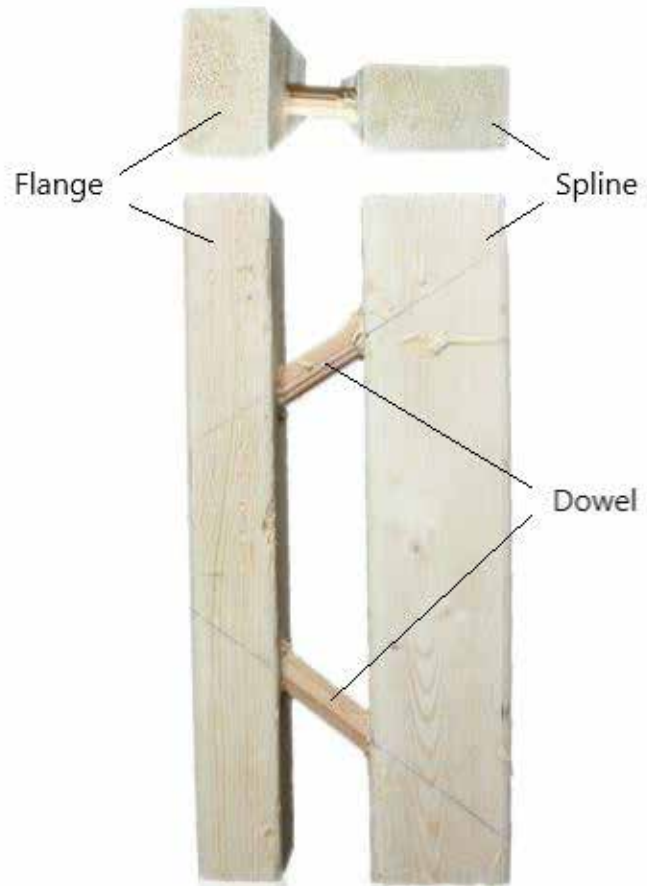


Figure 1. BareNaked Tstud™

Performance Characteristics

- BareNaked Tstud™ is pre-assembled and designed to be used as a direct replacement of solid sawn lumber as wall studs, lower top plate, and bottom plate.
- BareNaked Tstud™ is an alternative to solid sawn 2x4 lumber in all cases and 2x6 lumber in some cases for wall structural members. For use as a 2x6, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment. Design loads shall be checked by a qualified individual and shall not exceed the allowable capacities set forth in Section 5 of ESR-5357.
- Use as jack, trimmer, and cripple studs is permitted.
- Max Wall Height 5.5": 12' and 7.25": 16'

Installation

- A copy of the manufacturer's published installation instructions shall be available at all times on the jobsite during installation.
- Install BareNaked Tstud™ in the same manner as solid sawn lumber, except as noted herein. Note that nails must be driven into each wood member when applicable.

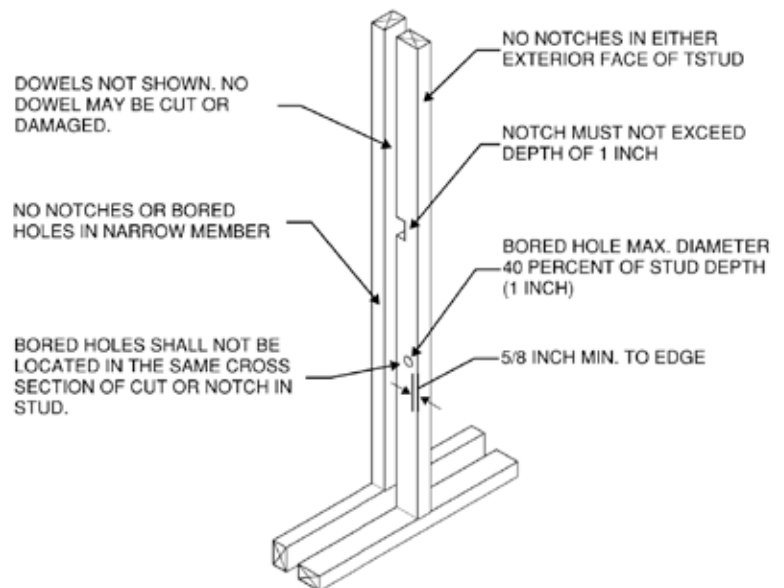
- BareNaked Tstud™ is allowed to be oriented with flange or spline facing the interior of the structure.
- Structural sheathing shall be installed on at least one side of the wall and fastened in accordance with the applicable building code.

Minimum Fastening Requirements

- Fasteners for BareNaked Tstud™ connections shall be distributed in both BareNaked Tstud™ wood members.
- BareNaked Tstud™ used as structural members of a wall shall be fastened as specified in **Table 1 on the next page**.

Cutting and Notching

- BareNaked Tstud™ members may be drilled and notched as indicated in Figure 9.
- A BareNaked Tstud™ can be cross-cut anywhere to make a shorter member but the dowels within a member should not be cut or notched anywhere along the length.
- Bored holes shall not be located in the same cross section of cut or notch in stud. Where multiple notches or holes are made in the same stud, consult an engineer to ensure the structural integrity of the stud is maintained.



Minimum Fastening Requirements

- Fasteners for BareNaked Tstud™ connections shall be distributed in both BareNaked Tstud™ wood members.
- BareNaked Tstud™ used as structural members of a wall shall be fastened as specified in Table 1.

Application	Fastening	Number & Type of Fastener	Installation
Ceiling joists to top plate (toe nail)	Toe Nail	3(4"x0.131)	Fasten two (2) toe nails into interior spline/flange and one (1) toe nail into exterior spline/flange
Rafter or roof truss to plate (toe nail)	Toe Nail	3 (3½" x 0.135")	Two (2) toe nails on one side and 1 toe nail on opposite side of each rafter or truss
		4 (4" x 0.131")	Fasten two (2) toe nails into interior spline/flange and two (2) toe nails into exterior spline/flange
Stud to Stud ⁴	Face Nail Through Spline	2 (3" x 0.131")	Fasten two (2) face nails, one (1) into each spline/flange, spaced 16" o.c.
	Face Nail Through 2x3 Flange	2 (3.5" x 0.131")	
	Face Nail Through 2x4 Flange	2 (4.5" x 0.131")	
Abutting studs at intersecting wall corners	Face Nail Through Spline	(3" x 0.131")	Fasten one (1) face nail into exterior-facing spline/flange, spaced 12" o.c.
	Face Nail Through 2x3 Flange	(3.5" x 0.131")	
	Face Nail Through 2x4 Flange	(4.5" x 0.131")	
Double top plate splice	Face Nail Through Spline	12(3" x 0.131")	Fasten twelve (12) face nails on each side of end joint (minimum 24" lap splice length each side of joint)
	Face Nail Through 2x3 Flange	12(3.5" x 0.131")	
	Face Nail Through 2x4 Flange	12(4.5" x 0.131")	
Stud to plate	Stud to plate	4(4" x 0.131")	Fasten two (2) toe nails into sole plate on each side of the stud (each spline/flange)
Plate to stud	End Nail Into Stud Through Spline or 2x Lumber	3(3" x 0.131")	Fasten two (2) nails into the flange and one (1) into the spline
		2(3.5" x 0.162")	Fasten two (2) nails one (1) into each flange/spline
	End Nail Into Stud Through 2x3 Flange	3(3.5" x 0.131")	Fasten two (2) nails into the flange and one (1) into the spline
		2(3.5" x 0.162")	Fasten two (2) nails one (1) into each flange/spline
	End Nail Into Stud Through 2x4 Flange	3(4.5" x 0.131")	Fasten two (2) nails into the flange and one (1) into the spline
		2(4.5" x 0.162")	Fasten two (2) nails one (1) into each flange/spline
Top plates, laps at corners and intersections (face nail)	Face Nail Through Spline	2(3.5" x 0.162")	Fasten two (2) face nails one (1) into each flange/spline
Rim joist to sill or top plate	Toe Nail	(2.5" x 0.113")	Fasten by toe-nailing, spaced 4" o.c.
		(2.5" x 0.131")	Fasten by toe-nailing, spaced 6" o.c.

SI: 1 in. = 25.4 mm

1. See Figure 1 for spline and flange orientations. Spline and flange sizes vary depending on the stud depth.
2. #6 wood screws are permitted in place of 0.113" diameter nails. #8 wood screws are permitted in place of 0.131" and 0.135" diameter nails. #10 wood screws are permitted in place of 0.162" diameter nails. The screws must be of equal or greater length.
3. Care must be taken to avoid splitting.
4. When used as built-up column for strength, installation must be in accordance with Section 5 of ESR-5357.

Foam Installation

- The gap between BareNaked Tstud™ members provides space for spray insulation to be installed. This allows continuous insulation throughout the wall, unlike typical solid sawn studs which create a break in the insulation. See manufacturer's installation instructions for more information.

Wall Framing

- Walls should start and end with a solid sawn 2x6 (with 5½" BareNaked Tstud™) or 2x8 (with 7¼" BareNaked Tstud™). BareNaked Tstud™ should not be used on the ends of walls or at hold down locations.
- Wall studs can be placed at either 16" or 24" o.c., based on building design load requirements. Figure 3 provides wall top/bottom plate configurations utilizing the BareNaked Tstud™ and dimensional lumber. The wall configurations are listed below.

1. Solid Sawn Top and Bottom Plates with BareNaked Tstud™ (Figure 3: Next Page)

- Typical solid sawn top plates may be used with the BareNaked Tstud™

2. Solid Sawn Top and Bottom Plates with BareNaked Tstud™ (Figure 3: Next Page)

- Studs to be cut to fit the top and bottom plate configuration. **DO NOT CUT DOWELS**
- Top plates must point flange down into wall stud
- Bottom plate must point flange up into wall stud

- Top and bottom plate flanges may be on the interior or exterior side of the wall, as long as the flange points toward the stud.
- Flange and spline of the stud must line up with flange and spline of top and bottom plates respectively (stud spline connected to plate flange not permitted).
- Nail top plates together and top and bottom plates to BareNaked Tstud™ per Table 1 "Top plates, laps at corners, and intersections" and "Plate to Stud" requirements.

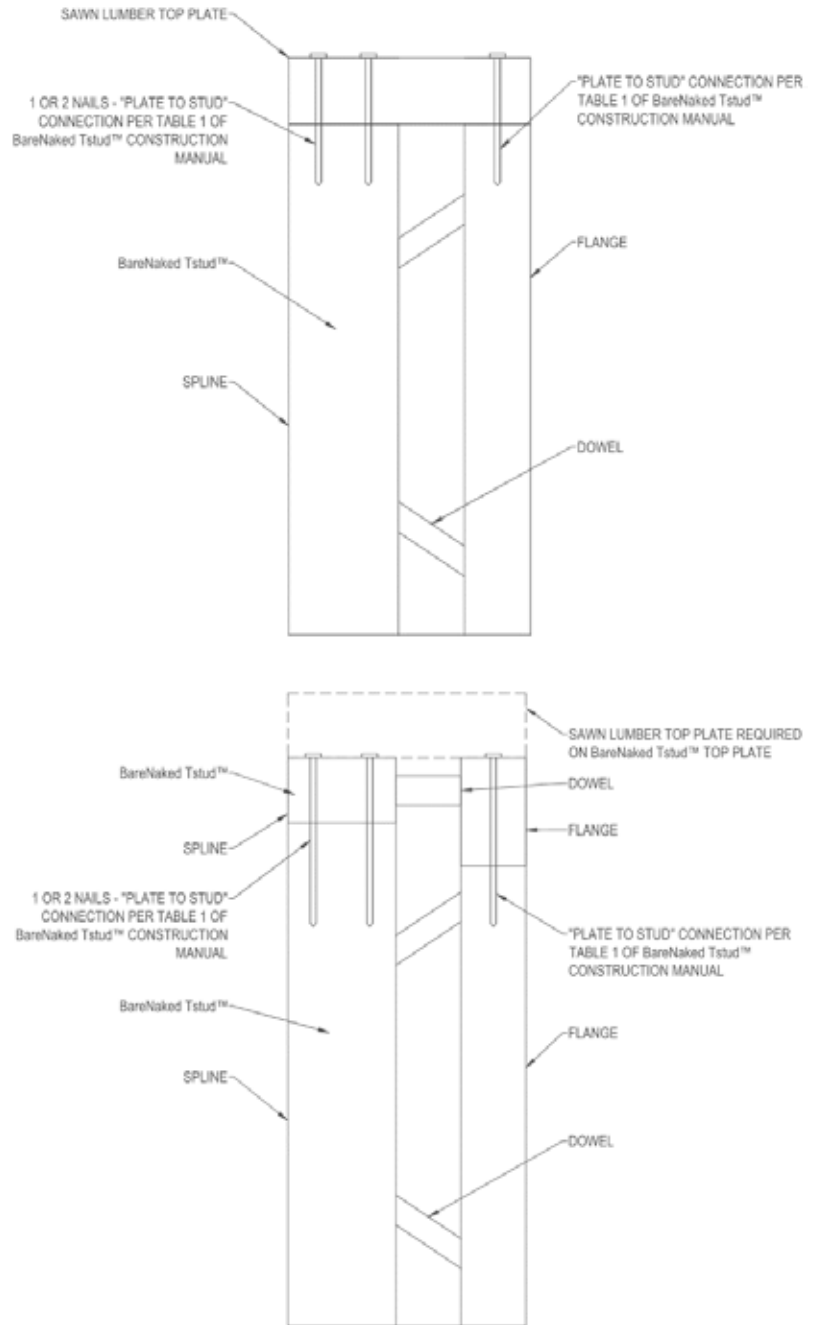


Figure 2: Nailing Solid Sawn Plate and BareNaked Tstud™ Plate to Stud

Drywall Nailers

- At the corner of two walls, a 2x3 or 2x4 can be installed to provide a surface for the drywall to be attached (see Figure 4).

Header Openings

- Lay out jack and king studs and face nail together per “Stud to Stud” connection in Table 1.
- Apply header to jack studs. When a header member rests in the gap of the jack stud, a squash block shall be inserted between the header and jack stud, as shown in Figure 5.
- LVL or LSL squash blocks are recommended as they won't split when nailing, but 2x material is suitable.

Figure 3. BareNaked Tstud™ Top Plate, Bottom Plate, and Stud Configurations

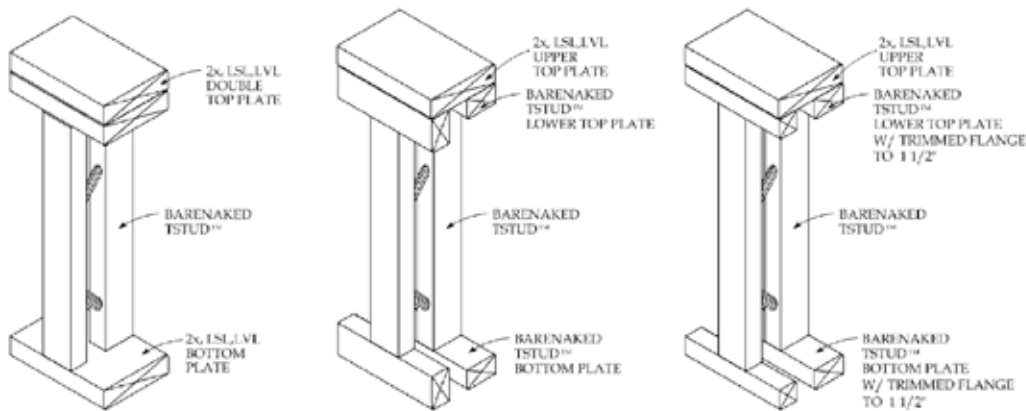


Figure 4. Drywall Nailer in Corner



Figure 5. Squash Block between Header and Jack Stud

Connection Details

Rafter or Roof Truss to Plate (Toe Nail)

- Trusses and rafters having a maximum reaction of 3,665 lbs may be placed anywhere on walls framed with 5.5" BareNaked Tstuds™, and having the following properties:
 - No greater than eleven feet tall
 - Maximum stud spacing of 24" o.c.
 - Top and Bottom plates are Spruce Pine Fir (SPF, #2 or better) 2x6's or 5.5" BareNaked Tstuds™
- Trusses and rafters having a maximum reaction of 4,875 lbs may be placed anywhere on walls framed with 5.5" BareNaked Tstuds™, and having the following properties:
 - No greater than nine feet tall
 - Maximum stud spacing of 24" o.c.
 - Top and Bottom plates are Southern Pine (SYP) 2x6's
- Trusses and rafters having a maximum reaction of 4,400 lbs may be placed anywhere on walls framed with 7.25" BareNaked Tstuds™, and having the following properties:
 - No greater than fourteen feet tall
 - Maximum stud spacing of 24" o.c.
 - Top and Bottom plates are Spruce Pine Fir (SPF, #2 or better) 2x8's or 7.25" BareNaked Tstuds™
- Trusses and rafters having a maximum reaction of 5,850 lbs may be placed anywhere on walls framed with 7.25" BareNaked Tstuds™, and having the following properties:
 - No greater than eleven feet tall
 - Maximum stud spacing of 24" o.c.
 - Top and Bottom plates are (SYP, #2 or better) 2x8's
- For wall assemblies with top and bottom plates of other wood products or species, an engineering design is required.



Thermal Studs

TSTUD™ WINDOW OPENINGS

Window Openings

- When using BareNaked Tstud™ for framing around a window, orient the flange toward the exterior of the structure pointing toward the window. The window will be mounted on the outside of the flange, which will leave about a 1" gap on the interior around the window. This gap is then filled with wood or insulation.
- The flange on the window sill plate will need to be cut to fit. The flat side must be placed down to accommodate the cripple studs below. Figure 6 shows the sill plate of a window connecting to framing around the window using BareNaked Tstud™.

Figure 6. Window Sill to Jack Stud Connection





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TSTUD™ COLUMNS AND HEADERS

Built-Up BareNaked Tstud™ Headers

• BareNaked Tstud™ headers are manufactured by gluing together two BareNaked Tstuds™ to form a box section and filled with foam as shown in Figure 10.

BareNaked Tstuds™ may be used and designed as a header per Section 5 of ESR-5357.

- Allowable loads and span lengths for BareNaked Tstuds™ used as headers can be found in Section 5 of ESR-5357.
- Headers must be built and installed as received by the manufacturer. It is not acceptable to construct headers from BareNaked Tstuds™ in the field.
- Members used for headers are limited to 2 1/2" x 5 1/2" and 2 1/2" x 7 1/4" sizes. The 3 1/2" x 7 1/4" members shall not be used as headers.
- Headers must be placed with the narrow face of the header resting on the wall so that the dowels are oriented in line with the wall (perpendicular to the applied load).
- Where stacked headers are used, headers shall be fastened with 4" x 0.131" nails at 16" o.c. into each side of the header.

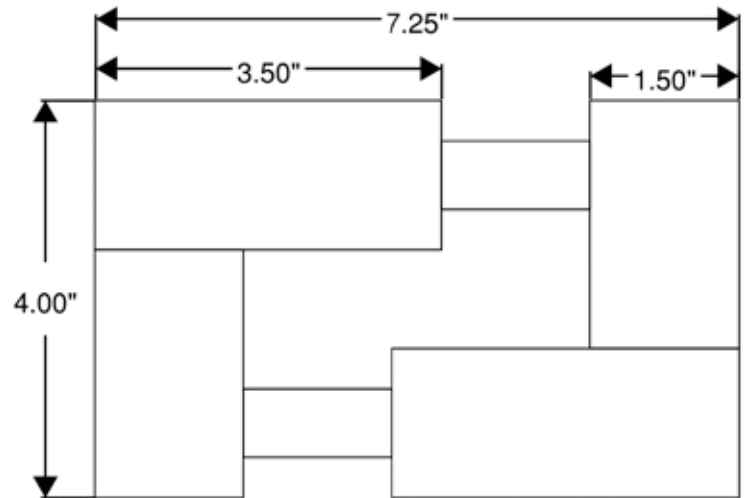
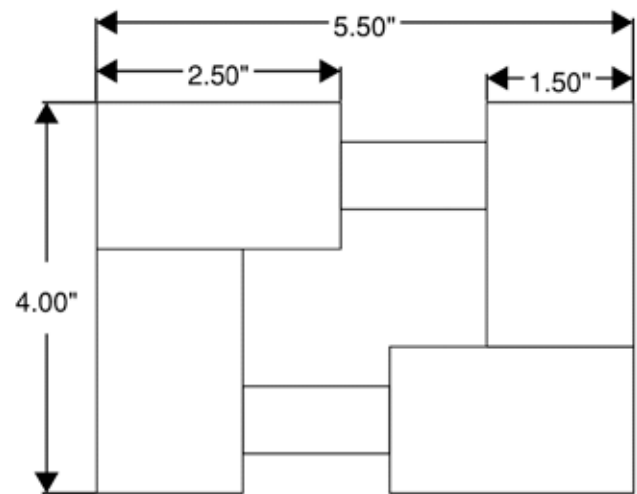


Figure 10. BareNaked Tstud™ Header



Built-Up Member (Face Nail)

- Attach BareNaked Tstuds™ together as shown in Figure 7 and Figure 8. Alternatively screws may be used as stated in Footnote #2 of Table 1

- When used as a built-up column for strength, installation must be in accordance with Section 5 of ESR-5357.

Stud to Bottom Plate

- BareNaked Tstud™ shall only be used as a bottom plate when the wall is attached to wood decking. Fasten each flange of the BareNaked Tstud™ to the wood decking.

- Use treated solid sawn lumber bottom plates where walls are set on concrete.



Figure 7: Built-Up BareNaked Tstud™ Connection with 2x3 Flanges

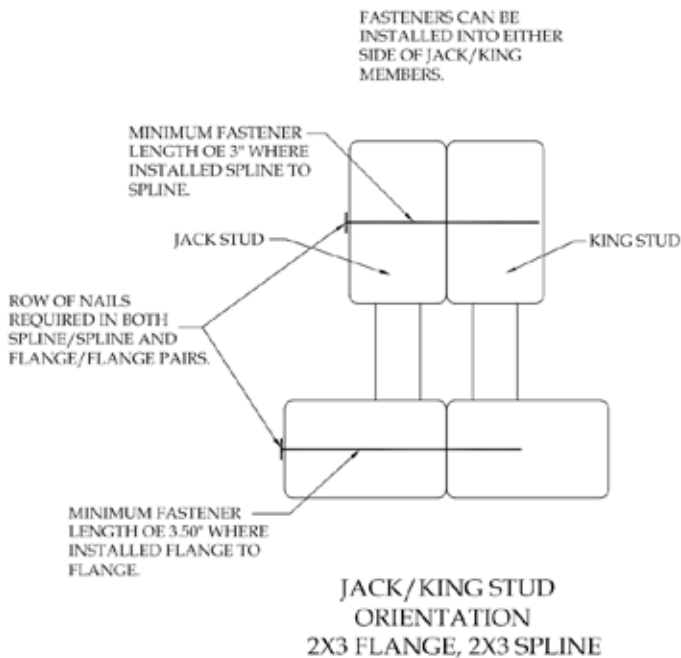


Figure 8: Built-Up BareNaked Tstud™ Connection with 2x4 Flanges

