



CERTIFICATION



Approved. Sealed. Code Compliant.

Technical Evaluation Report

TER 1912-07

**SPAX® PowerLags® Series Structural
Wood Fasteners Properties**

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

Products:

**SPAX® PowerLags® Series
Structural Wood Fasteners**

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July 27, 2022

Subject to Renewal:

July 1, 2023



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® PowerLags® Series Structural Wood Fasteners

2 APPLICABLE CODES AND STANDARDS^{2,3}

2.1 Codes

- 2.1.1 *IBC—15, 18, 21: International Building Code®*
- 2.1.2 *IRC—15, 18, 21: International Residential Code®*
- 2.1.3 *FBC-B—17, 20: Florida Building Code – Building⁴*
- 2.1.4 *FBC-R—17, 20: Florida Building Code – Residential⁴*
- 2.1.5 *CBC—16, 19: California Building Code (Title 24, Part 2)⁵*
- 2.1.6 *CRC—16, 19: California Residential Code (Title 24, Part 2.5)⁵*
- 2.1.7 *LABC—17, 20: Los Angeles Building Code⁶*
- 2.1.8 *LARC—17, 20: Los Angeles Residential Code⁶*

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*

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 2021 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2018 versions of the referenced codes and the standards referenced therein.

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

⁴ All references to the *FBC-B* and *FBC-R* are the same as the 2018 *IBC* and 2018 *IRC* unless otherwise noted in the Florida Supplement at the end of this TER.

⁵ All references to the *CBC* and *CRC* are the same as the 2018 *IBC* and 2018 *IRC* unless otherwise noted in the California Supplement at the end of this TER.

⁶ All references to the *LABC* and *LARC* are the same as the 2018 *IBC* and 2018 *IRC* unless otherwise noted in the Los Angeles Supplement at the end of this TER.

- 2.2.6 *ASTM D1037: Standard Test Methods for Evaluating Properties of Wood-Base Fiber and Particle Panel Materials*
- 2.2.7 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood*
- 2.2.8 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*
- 2.2.9 *ASTM F606: Standard Test Methods for Determining the Mechanical Properties of Externally and Internally Threaded Fasteners, Washers, Direct Tension Indicators, and Rivets*
- 2.2.10 *ASTM G85: Standard Practice for Modified Salt Spray (Fog) Testing*

3 PERFORMANCE EVALUATION

- 3.1 SPAX® PowerLags® were tested and evaluated to determine their structural resistance properties, which are used to develop reference design values for allowable stress design (ASD). The following properties were evaluated:
 - 3.1.1 Bending yield in accordance with *ASTM F1575*
 - 3.1.2 Tensile strength in accordance with *ASTM F606* and *AISI S904*
 - 3.1.3 Shear strength in accordance with *ASTM F1575* and *AISI S904*
 - 3.1.4 Head pull-through in accordance with *ASTM D1037* and *ASTM D1761*
 - 3.1.5 Withdrawal strength in accordance with *ASTM D1761*
 - 3.1.6 Lateral resistance in accordance with *ASTM D1761* and *NDS*
 - 3.1.7 Corrosion resistance in accordance with *ASTM B117* and *ASTM G85*
- 3.2 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this TER.
- 3.3 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.4 For connection design values for truss/rafter/joist to walls, stud to plate, and plate to rim board connections see [TER 1910-02](#).
- 3.5 Any engineering evaluation conducted for this TER was performed within Dr.J'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 General

- 4.1.1 The SPAX® PowerLags® series structural wood fasteners described in this report are threaded fasteners manufactured using a standard cold-forming process and subsequently heat-treated and coated.
- 4.1.2 The fasteners are available with a variety of coatings, including proprietary coating systems designated as zinc, yellow zinc, HCR™, HCR-X™, and WIROX®.
- 4.1.3 The SPAX® PowerLags® series structural wood fasteners are available in five different diameters and four different head types, and have lengths ranging from 1 to 24 inches (25 to 610 mm), inclusive of the threaded portion. The four head types are as follows:
 - 4.1.3.1 Hex Washer Head design (Figure 1)
 - 4.1.3.2 T-Star Washer Head design with 6-Lobe recess drive system (Figure 2)
 - 4.1.3.3 T-Star Pancake Head design with 6-Lobe recess drive system (Figure 3)
 - 4.1.3.4 T-Star plus Cylindric Head design with 6-Lobe recess drive system containing a post (Figure 4)
- 4.1.4 For fastener diameters, lengths, and head types, see Table 1 for #14, Table 2 for ¼", Table 3 for 5/16", Table 4 for 3/8", and Table 5 for ½" series. All fasteners described in this TER are manufactured with cold-rolled threads and a gimlet point.

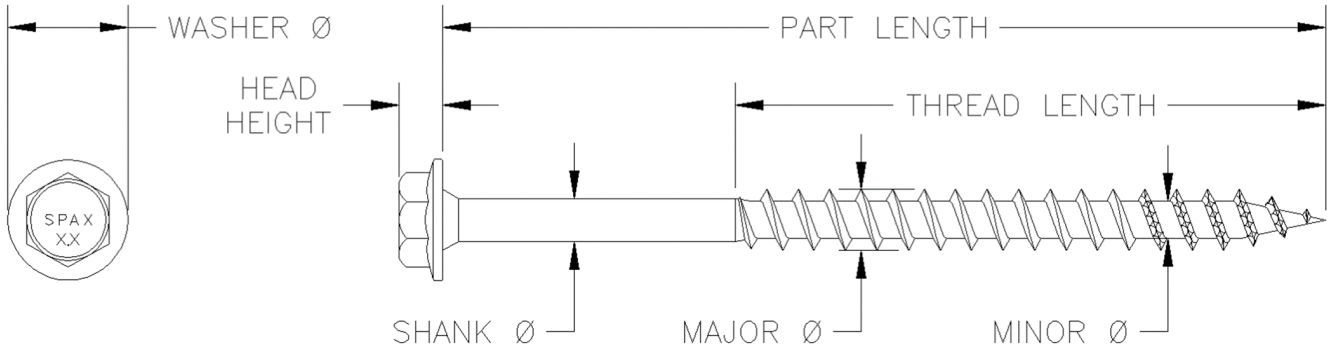


FIGURE 1. SPAX® HEX WASHER HEAD POWERLAGS® FASTENER

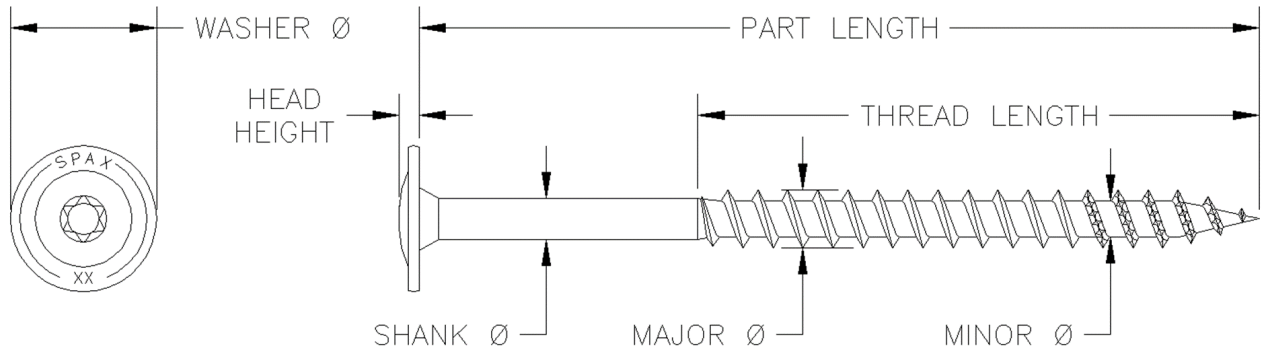


FIGURE 2. SPAX® T-STAR WASHER HEAD POWERLAGS® FASTENER

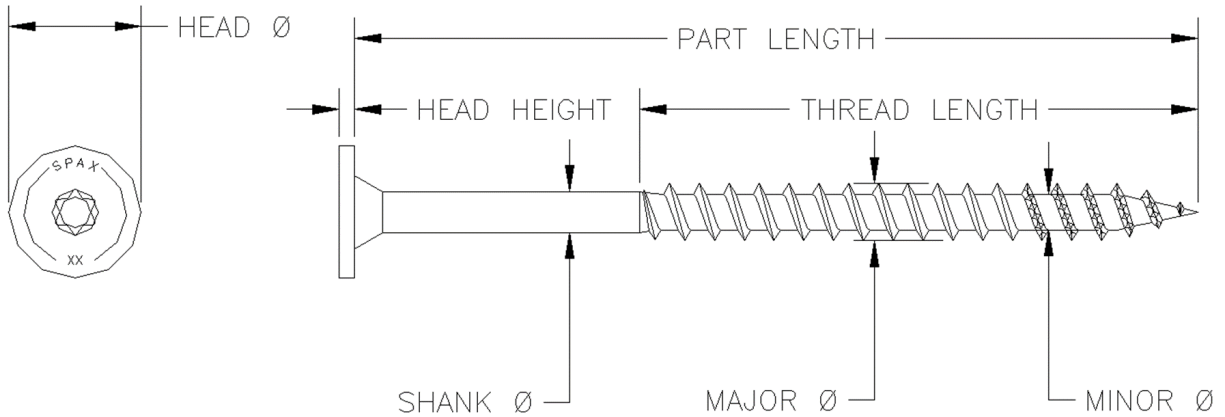


FIGURE 3. SPAX® T-STAR PANCAKE HEAD POWERLAGS® FASTENER

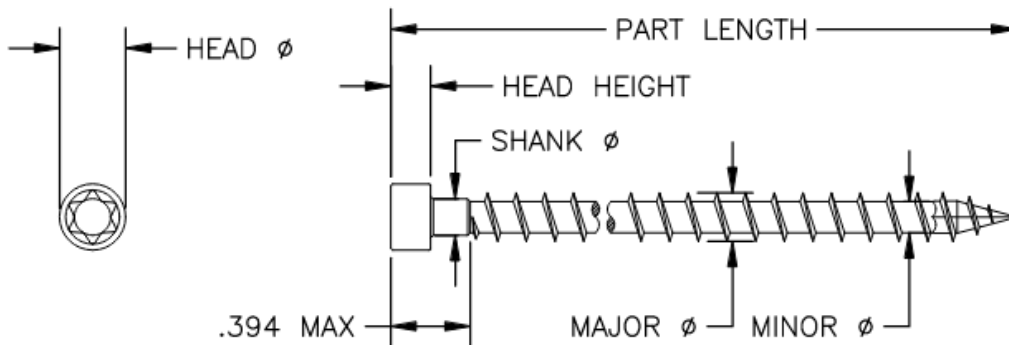


FIGURE 4. SPAX® T-STAR PLUS CYLINDRIC HEAD POWERLAGS® FASTENER

4.2 Fastener Material

- 4.2.1 SPAX® PowerLags® are made of hardened carbon steel grade 10B18, 1022, or 10B21 wire conforming to ASTM A510, or grade 17MnB3 or 19MnB4 wire conforming to DIN 1654.

4.3 Corrosion Resistance

4.3.1 Interior Wood Applications:

- 4.3.1.1 The SPAX® PowerLags® series structural wood fasteners having the proprietary zinc, yellow zinc, and WIROX® coatings are equivalent to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (*IBC Section 2304.10.6*⁷ and *IRC Section R317.3*) when recognized for use in untreated wood and above ground contact pressure treated wood with waterborne alkaline copper quaternary, Type D (ACQ-D), to a maximum retention level of 0.40 pcf (6.4 kg/m³), interior, dry/damp general construction applications (e.g., Above Ground AWWA UC1-UC2 ACQ-D).

4.3.2 Exterior Wood Applications:

- 4.3.2.1 The SPAX® PowerLags® series structural wood fasteners having the proprietary HCR™ and HCR-X™ coatings are equivalent to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (*IBC Section 2304.10.6*⁸ and *IRC Section R317.3*) when recognized for use in untreated wood and ground contact pressure treated wood with waterborne alkaline copper quaternary, Type D (ACQ-D), to a minimum retention level of 0.40 pcf (6.4 kg/m³), exterior, freshwater, general construction applications (e.g., Above Ground AWWA UC1-UC4A ACQ-D).

4.3.3 Fire Retardant Treated (FRT) Wood Applications:

- 4.3.3.1 SPAX® PowerLags® proprietary coating systems designated as zinc, yellow zinc, HCR™, HCR-X™, and WIROX® are recognized for use in FRT lumber, provided the conditions set forth by the FRT lumber manufacturer are met, including appropriate strength reductions.

4.4 Wood Material

- 4.4.1 Wood main and side members must be solid-sawn lumber or boards having an assigned specific gravity as given in the respective tables of this TER. Assigned specific gravity must be determined in accordance with NDS Table 12.3.3A.

- 4.5 The fasteners evaluated in this TER are set forth in Table 1, Table 2, Table 3, Table 4, and Table 5.

⁷ 2018 IBC Section 2304.10.5

⁸ 2018 IBC Section 2304.10.5

TABLE 1. #14 SPAX® POWERLAGS® SERIES FASTENER SPECIFICATIONS⁵

| Fastener Designation | Head | | | | Length (in) | | Diameter (in) | | | Bending Yield Strength ³ , f _{yb} (psi) | Allowable Steel Strength (lbs) | |
|----------------------|----------------------------|--------------------|---------------|-------------|-----------------------|---------------------|---------------|-------|-------|--|--------------------------------|--------------------|
| | Style | Drive System | Diameter (in) | Height (in) | Fastener ¹ | Thread ² | Shank | Minor | Major | | Tensile | Shear ⁴ |
| #14 x 4¾" | T-Star plus Cylindric Head | T-30 6 Lobe Recess | 0.320 | 0.200 | 4¾ | 4.356 | 0.170 | 0.155 | 0.240 | 160,000 | 990 | 750 |
| #14 x 6¼" | | | | | 6¼ | 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 top side of the head to the tip.
2. Thread length includes tapered tip (Figure 4).
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.

TABLE 2. ¼" SPAX® POWERLAGS® SERIES FASTENER SPECIFICATIONS⁵

| Fastener Designation | Head | | | | Length (in) | | Diameter (in) | | | Bending Yield Strength ³ , f _{yb} (psi) | Allowable Steel Strength (lbs) | |
|----------------------|--------------------|--------------------|---------------|-------------|-----------------------|---------------------|---------------|-------|-------|--|--------------------------------|--------------------|
| | Style | Drive System | Diameter (in) | Height (in) | Fastener ¹ | Thread ² | Shank | Minor | Major | | Tensile | Shear ⁴ |
| ¼ x 2" | Hex Washer Head | ¾" Hex Driver | 0.545 | 0.210 | 2 | 1.770 | 0.195 | 0.170 | 0.276 | 158,000 | 1,160 | 995 |
| ¼ x 2½" | | | | | 2½ | 1.375 | | | | | | |
| ¼ x 3" | | | | | 3 | 2.360 | | | | | | |
| ¼ x 3½" | | | | | 3½ | 2.360 | | | | | | |
| All Longer Lengths | | | | | - | 2.375 | | | | | | |
| ¼ x 2" | T-Star Washer Head | T-30 6 Lobe Recess | 0.697 | 0.097 | 2 | 1.375 | 0.195 | 0.170 | 0.276 | 158,000 | 1,160 | 995 |
| ¼ x 2½" | | | | | 2½ | 1.375 | | | | | | |
| ¼ x 3" | | | | | 3 | 1.790 | | | | | | |
| ¼ x 3½" | | | | | 3½ | 1.960 | | | | | | |
| All Longer Lengths | | | | | - | 2.375 | | | | | | |

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

1. Fastener length is measured from the underside of the head to the tip. These screws are manufactured in lengths up to 24 inches. See Table 9 for additional available lengths.
2. Thread length includes tapered tip (see Figure 1 and Figure 2).
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 ASTM F1575 using shank diameter.
5. Tabulated fastener dimensions are measured on uncoated fasteners. Finished dimensions are larger due to the proprietary coatings added.



TABLE 3. 5/16" SPAX® POWERLAGS® SERIES FASTENER SPECIFICATIONS⁵

| Fastener Designation | Head | | | | Length (in) | | Diameter (in) | | | Bending Yield Strength ³ , f _{yb} (psi) | Allowable Steel Strength (lbs) | |
|----------------------|---------------------|--------------------|---------------|-------------|-----------------------|---------------------|---------------|-------|-------|--|--------------------------------|--------------------|
| | Style | Drive System | Diameter (in) | Height (in) | Fastener ¹ | Thread ² | Shank | Minor | Major | | Tensile | Shear ⁴ |
| 5/16 X 2" | Hex Washer Head | 7/16" Hex Driver | 0.591 | 0.248 | 2 | 1.375 | 0.217 | 0.189 | 0.315 | 150,000 | 1,515 | 1,205 |
| 5/16 X 2½" | | | | | 2½ | 1.375 | | | | | | |
| 5/16 X 3" | | | | | 3 | 2.360 | | | | | | |
| 5/16 X 3½" | | | | | 3½ | 2.993 | | | | | | |
| 5/16 X 4" | | | | | 4 | 2.993 | | | | | | |
| All Longer Lengths | | | | | - | 2.375 | | | | | | |
| 5/16 X 2" | T-Star Washer Head | T-40 6 Lobe Recess | 0.776 | 0.140 | 2 | 1.375 | 0.217 | 0.189 | 0.315 | 150,000 | 1,515 | 1,205 |
| 5/16 X 2½" | | | | | 2½ | 1.375 | | | | | | |
| 5/16 X 3" | | | | | 3 | 1.650 | | | | | | |
| 5/16 X 3½" | | | | | 3½ | 2.050 | | | | | | |
| 5/16 X 4" | | | | | 4 | 2.375 | | | | | | |
| All Longer Lengths | | | | | - | 2.375 | | | | | | |
| 5/16 X 2" | T-Star Pancake Head | T-40 6 Lobe Recess | 0.610 | 0.085 | 2 | 1.375 | 0.217 | 0.189 | 0.315 | 150,000 | 1,515 | 1,205 |
| 5/16 X 2½" | | | | | 2½ | 1.375 | | | | | | |
| 5/16 X 3" | | | | | 3 | 1.375 | | | | | | |
| 5/16 X 3½" | | | | | 3½ | 1.375 | | | | | | |
| 5/16 X 4" | | | | | 4 | 2.375 | | | | | | |
| All Longer Lengths | | | | | - | 2.375 | | | | | | |

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

1. Fastener length is measured from the underside of the head to the tip. These screws are manufactured in lengths up to 24 inches. See Table 10 for all available lengths.
2. Thread length includes tapered tip (see Figure 1, Figure 2, and Figure 3).
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 ASTM F1575 using shank diameter.
5. Tabulated fastener dimensions are measured on uncoated fasteners. Finished dimensions are larger due to the proprietary coatings added.

TABLE 4. 3/8" SPAX® POWERLAGS® SERIES FASTENER SPECIFICATIONS⁵

| Fastener Designation | Head | | | | Length (in) | | Diameter (in) | | | Bending Yield Strength ³ , f _{yb} (psi) | Allowable Steel Strength (lbs) | |
|----------------------|--------------------|--------------------|---------------|-------------|-----------------------|---------------------|---------------|-------|-------|--|--------------------------------|--------------------|
| | Style | Drive System | Diameter (in) | Height (in) | Fastener ¹ | Thread ² | Shank | Minor | Major | | Tensile | Shear ⁴ |
| 3/8 x 4" | Hex Washer Head | 1/2" Hex Driver | 0.748 | 0.307 | 4 | 2.375 | 0.270 | 0.236 | 0.394 | 144,000 | 2,430 | 1,855 |
| 3/8 x 4 1/2" | | | | | 4 1/2 | 2.375 | | | | | | |
| All Longer Lengths | | | | | - | 3.105 | | | | | | |
| 3/8 x 4" | T-Star Washer Head | T-40 6 Lobe Recess | 0.970 | 0.173 | 4 | 2.375 | 0.270 | 0.236 | 0.394 | 144,000 | 2,430 | 1,855 |
| 3/8 x 4 1/2" | | | | | 4 1/2 | 2.375 | | | | | | |
| All Longer Lengths | | | | | - | 3.105 | | | | | | |

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

1. Fastener length is measured from the underside of the head to the tip. These screws are manufactured in lengths up to 18 inches. See Table 11 for all available lengths.
2. Thread length includes tapered tip (see Figure 1 and Figure 2).
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 ASTM F1575 using shank diameter.
5. Tabulated fastener dimensions are measured on uncoated fasteners. Finished dimensions are larger due to the proprietary coatings added.

TABLE 5. 1/2" SPAX® POWERLAGS® SERIES FASTENER SPECIFICATIONS

| Fastener Designation | Head | | | | Length (in) | | Diameter (in) | | | Bending Yield Strength ³ , f _{yb} (psi) | Allowable Steel Strength (lbs) | |
|----------------------|-----------------|-----------------|---------------|-------------|-----------------------|---------------------|---------------|-------|-------|--|--------------------------------|--------------------|
| | Style | Drive System | Diameter (in) | Height (in) | Fastener ¹ | Thread ² | Shank | Minor | Major | | Tensile | Shear ⁴ |
| 1/2" x All Lengths | Hex Washer Head | 5/8" Hex Driver | 0.858 | 0.394 | - | 3.150 | 0.335 | 0.295 | 0.480 | 166,000 | 3,415 | 3,245 |

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

1. Fastener length is measured from the underside of the head to the tip. These screws are manufactured in lengths from 4 inches to 12 inches. See Table 12 for all available lengths.
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 ASTM F1575 using shank diameter.
5. Tabulated fastener dimensions are measured on uncoated fasteners. Finished dimensions are larger due to the proprietary coatings added.

5 APPLICATIONS

- 5.1 SPAX® PowerLags® are used to attach wood framing members in conventional light-frame construction and provide resistance against head pull-through, withdrawal, and shear loads.
- 5.2 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.
- 5.3 *Design*
 - 5.3.1 Design of SPAX® PowerLags® is governed by the applicable code and the provisions for dowel-type fasteners in NDS.
 - 5.3.2 Unless otherwise noted, adjustment of the design stresses for duration of load shall be in accordance with the applicable code.



5.4 Head Pull-Through Design Values

5.4.1 Reference design values for head pull-through for SPAX® PowerLags® are specified in Table 6.

TABLE 6. REFERENCE PULL-THROUGH DESIGN VALUES (P) FOR SPAX® POWERLAGS®

| Fastener Series | Head Style | Pull-Through Design Value ^{1,2} , P (lbf) | | |
|------------------------|----------------------------|--|-------------|---------------|
| | | Wood Species (Specific Gravity ³) | | |
| | | SP (0.55) | DF-L (0.50) | SPF/HF (0.42) |
| #14 SPAX® PowerLags® | T-Star plus Cylindric Head | 285 | 285 | 235 |
| ¼" SPAX® PowerLags® | Hex Washer Head | 700 | 640 | 455 |
| | T-Star Washer Head | 850 | 785 | 585 |
| 5/16" SPAX® PowerLags® | Hex Washer Head | 755 | 680 | 500 |
| | T-Star Washer Head | 965 | 840 | 665 |
| | T-Star Pancake Head | 810 | 735 | 560 |
| ¾" SPAX® PowerLags® | Hex Washer Head | 985 | 825 | 575 |
| | T-Star Washer Head | 1245 | 1085 | 880 |
| ½" SPAX® PowerLags® | Hex Washer Head | 1185 | 970 | 865 |

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

- Minimum 1.5" wood member thickness
- Tabulated pull-through values shall be adjusted by all applicable adjustment factors per *NDS* Table 11.3.1.
- For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity (SG) of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.

5.5 Reference Withdrawal Design Values in Face Grain Applications

5.5.1 Reference withdrawal design values for SPAX® PowerLags® fasteners are specified in Table 7.

TABLE 7. REFERENCE WITHDRAWAL DESIGN VALUES (W) FOR SPAX® POWERLAGS® FASTENERS IN FACE GRAIN

| Fastener Series | Head Style | Reference Withdrawal Design Values ^{1,2} , W (lbf/in) | | |
|----------------------|----------------------------|--|-------------|---------------|
| | | Wood Species (Specific Gravity ³) | | |
| | | SP (0.55) | DF-L (0.50) | SPF/HF (0.42) |
| #14 SPAX® PowerLags® | T-Star plus Cylindric Head | 205 | 130 | 130 |
| ¼" SPAX® PowerLags® | Hex Washer Head | 375 | 310 | 245 |
| | T-Star Washer Head | | | |
| ⅝" SPAX® PowerLags® | Hex Washer Head | 415 | 300 | 250 |
| | T-Star Washer Head | | | |
| | T-Star Pancake Head | | | |
| ⅜" SPAX® PowerLags® | Hex Washer Head | 465 | 300 | 280 |
| | T-Star Washer Head | | | |
| ½" SPAX® PowerLags® | Hex Washer Head | 445 | 275 | 275 |

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 lb/ft = 0.0146 kN/m

1. Tabulated withdrawal values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
2. Full withdrawal strength is calculated by multiplying the length of thread embedded in the main member by the tabulated reference withdrawal values.
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.

5.6 Lateral Design Values

5.6.1 Reference lateral design values for shear load parallel and perpendicular to grain for SPAX® PowerLags® fasteners are specified in Table 8, Table 9, Table 10, Table 11, and Table 12.

TABLE 8. #14 SPAX® POWERLAGS® FASTENER LATERAL DESIGN VALUES

| Fastener Designation | Minimum Main Member Penetration ¹ (in) | Minimum Side Member Thickness (in) | Reference Lateral Shear Value ^{4,5,6} , Z (lbf) | | | | | |
|----------------------|---|------------------------------------|--|----------------|-----------------|----------------|-----------------|----------------|
| | | | Wood Species (Specific Gravity ^{2,3}) | | | | | |
| | | | SP (0.55) | | DF-L (0.50) | | SPF/HF (0.42) | |
| | | | Z | Z _⊥ | Z | Z _⊥ | Z | Z _⊥ |
| #14 x 4¾" | 1.5 | 1.5 | 185 | 185 | 170 | 170 | 145 | 145 |
| #14 x 6¼" | | | | | | | | |

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

1. Penetration depth includes the length of tapered tip.
2. The species applies to both the main and side members. Where the members are different specific gravities, use the lower of the two.
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.
4. The fastener shall be oriented perpendicular to grain, and the underside of the fastener head shall be installed flush with the surface of the side member.
5. Z_⊥ = Lateral Design Values Perpendicular to Grain, Z_{||} = Lateral Design Values Parallel to Grain.
6. Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.

TABLE 9. 1/4" SPAX® POWERLAGS® FASTENER LATERAL DESIGN VALUES

| Fastener Designation | Minimum Main Member Penetration ¹ (in) | Minimum Side Member Thickness (in) | Reference Lateral Shear Value ^{4,5,6} , Z (lbf) | | | | | |
|----------------------|---|------------------------------------|--|----------------|-----------------|----------------|-----------------|----------------|
| | | | Wood Species (Specific Gravity ^{2,3}) | | | | | |
| | | | SP (0.55) | | DF-L (0.50) | | SPF/HF (0.42) | |
| | | | Z | Z _⊥ | Z | Z _⊥ | Z | Z _⊥ |
| 1/4 x 2" | 1.375 | 0.625 | 305 | 285 | 265 | 235 | 250 | 225 |
| 1/4 x 2 1/2" | | | | | | | | |
| 1/4 x 3" | | | | | | | | |
| 1/4 x 3 1/2" | 2.375 | 1.5 | 390 | 370 | 360 | 340 | 315 | 285 |
| 1/4 x 4" | | | | | | | | |
| 1/4 x 4 1/2" | 2.375 | 1.5 | 400 | 370 | 360 | 335 | 350 | 310 |
| 1/4 x 5" | | | | | | | | |
| 1/4 x 5 1/2" | | | | | | | | |
| 1/4 x 6" | | | | | | | | |
| 1/4 x 6 1/2" | | | | | | | | |
| 1/4 x 7" | | | | | | | | |
| 1/4 x 7 1/2" | | | | | | | | |
| 1/4 x 8" | | | | | | | | |
| 1/4 x 8 1/2" | | | | | | | | |
| 1/4 x 9" | | | | | | | | |
| 1/4 x 10" | | | | | | | | |
| 1/4 x 11" | | | | | | | | |
| 1/4 x 12" | | | | | | | | |
| 1/4 x 13" | | | | | | | | |
| 1/4 x 14" | | | | | | | | |
| 1/4 x 15" | | | | | | | | |
| 1/4 x 16" | | | | | | | | |
| 1/4 x 18" | | | | | | | | |
| 1/4 x 20" | | | | | | | | |
| 1/4 x 22" | | | | | | | | |
| 1/4 x 24" | | | | | | | | |

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

1. Penetration depth includes the length of tapered tip.
2. The species applies to both the main and side members. Where the members are different specific gravities, use the lower of the two.
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.
4. The fastener shall be oriented perpendicular to grain, and the underside of the fastener head shall be installed flush with the surface of the side member.
5. Z_⊥ = Lateral Design Values Perpendicular to Grain, Z_{||} = Lateral Design Values Parallel to Grain.
6. Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.

TABLE 10. 5/16" SPAX® POWERLAGS® LATERAL DESIGN VALUES

| Fastener Designation | Minimum Main Member Penetration ¹ (in) | Minimum Side Member Thickness (in) | Reference Lateral Shear Value ^{4,5,6} , Z (lbf) | | | | | |
|----------------------|---|------------------------------------|--|----------------|-----------------|----------------|-----------------|----------------|
| | | | Wood Species (Specific Gravity ^{2,3}) | | | | | |
| | | | SP (0.55) | | DF-L (0.50) | | SPF/HF (0.42) | |
| | | | Z | Z _⊥ | Z | Z _⊥ | Z | Z _⊥ |
| 5/16 x 2" | 1.375 | 0.625 | 340 | 305 | 310 | 280 | 265 | 230 |
| 5/16 x 2 1/2" | | | | | | | | |
| 5/16 x 3" | | | | | | | | |
| 5/16 x 3 1/2" | 2.125 | 400 | 380 | 360 | 340 | 325 | 300 | |
| 5/16 x 4" | | | | | | | | |
| 5/16 x 4 1/2" | 2.375 | 1.5 | 440 | 405 | 405 | 375 | 380 | 355 |
| 5/16 x 5" | | | | | | | | |
| 5/16 x 5 1/2" | | | | | | | | |
| 5/16 x 6" | | | | | | | | |
| 5/16 x 6 1/2" | | | | | | | | |
| 5/16 x 7" | | | | | | | | |
| 5/16 x 7 1/2" | | | | | | | | |
| 5/16 x 8" | | | | | | | | |
| 5/16 x 8 1/2" | | | | | | | | |
| 5/16 x 9" | | | | | | | | |
| 5/16 x 10" | | | | | | | | |
| 5/16 x 11" | | | | | | | | |
| 5/16 x 12" | | | | | | | | |
| 5/16 x 13" | | | | | | | | |
| 5/16 x 14" | | | | | | | | |
| 5/16 x 15" | | | | | | | | |
| 5/16 x 16" | | | | | | | | |
| 5/16 x 18" | | | | | | | | |
| 5/16 x 20" | | | | | | | | |
| 5/16 x 22" | | | | | | | | |
| 5/16 x 24" | | | | | | | | |

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

1. Penetration depth includes the length of tapered tip.
2. The species applies to both the main and side members. Where the members are different specific gravities, use the lower of the two.
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.
4. The fastener shall be oriented perpendicular to grain, and the underside of the fastener head shall be installed flush with the surface of the side member.
5. Z_⊥ = Lateral Design Values Perpendicular to Grain, Z_{||} = Lateral Design Values Parallel to Grain.
6. Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.



TABLE 11. 3/8" SPAX® POWERLAGS® LATERAL DESIGN VALUES

| Fastener Designation | Minimum Main Member Penetration ¹ (in) | Minimum Side Member Thickness (in) | Reference Lateral Shear Value ^{4,5,6} , Z (lbf) | | | | | |
|----------------------|---|------------------------------------|--|----------------|-----------------|----------------|-----------------|----------------|
| | | | Wood Species (Specific Gravity ^{2,3}) | | | | | |
| | | | SP (0.55) | | DF-L (0.50) | | SPF/HF (0.42) | |
| | | | Z | Z _⊥ | Z | Z _⊥ | Z | Z _⊥ |
| 3/8 x 4" | 2.375 | 1.5 | 530 | 485 | 475 | 440 | 445 | 405 |
| 3/8 x 4 1/2" | | | | | | | | |
| 3/8 x 5" | | | | | | | | |
| 3/8 x 5 1/2" | | | | | | | | |
| 3/8 x 6" | | | | | | | | |
| 3/8 x 6 1/2" | | | | | | | | |
| 3/8 x 7" | | | | | | | | |
| 3/8 x 7 1/2" | | | | | | | | |
| 3/8 x 8" | | | | | | | | |
| 3/8 x 8 1/2" | | | | | | | | |
| 3/8 x 9" | | | | | | | | |
| 3/8 x 10" | | | | | | | | |
| 3/8 x 11" | | | | | | | | |
| 3/8 x 12" | | | | | | | | |
| 3/8 x 13" | | | | | | | | |
| 3/8 x 14" | | | | | | | | |
| 3/8 x 15" | | | | | | | | |
| 3/8 x 16" | | | | | | | | |
| 3/8 x 18" | | | | | | | | |

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

1. Penetration depth includes the length of tapered tip.
2. The species applies to both the main and side members. Where the members are different specific gravities, use the lower of the two.
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.
4. The fastener shall be oriented perpendicular to grain, and the underside of the fastener head shall be installed flush with the surface of the side member.
5. Z_⊥ = Lateral Design Values Perpendicular to Grain, Z_{||} = Lateral Design Values Parallel to Grain.
6. Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.

TABLE 12. 1/2" SPAX® POWERLAGS® LATERAL DESIGN VALUES

| Fastener Designation | Minimum Main Member Penetration ¹ (in) | Minimum Side Member Thickness (in) | Reference Lateral Shear Value ^{4,5,6} , Z (lbf) | | | | | |
|----------------------|---|------------------------------------|--|----------------|-----------------|----------------|-----------------|----------------|
| | | | Wood Species (Specific Gravity ^{2,3}) | | | | | |
| | | | SP (0.55) | | DF-L (0.50) | | SPF/HF (0.42) | |
| | | | Z | Z _⊥ | Z | Z _⊥ | Z | Z _⊥ |
| 1/2 x 4" | 2.375 | 1.5 | 585 | 475 | 550 | 400 | 500 | 370 |
| 1/2 x 4 1/2" | | | | | | | | |
| 1/2 x 5" | | | | | | | | |
| 1/2 x 5 1/2" | | | | | | | | |
| 1/2 x 6" | | | | | | | | |
| 1/2 x 6 1/2" | | | | | | | | |
| 1/2 x 7" | | | | | | | | |
| 1/2 x 7 1/2" | | | | | | | | |
| 1/2 x 8" | | | | | | | | |
| 1/2 x 8 1/2" | | | | | | | | |
| 1/2 x 9" | | | | | | | | |
| 1/2 x 10" | | | | | | | | |
| 1/2 x 11" | | | | | | | | |
| 1/2 x 12" | | | | | | | | |

SI: 1 in = 25.4 mm, 1 lbf = 4.45 N

1. Penetration depth includes the length of tapered tip.
2. The species applies to both the main and side members. Where the members are different specific gravities, use the lower of the two.
3. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity of 0.42. For wood species with an assigned specific gravity between 0.50 and 0.55, use the tabulated values for specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated values for specific gravity of 0.55.
4. The fastener shall be oriented perpendicular to grain, and the underside of the fastener head shall be installed flush with the surface of the side member.
5. Z_⊥ = Lateral Design Values Perpendicular to Grain, Z_{||} = Lateral Design Values Parallel to Grain.
6. Tabulated lateral design values shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.

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 SPAX® PowerLags® shall be installed using the driver bits specified in Table 1, Table 2, Table 3, Table 4, and Table 5, as applicable.
- 6.3 Fasteners shall not be struck with a hammer during installation.
- 6.4 *Lead Hole Requirements*
 - 6.4.1 Lead holes are not required for #14, ¼", and 5/16" SPAX® PowerLags®.
 - 6.4.2 Lead holes of 0.172" (4.37 mm) diameter are required for 3/8" SPAX® PowerLags®.
 - 6.4.3 Lead holes of 0.203" (5.16 mm) diameter are required for ½" SPAX® PowerLags®.
- 6.5 The fastener head must be installed flush to the surface of the wood side member being connected. The fastener must not be overdriven.
- 6.6 Minimum main member penetration is 1½" unless otherwise stated in this TER.
- 6.7 Minimum requirements for fastener spacing, edge distance, and end distance shall be in accordance with Table 13.

TABLE 13. MINIMUM SPACING, EDGE DISTANCE, AND END DISTANCE REQUIREMENTS

| Connection Geometry | Minimum Spacing/Distance ^{1,2,3} (in) | | | | |
|---|--|----|-------|-----------------------|----|
| | #14 | ¼" | 5/16" | 3/8" | ½" |
| Edge Distance – Load in any direction | ½ | ½ | 5/8 | 2¼ | 2¾ |
| End Distance – Load parallel to grain, towards end | 25/8 | 3 | 33/8 | 4½ | 5½ |
| End Distance – Load parallel to grain, away from end | 1¾ | 2 | 2¼ | 13/8 | 1¾ |
| End Distance – Load perpendicular to grain | 1¾ | 2 | 2¼ | 13/8 | 1¾ |
| Spacing between Fasteners in a Row – Parallel to grain | 25/8 | 3 | 33/8 | 2¾ | 3¾ |
| Spacing between Fasteners in a Row – Perpendicular to grain | 1¾ | 2 | 2¼ | 13/8 | 1¾ |
| Spacing between Rows of Fasteners – In-line | 7/8 | 1 | 11/8 | See NDS Table 12.5.1D | |
| Spacing between Rows of Fasteners – Staggered | ½ | ½ | 5/8 | | |

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. 3/8" and ½" diameter screws require lead holes. See Section 6.4 for lead hole requirements.

7 TEST ENGINEERING SUBSTANTIATING DATA

- 7.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:
 - 7.1.1 Bending yield testing in accordance with *ASTM F1575*
 - 7.1.2 Tensile strength testing in accordance with *AISI S904*
 - 7.1.3 Shear strength testing in accordance with *AISI S904*
 - 7.1.4 Head pull-through testing in accordance with *ASTM D1761*
 - 7.1.5 Withdrawal testing in accordance with *ASTM D1761*
 - 7.1.6 Lateral connection testing in accordance with *ASTM D1761*
 - 7.1.7 Corrosion resistance testing in accordance with *ASTM B117* and *ASTM G85*

- 7.2 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.
- 7.3 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 Provide resistance to head pull-through loads as shown in Table 6.
 - 8.1.2 Provide resistance to reference withdrawal loads as shown in Table 7.
 - 8.1.3 Provide resistance to lateral loads applied to the fastener in a wood as shown in Table 8, Table 9, Table 10, Table 11, and Table 12.
- 8.2 Building codes require data from valid research reports be obtained from approved sources (i.e., licensed registered design professionals [RDPs]).
- 8.2.1 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.
- 8.3 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.
- 8.4 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.”
- 8.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10⁹ 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 Wood main and side members must have a moisture content of less than or equal to 19 percent. Where fasteners are installed in a wet service condition, the appropriate reduction factors shall be applied per NDS Table 11.3.1.
- 9.2 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this TER.
- 9.3 In cases where fastener metal capacity (instead of the wood member) controls the connection design, the allowable connection strength shall not be multiplied by the adjustment factors specified in *NDS*.
- 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 2018 IFC Section 104.9



- 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 of this TER, visit drjcertification.org.
- 11.2 For information on the current status of this TER, contact DrJ Certification.

Issue Date: January 31, 2022
Subject to Renewal: July 1, 2023

FBC Supplement to TER 1912-07

REPORT HOLDER: Altenloh, Brinck & Company U.S., Inc.

1 EVALUATION SUBJECT

- 1.1 SPAX® PowerLags® Series Structural Wood Fasteners

2 PURPOSE AND SCOPE

2.1 Purpose

- 2.1.1 The purpose of this Technical Evaluation Report (TER) supplement is to show SPAX® PowerLags® Series Structural Wood Fasteners, recognized in TER 1912-07, has also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 Applicable Code Editions

- 2.2.1 *FBC-B—17, 20: Florida Building Code – Building*
- 2.2.2 *FBC-R—17, 20: Florida Building Code – Residential*

3 CONCLUSIONS

- 3.1 SPAX® PowerLags® Series Structural Wood Fasteners, described in TER 1912-07, complies with the *FBC-B* and *FBC-R* and is subject to the conditions of use described in this supplement.
- 3.2 Where there are variations between the *IBC* and *IRC* and the *FBC-B* and *FBC-R* applicable to this TER, they are listed here.
 - 3.2.1 *FBC-B* Section 104.4 and Section 110.4 are reserved.
 - 3.2.2 *FBC-R* Section R104 and Section R109 are reserved.

4 CONDITIONS OF USE

- 4.1 SPAX® PowerLags® Series Structural Wood Fasteners, described in TER 1912-07, must comply with all of the following conditions:
 - 4.1.1 All applicable sections in TER 1912-07
 - 4.1.2 The design, installation, and inspections are in accordance with additional requirements of *FBC-B* Chapter 16 and Chapter 17, as applicable.

Issue Date: July 27, 2022
Subject to Renewal: July 1, 2023

CBC and CRC Supplement to TER 1912-07

REPORT HOLDER: Altenloh, Brinck & Company U.S., Inc.

1 EVALUATION SUBJECT

- 1.1 SPAX® PowerLags® Series Structural Wood Fasteners

2 PURPOSE AND SCOPE

2.1 Purpose

- 2.1.1 The purpose of this Technical Evaluation Report (TER) supplement is to show SPAX® PowerLags® Series Structural Wood Fasteners, recognized in TER 1912-07, has also been evaluated for compliance with the codes listed below.

2.2 Applicable Code Editions

- 2.2.1 *CBC—16, 19: California Building Code (Title 24, Part 2)*
- 2.2.2 *CRC—16, 19: California Residential Code (Title 24, Part 2.5)*

3 CONCLUSIONS

- 3.1 SPAX® PowerLags® Series Structural Wood Fasteners, described in TER 1912-07, complies with the *CBC* and *CRC* and is subject to the conditions of use described in this supplement.
- 3.2 Where there are variations between the *IBC* and *IRC* and the *CBC* and *CRC* applicable to this TER, they are listed here.
 - 3.2.1 No Variations

4 CONDITIONS OF USE

- 4.1 SPAX® PowerLags® Series Structural Wood Fasteners, described in TER 1912-07, must comply with all of the following conditions:
 - 4.1.1 All applicable sections in TER 1912-07
 - 4.1.2 The design, installation, and inspections are in accordance with additional requirements of the *CBC* and *CRC*, as applicable.

Issue Date: July 27, 2022
Subject to Renewal: July 1, 2023

LABC and LARC Supplement to TER 1912-07

REPORT HOLDER: Altenloh, Brinck & Company U.S., Inc.

1 EVALUATION SUBJECT

- 1.1 SPAX® PowerLags® Series Structural Wood Fasteners

2 PURPOSE AND SCOPE

2.1 Purpose

- 2.1.1 The purpose of this Technical Evaluation Report (TER) supplement is to show SPAX® PowerLags® Series Structural Wood Fasteners, recognized in TER 1912-07, has also been evaluated for compliance with the codes listed below as adopted by the Los Angeles Department of Building and Safety (LADBS).

2.2 Applicable Code Editions

- 2.2.1 LABC—17, 20: Los Angeles Building Code
- 2.2.2 LARC—17, 20: Los Angeles Residential Code

3 CONCLUSIONS

- 3.1 SPAX® PowerLags® Series Structural Wood Fasteners, described in TER 1912-07, complies with the LABC and LARC and is subject to the conditions of use described in this supplement.
- 3.2 Where there are variations between the IBC and IRC and the LABC and LARC are applicable to this TER, they are listed here.
 - 3.2.1 LABC Section 91.104.2.6 replaces IBC Section 104.11
 - 3.2.2 LARC Section 91.104.2.6 replaces IRC Section R104.11
 - 3.2.3 LABC Section 91.104.2.2 replaces IBC Section 104.4
 - 3.2.4 LABC Section 91.108 replaces IBC Section 110.4
 - 3.2.5 LARC Section 91.104.2.2 replaces IRC Section R104.4
 - 3.2.6 LARC Section 91.108 replaces IRC Section R109.2
 - 3.2.7 LABC Section 91.104 replaces IBC Section 104
 - 3.2.8 LABC Section 91.108.5 replaces IBC Section 110.3.

4 CONDITIONS OF USE

- 4.1 SPAX® PowerLags® Series Structural Wood Fasteners, described in TER 1912-07, must comply with all of the following conditions:
 - 4.1.1 All applicable sections in TER 1912-07
 - 4.1.2 The design, installation, conditions of use, and identification of SPAX® PowerLags® Series Structural Wood Fasteners are in accordance with the 2018 *International Building Code (IBC)* provisions noted in TER 1912-07.
 - 4.1.3 The design, installation, and inspections are in accordance with additional requirements of LABC Chapter 16 and 17, as applicable.