



CERTIFICATION



Approved. Sealed. Code Compliant.

Technical Evaluation Report

TER 1910-02

Use of SPAX® PowerLag®
#14 x 4¾" & #14 x 6¼" Screws in Wall
Connections: Truss/Rafter/Joist to Wall,
Stud to Plate, and Plate to Rim Board

**Altenloh, Brinck & Company
U.S., Inc.**

Products:

**SPAX® PowerLag® Screws (#14
x 4¾" and #14 x 6¼")**

Issue Date:

June 25, 2020

Revision Date:

August 16, 2021

Subject to Renewal:

July 1, 2022



COMPANY
INFORMATION:

Altenloh, Brinck & Company U.S., Inc.

2105 County Road 12C
Bryan, OH 43506-8301

419-636-6715 or 800-443-9602

www.spax.us

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 00 90 - Wood and Plastic Fastenings

SECTION: 06 05 23 - Wood, Plastic, and Composite Fastenings

1 PRODUCTS EVALUATED¹

- 1.1 SPAX® PowerLag® Screws (#14 x 4¾" and #14 x 6¼")

2 APPLICABLE CODES AND STANDARDS^{2,3}

2.1 Codes

- 2.1.1 *IBC—12, 15, 18: International Building Code®*
2.1.2 *IRC—12, 15, 18: International Residential Code®*

2.2 Standards and Referenced Documents

- 2.2.1 *AISI S904: Standard Test Methods for Determining the Tensile and Shear Strengths of Screws*
2.2.2 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*
2.2.3 *ASTM A153: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*
2.2.4 *ASTM A510: Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel*
2.2.5 *ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus*
2.2.6 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*
2.2.7 *ASTM G85: Standard Practice for Modified Salt Spray (Fog) Testing*

¹ For more information, visit drjcertification.org or call us at 608-310-6748.

² Unless otherwise noted, all references in this TER are from the 2018 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein.

³ All terms defined in the applicable building codes are italicized.

3 PERFORMANCE EVALUATION

- 3.1 #14 x 4³/₄" and #14 x 6¹/₄" fasteners were evaluated as an alternate means of attaching metal plate connected wood trusses, rafters, or floor joists to the tops of walls to provide uplift and lateral load resistance. The fasteners were evaluated under the following conditions:
 - 3.1.1 Shear strength for use as an alternative to toenail connections, hurricane and seismic clips/straps, or nails in shear (lateral) load applications either parallel or perpendicular to wood grain.
 - 3.1.2 Withdrawal strength for use as an alternative to toenail connections, metal hurricane and seismic clips/straps, or nails in tension (uplift) load applications.
 - 3.1.3 Head pull-through strength for use as an alternative to toenail connections, hurricane and seismic clips/straps, or nails in tension (uplift) load applications.
- 3.2 #14 x 4³/₄" and #14 x 6¹/₄" fasteners were evaluated as an alternative means of attaching wall bottom plates to the rim board. The fasteners were evaluated under the following conditions:
 - 3.2.1 Shear strength to resist shear (lateral) loads applied parallel to the bottom plate and rim board.
- 3.3 #14 x 4³/₄" and #14 x 6¹/₄" fasteners were evaluated as an alternative means of attaching wall studs to top and bottom plates. The fasteners were evaluated under the following conditions:
 - 3.3.1 Shear strength for use as an alternative to toenail connections to resist shear (lateral) loads applied perpendicular to the wall.
 - 3.3.2 Withdrawal strength for use as an alternative to toenail connections to resist tension (uplift) loads.
 - 3.3.3 Head pull-through strength of #14 x 4³/₄" and #14 x 6¹/₄" fasteners for use as an alternative to toenail connections to resist tension (uplift) loads.
- 3.4 Connections other than those addressed in Section 3 are outside the scope of this TER.
- 3.5 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.6 Any engineering evaluation conducted for this TER was performed within DrJ's ANAB "accredited ICS code scope" and/or the defined professional engineering scope of work on the dates provided herein.

4 PRODUCT DESCRIPTION AND MATERIALS

- 4.1 The #14 x 4³/₄" and #14 x 6¹/₄" fasteners are a fully-threaded fastener with a cylinder head and a T-30 drive. The point is a threaded tip (Figure 1).

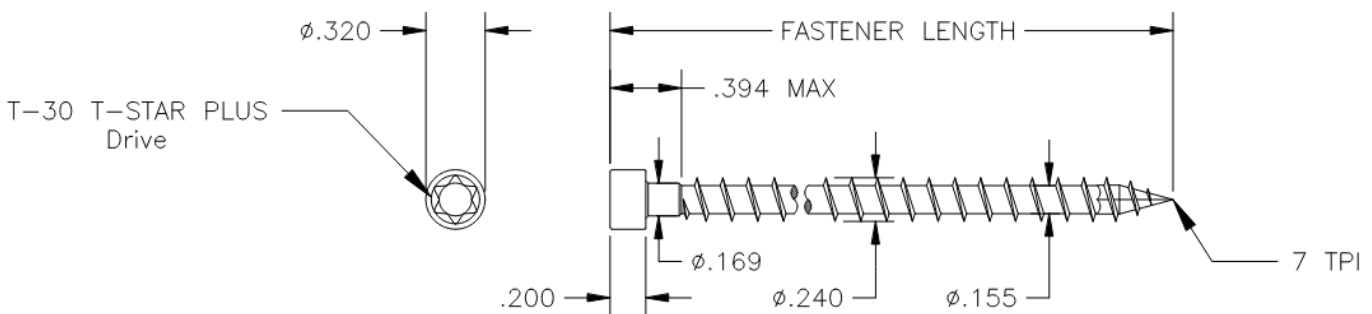


FIGURE 1. #14 X 4³/₄" AND #14 X 6¹/₄" FASTENER

- 4.2 The #14 x 4³/₄" and #14 x 6¹/₄" fasteners are made of hardened carbon steel grade 10B18 wire conforming to ASTM A510, or grade 17MnB3 or 19MnB4 wire conforming to DIN 1654.
- 4.3 The #14 x 4³/₄" and #14 x 6¹/₄" fasteners are manufactured using a standard cold-formed process followed by heat treating and coating processes.

4.4 The specifications for the fastener evaluated in this TER are set forth in Table 1.

TABLE 1. FASTENER SPECIFICATIONS

| Fastener Name | Head (in) | | | | Length (in) | | Diameters (in) | | | Bending Yield Strength ³ , f_{yb} (psi) | Allowable Steel Strength (lb) | |
|---------------------------------------|----------------------------|---------|----------|--------|-----------------------|---------------------|----------------|-------|-------|------------------------------------------------------|-------------------------------|--------------------|
| | Style | Marking | Diameter | Height | Fastener ¹ | Thread ² | Shank | Minor | Major | | Tensile | Shear ⁴ |
| #14 x 4 ³ / ₄ " | T-Star Plus Cylindric Head | None | 0.320 | 0.200 | 4.750 | 4.356 | 0.169 | 0.155 | 0.240 | 160,000 | 990 | 750 |
| #14 x 6 ¹ / ₄ " | | | | | 6.250 | 5.856 | | | | | | |

SI: 1 in. = 25.4 mm, 1 lb. = 4.45 N, 1 psi = 0.00689 MPa

1. Fastener length is measured from the topside of the head to the tip.
2. Thread length includes tapered tip (see Figure 1).
3. Bending yield strength, F_{yb} , is determined in accordance with *ASTM F1575* using minor thread diameter when fastener is tested in threaded section.
4. Shear strength is determined in accordance with *AISI S904* using minor thread diameter when fastener is tested in threaded section.
5. Tabulated fastener dimensions are measured on uncoated fasteners. Finished dimensions are larger due to the proprietary coatings added.

4.5 #14 x 4³/₄" and #14 x 6¹/₄" fasteners are available with a proprietary coating:

- 4.5.1 Interior Grade: Proprietary zinc plate coating that is equivalent to the protection provided by code-approved hot-dipped galvanized coatings meeting *ASTM A153*, Class D (*IBC Section 2304.10.5⁴* and *IRC Section R317.3*).
 - 4.5.1.1 Zinc plate coating is tested and recognized for use in above ground contact pressure-treated lumber (ACQ-D), interior, dry/damp general construction applications (e.g., Above Ground AWPA UC1-UC2 ACQ-D).
 - 4.5.1.2 Zinc plate-coated fasteners are approved for use in fire-retardant-treated (FRT) lumber, provided the conditions set forth by the FRT lumber manufacturer are met, including appropriate strength reductions.

5 APPLICATIONS

- 5.1 #14 x 4³/₄" and #14 x 6¹/₄" fasteners are used in the construction of walls that meet the requirements of *IBC Section 2308* or *IRC Section R602* for the following applications:
 - 5.1.1 To attach minimum 1½ inch-thick wood trusses, rafters, or floor joists to wood walls
 - 5.1.2 To attach wall bottom plates to rim boards in the construction of walls
 - 5.1.3 To attach minimum 1½ inch-thick wood studs to wall top and bottom plates
- 5.2 See Section 5.8, Section 5.9, and Section 5.10 for allowable design loads.
- 5.3 Allowable design loads are applicable to fasteners installed in accordance with Section 6.
- 5.4 Walls shall consist, at a minimum, of a single or double top plate installed in accordance with *IBC Section 2308.5.3.2⁵* or *IRC Section R602.3.2*.
- 5.5 #14 x 4³/₄" and #14 x 6¹/₄" fasteners are used in buildings requiring design in accordance with *IBC Section 1609* or wind analysis in accordance with *IRC Section R301.2.1*.
- 5.6 #14 x 4³/₄" and #14 x 6¹/₄" fasteners are used in buildings requiring design in accordance with *IBC Section 1613* or seismic analysis in accordance with *IRC Section R301.2.2*.
- 5.7 To maintain a continuous uplift load path, connections in the same area must be stacked on the same side of the wall (e.g., rater to top plate connection and top plat to stud connection).

⁴ 2012 *IBC Section 2304.9.5*

⁵ 2012 *IBC Section 2308.9.2.1*

5.8 Allowable Design Loads – Truss/Rafter/Joist to Top Plate Connection

- 5.8.1 Allowable design loads for uplift and lateral resistance for truss, rafter, and joist to top plate connections are provided in Table 2.
- 5.8.2 Loads parallel to the wall are labeled F1 and loads perpendicular to the wall are labeled F2. See Figure 2 for load directions.
- 5.8.3 Allowable design loads are applicable to fasteners installed in accordance with Section 6.6 in single or double top plate applications.

TABLE 2. ALLOWABLE UPLIFT AND LATERAL LOADS FOR FASTENERS IN TRUSS/RAFTER/JOIST TO TOP PLATE CONNECTIONS

| Fastener Length | Min. Penetration into Truss/Rafter/Joist ¹ (in) | Top Plate(s) | Fastener Angle to Vertical ⁷ | Allowable Loads ^{2,3,4,5,6} (lb) | | | | | |
|-----------------|------------------------------------------------------------|------------------|-----------------------------------------|-------------------------------------------|-----|-----|---------------|-----|-----|
| | | | | DF-L/SP (0.50) | | | SPF/HF (0.42) | | |
| | | | | Uplift | F1 | F2 | Uplift | F1 | F2 |
| 4.75 | 2½ | Single | 22.5° | 350 | 285 | 285 | 290 | 240 | 240 |
| | | | 90° | 455 | | | 375 | | |
| 6.25 | | Single or Double | 22.5° | 350 | | | 290 | | |
| | | | 90° | 455 | | | 375 | | |

SI: 1 in. = 25.4 mm, 1 lb. = 4.45 N

1. Wood truss, rafter, or floor joist members shall be a minimum of 2" nominal thickness. Design of truss, rafter, or floor joist is by others.
2. Equivalent specific gravity of structural composite lumber (SCL) shall be equal to or greater than the specific gravities provided in this table. Refer to product information from SCL manufacturer.
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for a specific gravity of 0.42. For wood species with an assigned specific gravity greater than or equal to 0.50, use the tabulated value for specific gravity of 0.50.
4. For applications involving members with different specific gravities, use the allowable load corresponding to the lowest specific gravity.
5. Includes 1.6 duration of load increase for wind and seismic. No further duration of load increases permitted. Reduce design values for other load durations as applicable.
6. See Figure 2 for load directions. See Figure 3 and Figure 4 installation details.
7. Install fastener at an upward angle from the vertical of 20° to 30° (22.5° is optimal) or 90° (See Figure 3 and Figure 4). For installation between 20° and 30°, design values for 22.5° may be used.

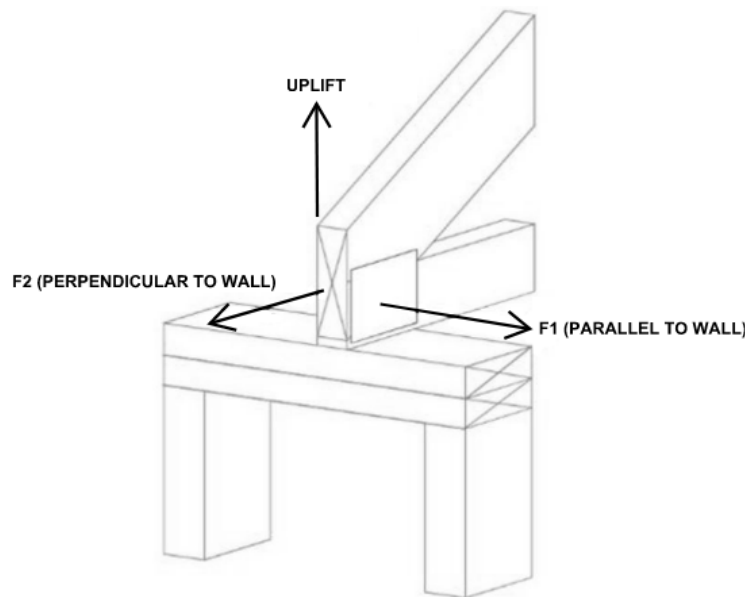


FIGURE 2. UPLIFT AND LATERAL LOAD (F1 AND F2) DIRECTIONS (SINGLE OR DOUBLE TOP PLATE APPLICATIONS)

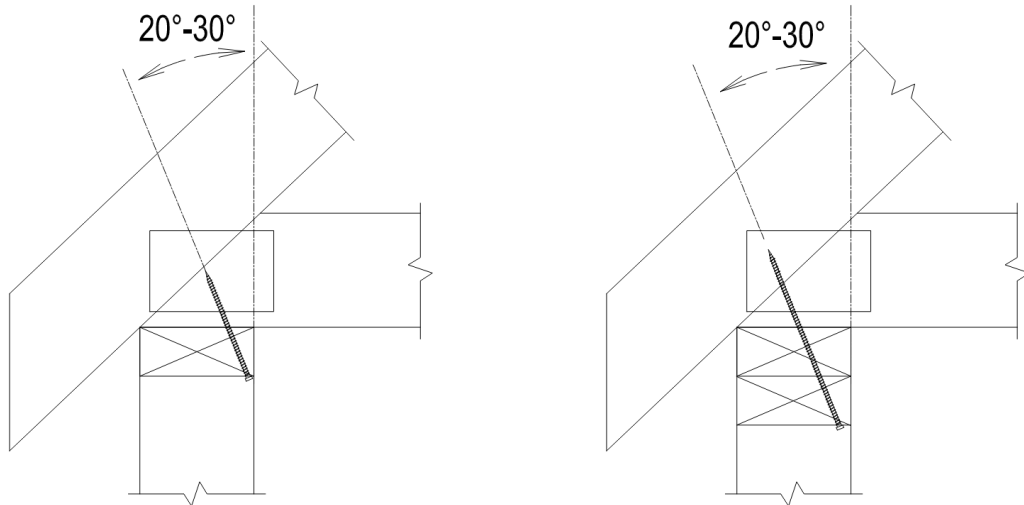


FIGURE 3. INSTALLATION OF FASTENERS AT AN ANGLE IN SINGLE AND DOUBLE TOP PLATE TO TRUSS/RAFTER/JOIST APPLICATIONS

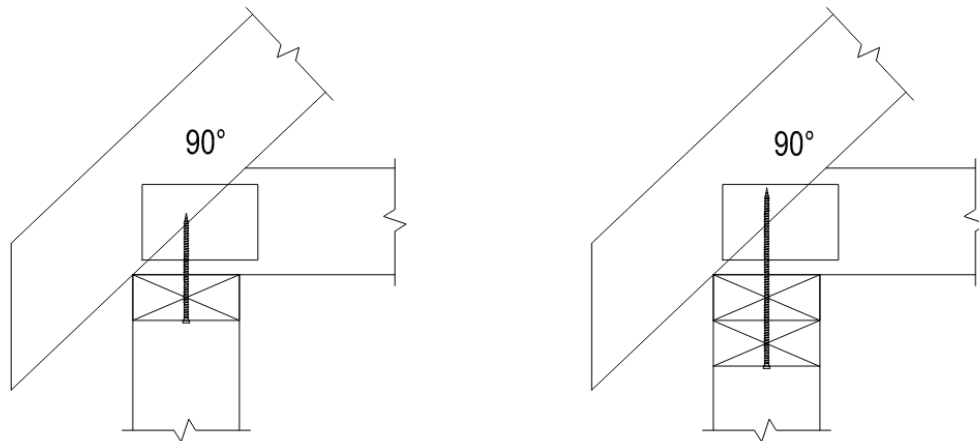


FIGURE 4. INSTALLATION OF FASTENERS PERPENDICULAR IN SINGLE OR DOUBLE TOP PLATE TO TRUSS/RAFTER/JOIST APPLICATIONS

5.9 Allowable Design Loads – Bottom Plate to Rim Board Connection

5.9.1 Allowable design loads for lateral resistance parallel to grain in bottom plate to rim board connections are provided in Table 3. The connection configuration is shown in Figure 5.

5.9.1.1 A wood structural panel (WSP) up to 1 1/8" thick is permitted between the rim board and the bottom plate, so long as it is independently fastened to the rim board per the building code and the minimum 2" screw penetration for the #14 x 4 3/4" and #14 x 6 1/4" is met.

5.9.1.2 Double bottom plates are permitted so long as they are independently fastened per the building code and the minimum 2" screw penetration for the #14 x 4 3/4" and #14 x 6 1/4" is met.

5.9.2 Allowable design loads are applicable to fasteners installed in accordance with Section 6.7.

TABLE 3. ALLOWABLE SHEAR LOADS PARALLEL TO GRAIN FOR BOTTOM PLATE TO RIM BOARD CONNECTIONS

| Fastener Length | Nominal Sole Plate Thickness | Min. Penetration into Rim Board (in) | Allowable Shear Loads, Parallel to Grain (lb) ^{1,2,3} | | | | | | | |
|-----------------|------------------------------|--------------------------------------|----------------------------------------------------------------|---------------|------------------|---------------|----------------|---------------|----------------|---------------|
| | | | Rim Board Species (Specific Gravity) | | | | | | | |
| | | | 2x DF-L/SP (0.50) | | 2x SPF/HF (0.42) | | 1¼" LVL (0.50) | | 1¼" LSL (0.50) | |
| | | | Sole Plate Species (Specific Gravity) | | | | | | | |
| | | | DF-L/SP (0.50) | SPF/HF (0.42) | DF-L/SP (0.50) | SPF/HF (0.42) | DF-L/SP (0.50) | SPF/HF (0.42) | DF-L/SP (0.50) | SPF/HF (0.42) |
| 4.75 | 2x | 2 | 170 | 155 | 155 | 145 | 170 | 155 | 170 | 155 |
| 6.25 | 2x or 3x | | | | | | | | | |

SI: 1 in. = 25.4 mm, 1 lb. = 4.45 N

1. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for a specific gravity of 0.42. For wood species with an assigned specific gravity greater than or equal to 0.50, use the tabulated value for specific gravity of 0.50.
2. For applications involving members with different specific gravities, use the allowable load corresponding to the lowest specific gravity.
3. Tabulated loads are based on a load duration factor of $C_D = 1.00$. Loads may be increased for load duration per NDS.

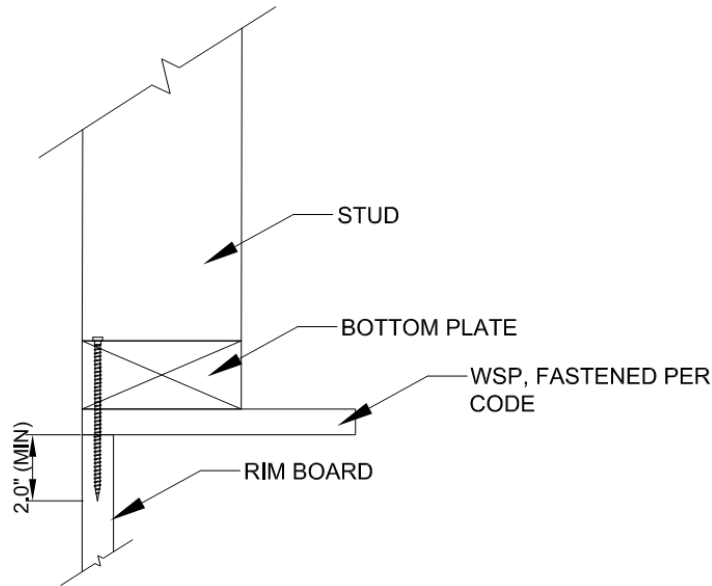


FIGURE 5. FASTENER IN BOTTOM PLATE TO RIM BOARD CONNECTION



5.10 Allowable Design Loads – Stud to Top or Bottom Plate Connection

- 5.10.1 Allowable design loads for uplift and lateral resistance in stud to plate connections for fasteners installed in the wide face and narrow face are provided in Table 4 and Table 5, respectively.
 - 5.10.1.1 Double bottom plates are permitted so long as they are independently fastened per the building code and the minimum 2" screw penetration for the #14 x 4¾" and #14 x 6¼" is met.
- 5.10.2 Installation details for stud to plate connections for fasteners installed in the wide face and narrow face are provided in Figure 6 and Figure 7, respectively.
- 5.10.3 Allowable design loads are applicable to fasteners installed in accordance with Section 6.8 in single or double top plate applications.

TABLE 4. ALLOWABLE DESIGN VALUES FOR STUD TO PLATE CONNECTIONS, FASTENER INSTALLED IN WIDE FACE

| Fastener Length | Number of Fasteners Installed | Nominal Plate Thickness | Allowable Loads ^{1,2,3,4} (lbs) | | | |
|-----------------|-------------------------------|-------------------------|------------------------------------------|---------------------------|---------------|---------------------------|
| | | | DF-L/SP (0.50) | | SPF/HF (0.42) | |
| | | | Uplift | Lateral (F2) ⁵ | Uplift | Lateral (F2) ⁵ |
| 4.75 | 1 | 2x | 260 | 270 | 260 | 210 |
| | 2 | | 520 | 540 | 520 | 420 |
| | 3 | | 780 | 810 | 780 | 630 |
| 6.25 | 1 | 2x | 260 | 285 | 260 | 240 |
| | 2 | | 520 | 570 | 520 | 480 |
| | 3 | | 780 | 860 | 780 | 720 |
| | 1 | Double 2x | 350 | 285 | 290 | 245 |
| | 2 | | 705 | 570 | 580 | 485 |
| | 3 | | 1055 | 860 | 871 | 730 |

SI: 1 in. = 25.4 mm, 1 lb. = 4.45 N

1. Dimensional lumber members shall be a minimum of 2" nominal thickness.
2. Fastener shall be installed at an angle between 20-30 degrees. 22 degrees is optimal (see Figure 6).
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for a specific gravity of 0.42. For wood species with an assigned specific gravity greater than or equal to 0.50, use the tabulated value for specific gravity of 0.50.
4. For applications involving members with different specific gravities, use the allowable load corresponding to the lowest specific gravity.
5. Includes 1.6 duration of load increase for wind and seismic. No further duration of load increases permitted. Reduce design values for other load durations as applicable.
6. The lateral load direction (F2) is perpendicular to the wall.

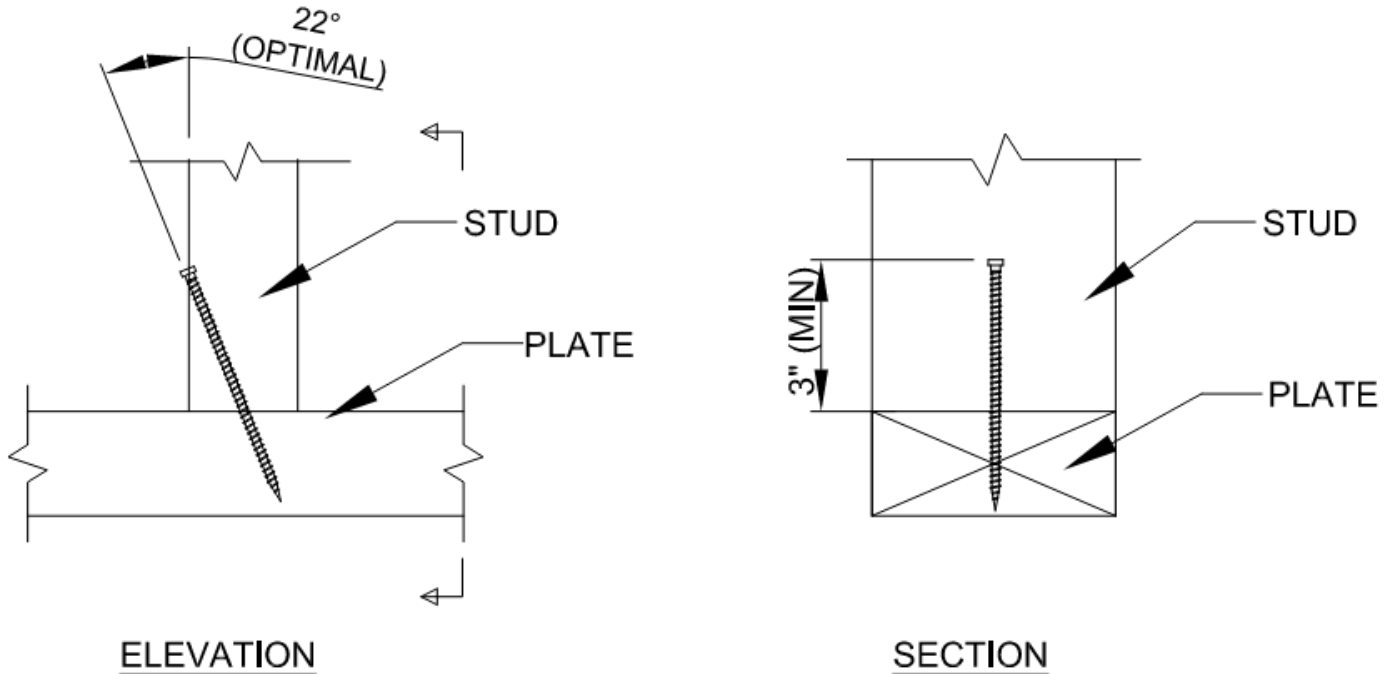


FIGURE 6. ELEVATION AND SECTION VIEWS FOR FASTENER INSTALLED IN WIDE FACE OF STUD

TABLE 5. ALLOWABLE DESIGN VALUES FOR STUD TO PLATE CONNECTIONS, FASTENER INSTALLED IN NARROW FACE

| Fastener Length | Nominal Plate Thickness | Allowable Loads ^{1,2,3,4,5} (lb) | | | |
|-----------------|-------------------------|-------------------------------------------|---------------------------|---------------|---------------------------|
| | | DF-L/SP (0.50) | | SPF/HF (0.42) | |
| | | Uplift | Lateral (F2) ⁶ | Uplift | Lateral (F2) ⁶ |
| 4.75 | 2x | 260 | 270 | 260 | 210 |
| 6.25 | 2x | 260 | 285 | 260 | 240 |
| | Double 2x | 350 | 285 | 290 | 245 |

SI: 1 in. = 25.4 mm, 1 lb. = 4.45 N

1. Dimensional lumber members shall be a minimum of 2" nominal thickness.
2. Fastener shall be installed at an angle between 20-30 degrees. 22 degrees is optimal (see Figure 7).
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for a specific gravity of 0.42. For wood species with an assigned specific gravity greater than or equal to 0.50, use the tabulated value for specific gravity of 0.50.
4. For applications involving members with different specific gravities, use the allowable load corresponding to the lowest specific gravity.
5. Includes 1.6 duration of load increase for wind and seismic. No further duration of load increases permitted. Reduce design values for other load durations as applicable.
6. Limit: one fastener installed in the narrow face of each stud.
7. The lateral load direction (F2) is perpendicular to the wall.

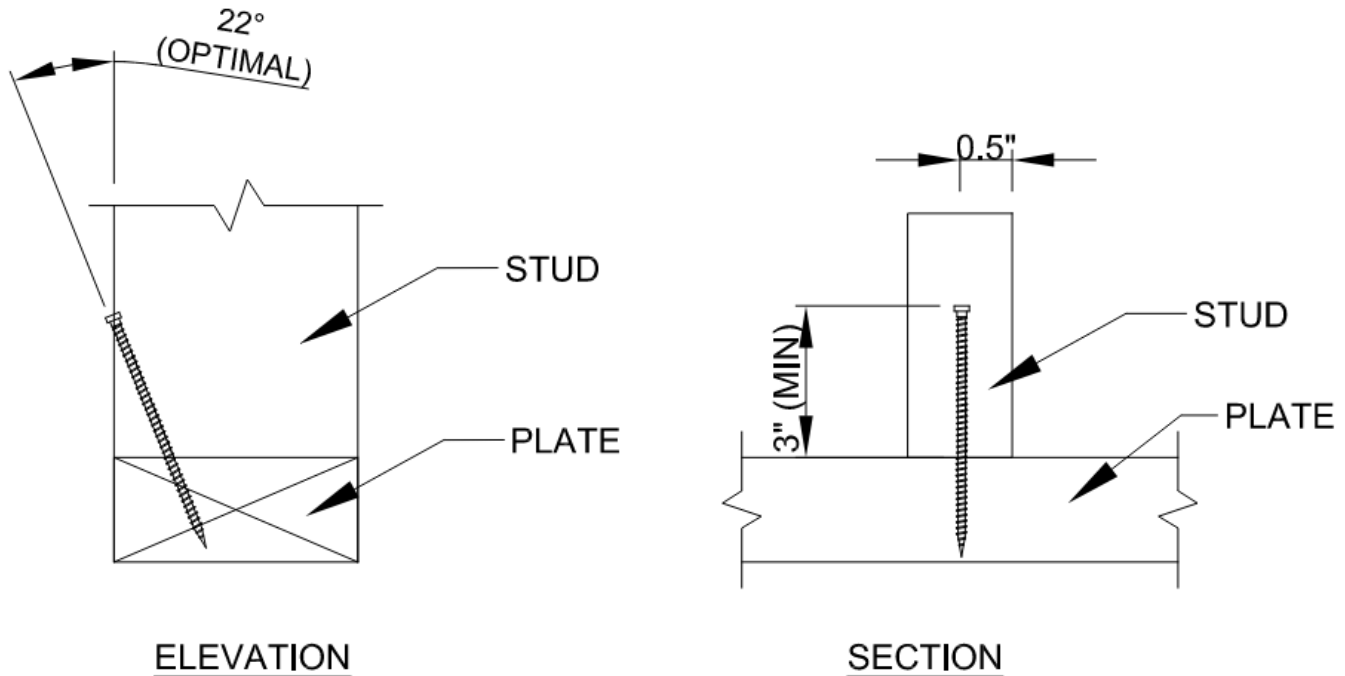


FIGURE 7. ELEVATION AND SECTION VIEWS FOR FASTENER INSTALLED IN NARROW FACE OF STUD

- 5.11 Where it is anticipated that loads will be applied to a single fastener in more than one direction simultaneously, additional evaluation is required to account for the combined effect of the loads using accepted engineering practice.
 - 5.11.1 Consult a professional engineer, as needed, for complex design conditions.
- 5.12 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

6 INSTALLATION

- 6.1 Installation shall comply with the manufacturer's installation instructions and this TER. In the event of a conflict between the manufacturer's installation instructions and this TER, the more restrictive shall govern.
- 6.2 #14 x 4³/₄" and #14 x 6¹/₄" fasteners shall be installed using a T-30 or SPAX® T-30 Plus driver bit.
- 6.3 Fasteners shall not be struck with a hammer during installation.
- 6.4 Lead holes are not required.
- 6.5 The fastener head must be installed flush to the surface of the wood member being connected. The fastener must not be overdriven.
- 6.6 *Truss/Rafter/Joist to Top Plate Connection*
 - 6.6.1 Install #14 x 4³/₄" and #14 x 6¹/₄" fasteners upward through the wall top plates or wood structural framing member at the bottom corner of the top plate(s) and into the center of the wood truss or rafter. The fastener should be installed at an upward angle from the vertical of 20° to 30° (Figure 3) and should penetrate the wood truss, rafter, or joist within 1/4" of the centerline. Fasteners located between studs may be installed at a 90° angle (Figure 4).
 - 6.6.1.1 If the wood truss, rafter, or floor joist is located directly over a top plate splice, offset the fastener 1/4" to one side of the splice. Note that the splice may be in either top plate.
 - 6.6.2 Minimum penetration for truss/rafter/joist to top plate connections is 2.5".

6.6.3 Minimum requirements for fastener spacing, edge distance, and end distance shall be in accordance with Table 6.

TABLE 6. MINIMUM SPACING, EDGE DISTANCE, AND END DISTANCE REQUIREMENTS

| Connection Geometry | Minimum Spacing (in) |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|
| Edge Distance – Load in any direction | 1/2 |
| End Distance – Load parallel to grain, towards end | 2 5/8 |
| End Distance – Load parallel to grain, away from end | 1 3/4 |
| End Distance – Load perpendicular to grain | 1 3/4 |
| Spacing between Fasteners in a Row – Parallel to grain | 2 5/8 |
| Spacing between Fasteners in a Row – Perpendicular to grain | 1 3/4 |
| Spacing between Rows of Fasteners – In-line | 7/8 |
| Spacing between Rows of Fasteners – Staggered | 1/2 |
| SI: 1 in. = 25.4 mm 1. Edge distances, end distances, and spacing of fasteners shall be sufficient to prevent splitting of the wood or as shown in this table, whichever is the more restrictive. 2. Values for "Spacing between Rows of Fasteners – Staggered" apply where the fasteners in adjacent rows are offset by one half of the "Spacing between Fasteners in a Row". 3. For required end distance in stud to plate connections, see Section 6.8.3.1. | |

6.7 *Bottom Plate to Rim Board Connection*

- 6.7.1 Install #14 x 4 3/4" and #14 x 6 1/4" fasteners downward at a 90° angle, a minimum of 1/2" from outside face of wall, through the plate and into the rim board (see Figure 5).
- 6.7.2 Minimum penetration for truss/rafter/joist to top plate connections is 2.0".
- 6.7.3 Minimum requirements for fastener spacing, edge distance, and end distance shall be in accordance with Table 6.

6.8 *Stud to Plate Connection*

- 6.8.1 Install #14 x 4 3/4" and #14 x 6 1/4" fasteners through the stud and into the wall top or bottom plate. The fastener should be installed at an angle from the vertical of 20° to 30° (Figure 6 and Figure 7).
- 6.8.2 Where three fasteners are installed in the wide face of the stud, two fasteners are driven into the same face with a minimum 1 3/4" spacing between them, and the third fastener is driven into the center of the stud (+/-1/8") on the opposite face.
- 6.8.3 Minimum requirements for fastener spacing, edge distance, and end distance shall be in accordance with Table 6, with the following exception:
 - 6.8.3.1 Fasteners shall be located a minimum of 3" from the end of the stud (see Figure 6 and Figure 7).



7 SUBSTANTIATING DATA

- 7.1 Connection design value calculations by DrJ Engineering, LLC in accordance with *NDS* and accepted engineering practice.
- 7.2 Material properties and design values in accordance with TER 1912-07
- 7.3 Information contained herein is the result of testing and/or data analysis by sources which conform to IBC Section 1703 and/or professional engineering regulations. DrJ relies upon accurate data to perform its ISO/IEC 17065 evaluations.
- 7.4 Where appropriate, DrJ's analysis is based on provisions that have been codified into law through state or local adoption of codes and standards. The providers of the codes and standards are legally responsible for their content. DrJ analysis may use code-adopted provisions as a control sample. A control sample versus a test sample establishes a product as being equivalent to that prescribed in this code in quality, strength, effectiveness, fire resistance, durability, and safety. Where the accuracy of the provisions provided herein is reliant upon the published properties of materials, DrJ relies upon the grade mark, grade stamp, mill certificate, and/or test data provided by material suppliers to be minimum properties. DrJ analysis relies upon these properties to be accurate.

8 FINDINGS

- 8.1 When used and installed in accordance with this TER and the manufacturer's installation instructions, the product(s) listed in Section 1.1 are approved for the following:
 - 8.1.1 An acceptable alternative means of attaching metal plate connected wood trusses, or floor joists to the tops of walls to provide uplift and lateral load resistance due to wind and seismic forces as provided in Table 2.
 - 8.1.2 An acceptable alternative means of attaching wall bottom plate to rim board to provide lateral load resistance parallel to the bottom plate as provided in Table 3.
 - 8.1.3 An acceptable alternative means of attaching wall studs to top and bottom plates, for fasteners installed in the wide face or narrow face of the stud, to provide uplift and lateral load resistance due to wind and seismic forces as provided in Table 4 and Table 5.
- 8.2 This product has been evaluated in the context of the codes listed in Section 1.1 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this TER, they are listed here.
 - 8.2.1 No known variations
- 8.3 Building codes require data from valid research reports be obtained from approved sources (i.e., licensed registered design professionals [RDPs]).
 - 8.3.1 Building official approval of a licensed RDP is performed by verifying the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.
- 8.4 Agencies who are accredited through ISO/IEC 17065 have met the code requirements for approval by the building official. DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131 and employs RDPs.
- 8.5 Through ANAB accreditation and the IAF MLA, DrJ certification can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – “certified once, accepted everywhere.”
- 8.6 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.9 are similar) states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code...Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.



9 CONDITIONS OF USE

- 9.1 For conditions not covered in this TER, connections shall be designed in accordance with accepted engineering practice.
- 9.2 Connected wood members must have a moisture content of less than or equal to 19 percent.
- 9.3 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this TER.
- 9.4 Where required by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.
- 9.5 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.6 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (e.g., owner or RDP).
- 9.7 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.8 This product has an internal quality control program and a third-party quality assurance program in accordance with IBC Section 104.4 and Section 110.4 and IRC Section R104.4 and Section R109.2.
- 9.9 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent.
- 9.10 This TER shall be reviewed for code compliance by the AHJ in concert with IBC Section 104.
- 9.11 The implementation of this TER for this product is dependent on the design, quality control, third-party quality assurance, proper implementation of installation instructions, inspections required by IBC Section 110.3, and any other code or regulatory requirements that may apply.

10 IDENTIFICATION

- 10.1 The product(s) listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at www.spax.us.

11 REVIEW SCHEDULE

- 11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.
- 11.2 For information on the current status of this TER, contact DrJ Certification.