# Listing and Technical Evaluation Report™

**Report No: 2212-01**

Issue Date: May 12, 2023

Revision Date: June 11, 2024

Subject to Renewal: July 1, 2025

## #8, #9, #10 and #14 Axis™, Pico™, Aura™ and Epic™ Fastener Properties

### Trade Secret Report Holder:

Screw Products, Inc.

Phone: 877-844-8880 Website: www.screw-products.com Email: info@screw-products.com

### CSI Designations:

**DIVISION**: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

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

## 1 Innovative Products Evaluated[1]

1.1 Axis, Pico, Aura and Epic Fasteners

## 2 Product Description and Materials

2.1 The innovative products evaluated in this report are shown in **Figure 1** through **Figure 8**.

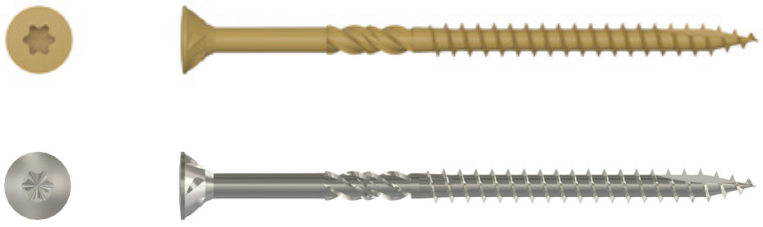

**Figure 1**. #8 Axis Fastener with Exterior Coating (Top) and Interior Coating (Bottom)

**Figure 2**. #8 Pico Fastener

**Figure 3**. #8 Aura Fastener

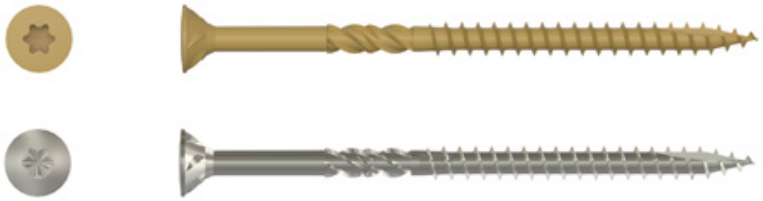

**Figure 4**. #9 Axis Fastener with Exterior Coating (Top) and Interior Coating (Bottom)

**Figure 5**. #9 Epic Fastener

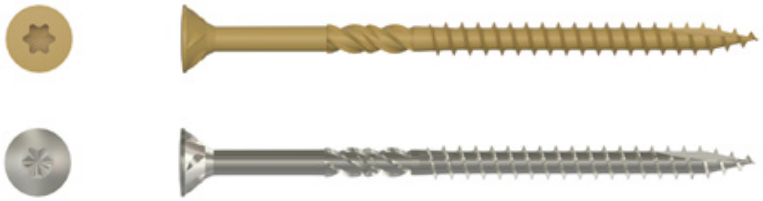

**Figure 6**. #10 Axis Fastener with Exterior Coating (Top) and Interior Coating (Bottom)

**Figure 7**. #10 Aura Fastener

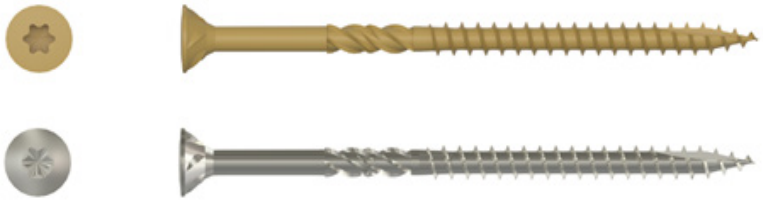

**Figure 8**. #14 Axis Fastener with Exterior Coating (Top) and Interior Coating (Bottom)

2.2 *Product Description*

2.2.1 Axis fasteners are fully or partially threaded screws with a countersunk head, with milled ribs, and star drive.

2.2.2 Pico fasteners are partially threaded screws with a countersunk head and star drive.

2.2.3 Aura fasteners are partially threaded screws with a mushroom head and star drive.

2.2.4 Epic fasteners are partially threaded screws with a countersunk head, with milled ribs, and a star drive.

2.2.5 Fasteners are made of heat treated, hardened steel.

2.3 *Corrosion Resistance*

2.3.1 Pico and Aura fasteners are coated with a proprietary Zytec™ GX coating that is equivalent to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (IBC Section 2304.10.6[2] and IRC Section R317.3) and may be used as an alternative to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (IBC Section 2304.10.6 and IRC Section R317.3) where screws are required to exhibit corrosion resistance when exposed to adverse environmental conditions which are subject to the limitations of this report.

2.3.1.1 Zytec GX coating is tested and recognized for use in ground contact pressure treated lumber (MCA), exterior, freshwater, general construction applications (i.e., Ground Contact AWPA UC1-UC4A MCA).

2.3.1.2 Zytec GX coated fasteners are approved for use in FRT lumber, provided the conditions set forth by the FRT lumber manufacturer are met, including appropriate strength reductions.

2.3.2 Axis fasteners are coated with a proprietary Zytec + or Zytec XT coating that is equivalent to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (IBC Section 2304.10.6 and IRC Section R317.3) and may be used as an alternative to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (IBC Section 2304.10.6 and IRC Section R317.3) where screws are required to exhibit corrosion resistance when exposed to adverse environmental conditions which are subject to the limitations of this report.

2.3.3 Epic fasteners are coated with a proprietary Zytec XT coating that is equivalent to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (IBC Section 2304.10.6[3] and IRC Section R317.3) and may be used as an alternative to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (IBC Section 2304.10.6 and IRC Section R317.3) where screws are required to exhibit corrosion resistance when exposed to adverse environmental conditions which are subject to the limitations of this report.

2.3.3.1 Zytec XT coating is tested and recognized for use in ground contact pressure treated lumber (MCA), exterior, freshwater, general construction applications (i.e., Ground Contact AWPA UC1-UC4A MCA).

2.3.3.2 Zytec XT coated fasteners are approved for use in FRT lumber, provided the conditions set forth by the FRT lumber manufacturer are met, including appropriate strength reductions.

2.4 The fasteners evaluated in this report are set forth in **Table 1**, **Table 2**, **Table 3** and **Table 4**.

**Table 1**. Fastener Specifications – Axis

| Fastener Name | Designation | Head (in) | | Nominal Length[1] (in) | Thread Length[2] (in) | Shank Diameter[3] (in) | Thread Diameter (in) | | Nominal Bending Yield, $F_{yb}$ (psi) | Allowable Fastener Strength (lb) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diameter | Drive Type | | | | Minor | Major | | Tensile | Shear[4] |
| #8 Axis | 8 x 3/4" | 0.323 | TX20 | 3/4 | Full | 0.122 | 0.106 | 0.165 | 212,000 | 550 | 420 |
| | 8 x 1" | | | 1 | Full | | | | | | |
| | 8 x 1 1/4" | | | 1 1/4 | 7/8 | | | | | | |
| | 8 x 1 1/2" | | | 1 1/2 | 1 | | | | | | |
| | 8 x 1 3/4" | | | 1 3/4 | 1 1/8 | | | | | | |
| | 8 x 2" | | | 2 | 1 1/4 | | | | | | |
| | 8 x 2 1/2" | | | 2 1/2 | 1 1/2 | | | | | | |

**Table 1**. Fastener Specifications – Axis

| Fastener Name | Designation | Head (in) | | Nominal Length[1] (in) | Thread Length[2] (in) | Shank Diameter[3] (in) | Thread Diameter (in) | | Nominal Bending Yield, $F_{yb}$ (psi) | Allowable Fastener Strength (lb) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diameter | Drive Type | | | | Minor | Major | | Tensile | Shear[4] |
| #9 Axis | 9 x 1" | 0.350 | TX20 | 1 | Full | 0.136 | 0.122 | 0.183 | 203,000 | 740 | 530 |
| | 9 x 1 1/4" | | | 1 1/4 | 7/8 | | | | | | |
| | 9 x 1 1/2" | | | 1 1/2 | 1 | | | | | | |
| | 9 x 2" | | | 2 | 1 1/4 | | | | | | |
| | 9 x 2 1/2" | | | 2 1/2 | 1 1/2 | | | | | | |
| | 9 x 2 3/4" | | | 2 3/4 | 1 1/2 | | | | | | |
| | 9 x 3" | | | 3 | 1 1/2 | | | | | | |
| #10 Axis | 10 x 1 1/2" | 0.386 | TX20 | 1 1/2 | 1 | 0.154 | 0.136 | 0.211 | 209,000 | 880 | 690 |
| | 10 x 2" | | | 2 | 1 1/4 | | | | | | |
| | 10 x 2 1/2" | | | 2 1/2 | 1 1/2 | | | | | | |
| | 10 x 3" | | | 3 | 1 1/2 | | | | | | |
| | 10 x 3 1/2" | | | 3 1/2 | 2 | | | | | | |
| | 10 x 4" | | | 4 | 2 | | | | | | |
| | 10 x 5" | | | 5 | 2 1/2 | | | | | | |
| | 10 x 6" | | | 6 | 2 1/2 | | | | | | |
| #14 Axis | 14 x 5" | 0.488 | TX30 | 5 | 2 1/2 | 0.173 | 0.152 | 0.246 | 205,000 | 1,110 | 830 |
| | 14 x 6" | | | 6 | | | | | | | |
| | 14 x 7" | | | 7 | | | | | | | |
| | 14 x 8" | | | 8 | | | | | | | |

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

1. Fastener length is measured from the top of the head to the tip.
2. Thread length excludes the knurl if knurl is present. The #8 x 3/4", #8 x 1", #8 x 1 1/4", #8 x 1 1/2", #8 x 1 3/4", #9 x 1", #9 x 1 1/4", #9 x 1 1/2" and #10 x 1 1/2" screws have no knurl.
3. Shank diameter based on manufactured thickness with coating.

**Table 2**. Fastener Specifications – Aura

| Fastener Name | Designation | Head (in) | | Nominal Length[1] (in) | Thread Length[2] (in) | Shank Diameter[3] (in) Minor | Thread Diameter (in) | | Nominal Bending Yield, $F_{yb}$ (psi) | Allowable Fastener Strength (lb) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diameter | Drive Type | | | | Minor | Major | | Tensile | Shear[4] |
| #8 Aura | 8 x 1" | 0.362 | TX20 | 1 | 3/4 | 0.122 | 0.106 | 0.165 | 212,000 | 550 | 420 |
| | 8 x 1 1/4" | | | 1 1/4 | 7/8 | | | | | | |
| | 8 x 1 1/2" | | | 1 1/2 | 1 | | | | | | |
| | 8 x 2" | | | 2 | 1 1/4 | | | | | | |
| | 8 x 2 1/2" | | | 2 1/2 | 1 1/2 | | | | | | |
| #10 Aura | 10 x 1" | 0.476 | TX20 | 1 | 3/4 | 0.154 | 0.136 | 0.211 | 209,000 | 880 | 690 |
| | 10 x 1 1/4" | | | 1 1/4 | 7/8 | | | | | | |
| | 10 x 1 1/2" | | | 1 1/2 | 1 | | | | | | |
| | 10 x 2" | | | 2 | 1 1/4 | | | | | | |
| | 10 x 2 1/2" | | | 2 1/2 | 1 1/2 | | | | | | |
| | 10 x 3" | | | 3 | 1 1/2 | | | | | | |

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.
2. Thread length excludes the knurl if knurl is present. The #8 x 1", #8 x 1 1/4", #8 x 1 1/2", #10 x 1", #10 x 1 1/4" and #10 x 1 1/2" screws have no knurl.
3. Shank diameter based on manufactured thickness with coating.

**Table 3**. Fastener Specifications – Pico

| Fastener Name | Designation | Head (in) | | Nominal Length[1] (in) | Thread Length[2] (in) | Shank Diameter[3] (in) Minor | Thread Diameter (in) | | Nominal Bending Yield, $F_{yb}$ (psi) | Allowable Fastener Strength (lb) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diameter | Drive Type | | | | Minor | Major | | Tensile | Shear[4] |
| #8 Pico | 8 x 1 5/8" | 0.201 | TX15 | 1 5/8 | 1 | 0.122 | 0.106 | 0.165 | 218,000 | 540 | 430 |
| | 8 x 2" | | | 2 | 1 1/4 | | | | | | |
| | 8 x 2 1/2" | | | 2 1/2 | 1 1/2 | | | | | | |
| | 8 x 3" | | | 3 | 1 1/2 | | | | | | |

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.
2. Thread length is the length of the lower thread
3. Shank diameter based on manufactured thickness with coating.

**Table 4**. Fastener Specifications – Epic

| Fastener Name | Designation | Head (in) | | Nominal Length[1] (in) | Thread Length[2] (in) | Shank Diameter[3] (in) Minor | Thread Diameter (in) | | Nominal Bending Yield, $F_{yb}$ (psi) | Allowable Fastener Strength (lb) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diameter | Drive Type | | | | Minor | Major | | Tensile | Shear[4] |
| #9 Epic | 9 x 1 5/8" | 0.260 | TX20 | 1 5/8 | 1 | 0.136 | 0.122 | 0.183 | 203,000 | 740 | 530 |
| | 9 x 2" | | | 2 | 1 1/4 | | | | | | |
| | 9 x 2 1/2" | | | 2 1/2 | 1 1/2 | | | | | | |
| | 9 x 3" | | | 3 | 1 1/2 | | | | | | |
| | 9 x 4" | | | 4 | 2 | | | | | | |
| | 9 x 5" | | | 5 | 2 1/2 | | | | | | |

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.
2. Thread length excludes the knurl if knurl is present. The #9 x 1 5/8" screws have no knurl.
3. Shank diameter based on manufactured thickness with coating.

2.5 As needed, review material properties for design in **Section 6** and to regulatory evaluation in **Section 8**.

## 3 Definitions

3.1 New Materials[4] are defined as building materials, equipment, appliances, systems, or methods of construction not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.[5] The design strengths and permissible stresses shall be established by tests[6] and/or engineering analysis.[7]

3.2 Duly Authenticated Reports[8] and Research Reports[9] are test reports and related engineering evaluations, which are written by an approved agency[10] and/or an approved source.[11]

3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).[12]

3.3 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is listed in the ANAB directory.

3.4 An approved source is "approved" when a professional engineer (i.e., Registered Design Professional) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[13]

3.5 Testing and/or inspections conducted for this Duly Authenticated Report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed Registered Design Professional (RDP).

3.5.1 The Center for Building Innovation (CBI) is ANAB[14] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[15] the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing[16] stating the nonconformance and the path to its cure.

3.7 The regulatory authority shall accept Duly Authenticated Reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.[17]

3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope, shall be approved.[18] Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.[19]

3.9 Approval equity is a fundamental commercial and legal principle.[20]

## 4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation[21]

4.1 *Standards*

4.1.1 *AISI S904: Standard Test Methods for Determining the Tensile and Shear Strength of Screws*

4.1.2 *ANSI / AWC NDS: National Design Specification (NDS) for Wood Construction*

4.1.3 *ASTM B117: Standard Practice for Operating Salt Spray (Fog) Apparatus*

4.1.4 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood*

4.1.5 *ASTM D2395: Standard Test Methods for Density and Specific Gravity (Relative Density) of Wood and Wood-Based Materials*

4.1.6 *ASTM D2915: Standard Practice for Sampling and Data-Analysis for Structural Wood and Wood-Based Products*

4.1.7 *ASTM D4442: Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials*

4.1.8 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*

4.2 *Regulations*

4.2.1 *IBC – 15, 18, 21: International Building Code®*

4.2.2 *IRC – 15, 18, 21: International Residential Code®*

4.2.3 *FBC-B—20, 23: Florida Building Code – Building*[22]

4.2.4 *FBC-R—20, 23: Florida Building Code – Residential*[22]

4.2.5 *CBC—19, 22: California Building Code*[23]

4.2.6 *CRC—19, 22: California Residential Code*[23]

4.2.7 *LABC—20, 23: Los Angeles Building Code*[24]

4.2.8 *LARC—20, 23: Los Angeles Residential Code*[24]

## 5 Listed[25]

5.1 Equipment, materials, products or services included in a List published by a nationally recognized testing laboratory (i.e., CBI), approved agency (i.e., CBI and DrJ), and/or approved source (i.e., DrJ) or other organization concerned with product evaluation (i.e., DrJ) that maintains periodic inspection (i.e., CBI) of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

## 6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 *General*

6.1.1 Axis, Pico, Aura and Epic Fasteners are used to attach wood framing members in conventional light-frame construction and provide resistance against withdrawal, head pull-through, axial, and shear loads. See **Section 6** for installation requirements.

6.1.2 Axis, Pico, Aura and Epic Fasteners are permitted to be installed without lead holes.

6.1.2.1 Where lead holes are used, provisions in Section 12.1 of NDS shall be followed.

6.2 *Design*

6.2.1 The design of Axis, Pico, Aura and Epic Fasteners is governed by the applicable code and provisions for dowel-type fasteners in NDS.

6.2.2 Unless otherwise noted, adjustment of the design stresses for duration of load shall be in accordance with the applicable code.

6.3 *Axis, Pico, Aura and Epic Fasteners Reference Lateral Design Values (Z)*

6.3.1 Reference lateral design values (lb) for shear load perpendicular to grain and parallel to grain for Axis, Pico, Aura and Epic Fasteners are specified in **Table 5**, **Table 6**, **Table 7** and **Table 8**.

**Table 5**. No. 8 Aura, Pico and Axis Fastener Reference Lateral Design Values (Z), lb[1,2,3,4]

| Type | Length (in) | Main Member[5,6] (Specific Gravity) | Side Member (Specific Gravity)[7] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 15/32 Plywood (0.42) | 19/32 Plywood (0.42) | 23/32 Plywood (0.42) | 7/16 OSB (0.50) | 19/32 OSB (0.50) | 23/32 OSB (0.50) | 2x SPF (0.42) | 2x DF (0.50) | 2x SP (0.55) |
| Aura, Pico and Axis | 1 1/4 | SPF (0.42) | 37 | 37 | - | 42 | 45 | - | - | - | - |
| | | DF (0.50) | 45 | 42 | - | 52 | 51 | - | - | - | - |
| | | SP (0.55) | 51 | 46 | - | 58 | 55 | - | - | - | - |
| | 1 1/2 | SPF (0.42) | 48 | 45 | 45 | 54 | 52 | 54 | - | - | - |
| | | DF (0.50) | 61 | 55 | 52 | 67 | 62 | 62 | - | - | - |
| | | SP (0.55) | 63 | 62 | 57 | 70 | 69 | 67 | - | - | - |
| | 1 5/8 | SPF (0.42) | 54 | 50 | 49 | 60 | 57 | 58 | - | - | - |
| | | DF (0.50) | 61 | 63 | 58 | 67 | 70 | 68 | - | - | - |
| | | SP (0.55) | 63 | 65 | 65 | 70 | 75 | 74 | - | - | - |
| | 1 3/4 | SPF (0.42) | 57 | 56 | 54 | 62 | 62 | 62 | - | - | - |
| | | DF (0.50) | 61 | 63 | 65 | 67 | 72 | 74 | - | - | - |
| | | SP (0.55) | 63 | 65 | 68 | 70 | 75 | 80 | - | - | - |
| | 2 | SPF (0.42) | 57 | 59 | 62 | 62 | 67 | 72 | - | - | - |
| | | DF (0.50) | 61 | 63 | 66 | 67 | 72 | 77 | - | - | - |
| | | SP (0.55) | 63 | 65 | 68 | 70 | 75 | 80 | - | - | - |
| | 2 1/2 | SPF (0.42) | 57 | 59 | 62 | 62 | 67 | 72 | 66 | 70 | 72 |
| | | DF (0.50) | 61 | 63 | 66 | 67 | 72 | 77 | 78 | 83 | 86 |
| | | SP (0.55) | 63 | 65 | 68 | 70 | 75 | 80 | 86 | 92 | 95 |
| | 3 | SPF (0.42) | 57 | 59 | 62 | 62 | 67 | 72 | 79 | 85 | 88 |
| | | DF (0.50) | 61 | 63 | 66 | 67 | 72 | 77 | 85 | 92 | 96 |
| | | SP (0.55) | 63 | 65 | 68 | 70 | 75 | 80 | 88 | 96 | 101 |

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

1. Reference lateral design values (Z) apply to Perpendicular and Parallel to grain load directions.
2. Cells marked with "–" indicate fastener is too short for the connection.
3. Reference lateral design values apply to two-member single shear connections and the fastener is installed in face grain.
4. Tabulated lateral design values (Z) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
5. Main member shall be a minimum 1.5" thick.
6. 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 between 0.50 and 0.55, use the tabulated values for a specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated value for specific gravity of 0.55.

**Table 6**. No. 9 Axis and Epic Fastener Reference Lateral Design Values (Z), lb[1,2,3,4]

| Type | Length (in) | Main Member (Specific Gravity)[5,6] | Side Member (Specific Gravity)[7] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 15/32 Plywood (0.42) | 19/32 Plywood (0.42) | 23/32 Plywood (0.42) | 7/16 OSB (0.50) | 19/32 OSB (0.50) | 23/32 OSB (0.50) | 2x SPF (0.42) | 2x DF (0.50) | 2x SP (0.55) |
| Epic and Axis | 1 1/4 | SPF (0.42) | 42 | - | - | 48 | - | - | - | - | - |
| | | DF (0.50) | 51 | - | - | 58 | - | - | - | - | - |
| | | SP (0.55) | 57 | - | - | 66 | - | - | - | - | - |
| | 1 1/2 | SPF (0.42) | 54 | 51 | 51 | 61 | 59 | 62 | - | - | - |
| | | DF (0.50) | 69 | 62 | 59 | 77 | 71 | 71 | - | - | - |
| | | SP (0.55) | 79 | 70 | 65 | 88 | 79 | 76 | - | - | - |
| | 1 5/8 | SPF (0.42) | 61 | 57 | 56 | 68 | 65 | 66 | - | - | - |
| | | DF (0.50) | 78 | 71 | 66 | 86 | 79 | 77 | - | - | - |
| | | SP (0.55) | 81 | 80 | 73 | 89 | 88 | 84 | - | - | - |
| | 2 | SPF (0.42) | 73 | 74 | 73 | 79 | 84 | 82 | - | - | - |
| | | DF (0.50) | 78 | 80 | 83 | 86 | 90 | 96 | - | - | - |
| | | SP (0.55) | 81 | 82 | 85 | 89 | 94 | 99 | - | - | - |
| | 2 1/2 | SPF (0.42) | 73 | 74 | 78 | 79 | 84 | 89 | 81 | 86 | 88 |
| | | DF (0.50) | 78 | 80 | 83 | 86 | 90 | 96 | 94 | 101 | 104 |
| | | SP (0.55) | 81 | 82 | 85 | 89 | 94 | 99 | 103 | 111 | 115 |
| | 2 3/4 | SPF (0.42) | 73 | 74 | 78 | 79 | 84 | 89 | 90 | 96 | 98 |
| | | DF (0.50) | 78 | 80 | 83 | 86 | 90 | 96 | 109 | 116 | 120 |
| | | SP (0.55) | 81 | 82 | 85 | 89 | 94 | 99 | 114 | 125 | 131 |
| | 3 | SPF (0.42) | 73 | 74 | 78 | 79 | 84 | 89 | 102 | 108 | 110 |
| | | DF (0.50) | 78 | 80 | 83 | 86 | 90 | 96 | 110 | 120 | 125 |
| | | SP (0.55) | 81 | 82 | 85 | 89 | 94 | 99 | 114 | 125 | 131 |
| | 4 | SPF (0.42) | 73 | 74 | 78 | 79 | 84 | 89 | 102 | 110 | 114 |
| | | DF (0.50) | 78 | 80 | 83 | 86 | 90 | 96 | 110 | 120 | 125 |
| | | SP (0.55) | 81 | 82 | 85 | 89 | 94 | 99 | 114 | 125 | 131 |
| | 5 | SPF (0.42) | 73 | 74 | 78 | 79 | 84 | 89 | 102 | 110 | 114 |
| | | DF (0.50) | 78 | 80 | 83 | 86 | 90 | 96 | 110 | 120 | 125 |
| | | SP (0.55) | 81 | 82 | 85 | 89 | 94 | 99 | 114 | 125 | 131 |

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

1. Reference lateral design values (Z) apply to Perpendicular and Parallel to grain load directions.
2. Cells marked with "–" indicate fastener is too short for the connection.
3. Reference lateral design values apply to two-member single shear connections and the fastener is installed in face grain.
4. Tabulated lateral design values (Z) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
5. Main member shall be a minimum 1.5" thick.
6. 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 between 0.50 and 0.55, use the tabulated values for a specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated value for specific gravity of 0.55.

**Table 7**. No. 10 Aura and Axis Fastener Reference Lateral Design Values (Z), lb[1,2,3,4]

| Type | Length (in) | Main Member[5,6] (Specific Gravity) | Side Member (Specific Gravity)[6] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 15/32 Plywood (0.42) | 19/32 Plywood (0.42) | 23/32 Plywood (0.42) | 7/16 OSB (0.50) | 19/32 OSB (0.50) | 23/32 OSB (0.50) | 2x SPF (0.42) | 2x DF (0.50) | 2x SP (0.55) |
| Aura and Axis | 1 1/2 | SPF (0.42) | 59 | 56 | - | 66 | 65 | - | - | - | - |
| | | DF (0.50) | 75 | 68 | - | 83 | 77 | - | - | - | - |
| | | SP (0.55) | 85 | 75 | - | 95 | 85 | - | - | - | - |
| | 2 | SPF (0.42) | 91 | 84 | 80 | 99 | 92 | 89 | - | - | - |
| | | DF (0.50) | 97 | 99 | 99 | 107 | 111 | 110 | - | - | - |
| | | SP (0.55) | 97 | 102 | 105 | 112 | 115 | 120 | - | - | - |
| | 2 1/2 | SPF (0.42) | 91 | 92 | 95 | 99 | 103 | 108 | 97 | 103 | 106 |
| | | DF (0.50) | 97 | 99 | 101 | 107 | 111 | 116 | 111 | 119 | 124 |
| | | SP (0.55) | 97 | 102 | 105 | 112 | 115 | 120 | 120 | 130 | 135 |
| | 3 | SPF (0.42) | 91 | 92 | 95 | 99 | 103 | 108 | 118 | 125 | 128 |
| | | DF (0.50) | 97 | 99 | 101 | 107 | 111 | 116 | 136 | 151 | 157 |
| | | SP (0.55) | 97 | 102 | 105 | 112 | 115 | 120 | 140 | 158 | 165 |
| | 3 1/2 | SPF (0.42) | 91 | 92 | 95 | 99 | 103 | 108 | 129 | 139 | 144 |
| | | DF (0.50) | 97 | 99 | 101 | 107 | 111 | 116 | 136 | 151 | 158 |
| | | SP (0.55) | 97 | 102 | 105 | 112 | 115 | 120 | 140 | 158 | 165 |
| | 4 | SPF (0.42) | 91 | 92 | 95 | 99 | 103 | 108 | 129 | 139 | 144 |
| | | DF (0.50) | 97 | 99 | 101 | 107 | 111 | 116 | 136 | 151 | 158 |
| | | SP (0.55) | 97 | 102 | 105 | 112 | 115 | 120 | 140 | 158 | 165 |
| | 5 | SPF (0.42) | 91 | 92 | 95 | 99 | 103 | 108 | 129 | 139 | 144 |
| | | DF (0.50) | 97 | 99 | 101 | 107 | 111 | 116 | 136 | 151 | 158 |
| | | SP (0.55) | 97 | 102 | 105 | 112 | 115 | 120 | 140 | 158 | 165 |
| | 6 | SPF (0.42) | 91 | 92 | 95 | 99 | 103 | 108 | 129 | 139 | 144 |
| | | DF (0.50) | 97 | 99 | 101 | 107 | 111 | 116 | 136 | 151 | 158 |
| | | SP (0.55) | 97 | 102 | 105 | 112 | 115 | 120 | 140 | 158 | 165 |

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

1. Reference lateral design values (Z) apply to Perpendicular and Parallel to grain load directions.
2. Cells marked with "–" indicate fastener is too short for the connection.
3. Reference lateral design values apply to two-member single shear connections and the fastener is installed in face grain.
4. Tabulated lateral design values (Z) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
5. Main member shall be a minimum 1.5" thick.
6. 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 between 0.50 and 0.55, use the tabulated values for a specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated value for specific gravity of 0.55.

**Table 8**. No. 14 Axis Fastener Reference Lateral Design Values (Z), lb[1,2,3,4,5]

| Type | Length (in) | Main Member[6,7] (Specific Gravity) | Side Member (Specific Gravity)[7] | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 15/32 Plywood (0.42) | 19/32 Plywood (0.42) | 23/32 Plywood (0.42) | 7/16 OSB (0.50) | 19/32 OSB (0.50) | 23/32 OSB (0.50) | 2x SPF (0.42) | 2x DF (0.50) | 2x SP (0.55) |
| Axis | All | SPF (0.42) | 109 | 113 | 116 | 122 | 125 | 130 | 150 | 171 | 178 |
| | | DF (0.50) | 109 | 122 | 123 | 132 | 135 | 140 | 159 | 187 | 195 |
| | | SP (0.55) | 109 | 126 | 127 | 138 | 140 | 145 | 163 | 195 | 204 |

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

1. The reference lateral design values provided in this table apply to the #14 Axis screw.
2. Reference lateral design values (Z) apply to Perpendicular and Parallel to grain load directions.
3. Cells marked with "–" indicate fastener is too short for the connection.
4. Reference lateral design values apply to two-member single shear connections and the fastener is installed in face grain.
5. Tabulated lateral design values (Z) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
6. Main member shall be a minimum 1.5" thick.
7. 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 between 0.50 and 0.55, use the tabulated values for a specific gravity of 0.50. For wood species with an assigned specific gravity greater than or equal to 0.55, use the tabulated value for specific gravity of 0.55.

## 6.4 *Withdrawal Design Values*

6.4.1 The reference withdrawal design values (lb/in) in **Table 9** apply to the screws listed in **Table 1**, **Table 2**, **Table 3** and **Table 4**.

**Table 9**. Reference Withdrawal Design Values (W) – Side Grain Applications, lb/in[1,2]

| Fastener Designation | Fastener Name | Fastener Length (in) | Thread Length (in) | Minimum Penetration Length[3] (in) | Wood Species (Specific Gravity)[4] |
|---|---|---|---|---|---|
| | | | | | HF/SPF (0.42) |
| No. 8 | Aura | 2 1/2 | 1 1/2 | 1 3/8 | 185 |
| | Axis | 2 1/2 | | | |
| | Pico | 2 1/2 | | | |
| | | 3 | | | |
| No. 9 | Axis | 2 1/2 | 1 1/2 | 1 1/2 | 220 |
| | | 2 3/4 | | | |
| | | 3 | | | |
| | Epic | 2 1/2 | 1 1/2 | | |
| | | 3 | | | |
| | | 4 | 2 | | |
| | | 5 | 2 1/2 | | |
| No. 10 | Axis | 3 1/2 | 2 | 1 3/4 | 225 |
| | | 4 | | | |
| | | 5 | 2 1/2 | | |
| | | 6 | | | |

**Table 9**. Reference Withdrawal Design Values (W) – Side Grain Applications, lb/in[1,2]

| Fastener Designation | Fastener Name | Fastener Length (in) | Thread Length (in) | Minimum Penetration Length[3] (in) | Wood Species (Specific Gravity)[4] |
|---|---|---|---|---|---|
| | | | | | HF/SPF (0.42) |
| No. 14 | Axis | 5 | 2 1/2 | 2 | 255 |
| | | 6 | | | |
| | | 7 | | | |
| | | 8 | | | |

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

1. Tabulated vales are in lbs/in of penetration. The minimum penetration to achieve these values is shown above. Values may be calculated for applications where more penetration is obtained up to penetrations corresponding to the thread length.
2. Tabulated withdrawal values (W) shall be adjusted by all applicable factors per NDS Table 11.3.1.
3. Fastener penetration is the threaded length embedded in the main member, including the tip.
4. For wood species with an assigned specific gravity above 0.42, use the tabulated values for a specific gravity of 0.42.

## 6.5 *Head Pull-Through Design Values*

6.5.1 The reference head pull-through design values (lb) in **Table 10** apply to the screws listed in **Table 1**, **Table 2**, **Table 3** and **Table 4**.

**Table 10**. Reference Head Pull-Through Design Values (P), lb[1]

| Fastener Designation | Fastener Name | Head Diameter | Minimum Wood Member Thickness[4] (in) | Wood Species (Specific Gravity)[3] |
|---|---|---|---|---|
| | | | | HF/SPF (0.42) |
| No. 8 | Pico | 0.201 | 1 1/4 | 45 |
| | Axis | 0.323 | | 215 |
| | Aura | 0.362 | | 290 |
| No. 9 | Epic | 0.260 | 1 1/4 | 75 |
| | Axis | 0.350 | | 185 |
| No. 10 | Axis | 0.386 | 1 1/2 | 305 |
| | Aura | 0.476 | | 480 |
| No. 14 | Axis | 0.488 | 1 3/4 | 370 |

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

1. Tabulated values apply where fasteners are installed in the face grain of the wood member.
2. Tabulated pull-through values (P) shall be adjusted by all applicable adjustment factors per NDS Table 11.3.1.
3. For wood species with an assigned specific gravity above 0.42, use the tabulated values for a specific gravity of 0.42.
4. Pull-through design values apply to connections having a minimum wood member thickness provided in the table.

6.6 Where the application falls outside of the performance evaluation, conditions of use and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

## 7 Certified Performance[26]

7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.[27]

7.2 The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.[28]

## 8 Regulatory Evaluation and Accepted Engineering Practice

8.1 Axis, Pico, Aura and Epic Fasteners comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 Axis, Pico, Aura and Epic Fasteners were tested and evaluated to determine their structural resistance properties that were used to develop reference design values for Allowable Stress Design (ASD).

8.1.1.1 Bending yield in accordance with ASTM F1575

8.1.1.2 Tensile strength in accordance with AISI S904

8.1.1.3 Shear strength in accordance with AISI S904

8.1.1.4 Lateral shear in accordance with ASTM D1761 and NDS

8.1.1.5 Withdrawal strength in accordance with ASTM D1761

8.1.1.6 Head pull-through in accordance with ASTM D1761

8.1.1.7 Corrosion resistance of fasteners meeting or exceeding the protection afforded hot-dipped galvanized fasteners in accordance with ASTM A153, Class D

8.2 Any building code, regulation, and/or accepted engineering evaluations (i.e., research reports, Duly Authenticated Reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP/approved sources. DrJ is qualified[29] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.

8.3 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which are also its areas of professional engineering competence.

8.4 Any regulation specific issues not addressed in this section are outside the scope of this report.

## 9 Installation

9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report and the applicable building code.

9.2 In the event of a conflict between the manufacturer installation instructions and this report, the more restrictive shall govern.

9.3 Install fasteners with head flush to the surface of the wood member.

9.4 Lead holes are not required.

9.5 Screws shall be installed with the appropriate rotating powered driver.

9.6 The minimum requirements for screw spacing, edge distance and end distance shall be in accordance with **Table 11**.

**Table 11**. Axis, Pico, Aura and Epic Fasteners Spacing, Edge Distance and End Distance Requirements,[1] Inch

| Connection Geometry | #8 | #9 | #10 | #14 |
|---|---|---|---|---|
| Edge Distance – Load in any direction | 3/8 | | 1/2 | |
| End Distance – Load parallel to grain, towards end | 1 7/8 | 2 1/8 | 2 3/8 | 2 5/8 |
| End Distance – Load parallel to grain, away from end | 1 1/4 | 1 3/8 | 1 5/8 | 1 3/4 |
| End Distance – Load perpendicular to grain | 1/2 | 5/8 | | 3/4 |
| Spacing between Fasteners in a Row – Parallel to grain | 1 7/8 | 2 1/8 | 2 3/8 | 2 5/8 |
| Spacing between Fasteners in a Row – Perpendicular to grain | 1 1/4 | 1 3/8 | 1 5/8 | 1 3/4 |
| Spacing between Rows of Fasteners – In-line | 5/8 | 3/4 | 7/8 | |
| Spacing between Rows of Fasteners – Staggered[2] | 3/8 | | 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 more restrictive.
2. Values for "Spacing between Rows of Fasteners-Staggered" apply where the screws in adjacent rows are offset by one-half of the "Spacing between Fasteners in a Row".

## 10 Substantiating Data

10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:

10.1.1 Bending yield testing in accordance with ASTM F1575

10.1.2 Shear and tensile testing in accordance with ASTM S904

10.1.3 Lateral strength testing in accordance with ASTM D1761

10.1.4 Withdrawal strength testing in accordance with ASTM D1761

10.1.5 Head pull-through testing in accordance with ASTM D1761

10.1.6 Corrosion resistance testing in accordance with ASTM B117

10.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or RDPs. Accuracy of external test data and resulting analysis is relied upon.

10.3 Where pertinent, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

10.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or Duly Authenticated Reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this Duly Authenticated Report, may be dependent upon published design properties by others.

10.5 Testing and engineering analysis: The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.[30]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for Axis, Pico, Aura and Epic Fasteners on the DrJ Certification website.

## 11 Findings

11.1 As outlined in **Section 6**, Axis, Pico, Aura and Epic Fasteners have performance characteristics that were tested and/or meet applicable regulations and are suitable for use pursuant to its specified purpose.

11.2 When used and installed in accordance with this Duly Authenticated Report and the manufacturer installation instructions, Axis, Pico, Aura and Epic Fasteners shall be approved for the following applications:

11.2.1 The reference design value properties defined herein for use in accordance with the applicable code.

11.3 Unless exempt by state statute, when Axis, Pico, Aura and Epic Fasteners are to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.

11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Screw Products, Inc..

11.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[31] are similar) in pertinent part 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.

11.6 **Approved**:[32] Building regulations require that the building official shall accept Duly Authenticated Reports.[33]

11.6.1 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited.

11.6.2 An approved source is "approved" when an RDP is properly licensed to transact engineering commerce.

11.6.3 Federal law, Title 18 US Code Section 242, requires that where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.

11.7 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB-Accredited Product Certification Body – Accreditation #1131.

11.8 Through the IAF Multilateral Agreements (MLA), this Duly Authenticated Report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 Duly Authenticated Reports are equivalent.[34]

## 12 Conditions of Use

12.1 Material properties shall not fall outside the boundaries defined in **Section 6**.

12.2 As defined in **Section 6**, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.

12.3 Moisture content shall be less than or equal to nineteen percent (19%) for sawn lumber.

12.4 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this evaluation report.

12.5 When required by adopted legislation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:

12.5.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.

12.5.2 This report and the installation instructions shall be submitted at the time of permit application.

12.5.3 These innovative products have an internal quality control program and a third-party quality assurance program.

12.5.4 At a minimum, these innovative products shall be installed per **Section 9** of this report.

12.5.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.

12.5.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4, and IRC Section R109.2.

12.5.7 The application of these innovative products in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2, and any other regulatory requirements that may apply.

12.6 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, "*the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new material or assemblies as provided for in Section 104.11*," all of IBC Section 104, and IBC Section 105.4.

12.7 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).

12.8 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

## 13 Identification

13.1 The innovative products listed in **Section 1.1** are identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.

13.2 Additional technical information can be found at www.screw-products.com.

## 14 Review Schedule

14.1 This report is subject to periodic review and revision. For the latest version, visit drjcertification.org.

14.2 For information on the status of this report, please contact DrJ Certification.

## 15 Approved for Use Pursuant to U.S. and International Legislation Defined in Appendix A

15.1 Axis, Pico, Aura and Epic Fasteners are included in this report published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services. This report states either that the material, product, or service meets recognized standards or has been tested and found suitable for a specified purpose. This report meets the legislative intent and definition of being acceptable to the AHJ.

# Appendix A

## 1 Legislation that Authorizes AHJ Approval

1.1 **Fair Competition**: State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:

1.1.1 Advance innovation

1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints

1.1.3 Benefit consumers through lower prices, better quality, and greater choice

1.2 **Adopted Legislation**: The following local, state, and federal regulations affirmatively authorize these innovative products to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:

1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies, and/or methods of construction. The goal is to "*protect economic freedom and opportunity by promoting free and fair competition in the marketplace*."

1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies, and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.

1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),[35] where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years[36] and/or a $5,000,000 fine or 3 times the value of[37] the Intellectual Property (IP) and Trade Secrets (TS).

1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of Listings, certified reports, Technical Evaluation Reports, Duly Authenticated Reports, and/or research reports prepared by approved agencies and/or approved sources.

1.2.4 For new materials[38] that are not specifically provided for in any regulation, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.

1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.[39]

1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence provided in writing, that specific legislation have been violated by an individual registered PE.

1.2.7 The AHJ shall accept Duly Authenticated Reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.[40]

1.3 **Approved**[41] **by Los Angeles**: The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards that apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.[42] The Superintendent of Building Approved Testing Agency Roster is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a DrJ Listing are LAMC approved. In addition, the Superintendent of Building shall accept Duly Authenticated Reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.[43]

1.4 **Approved by Chicago**: The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly, and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).

1.5 **Approved by New York City**: The 2022 NYC Building Code (NYCBC) states in part that an approved agency shall be deemed[44] an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement[45] (i.e., ANAB, International Accreditation Forum [IAF], etc.).

1.6 **Approved by Florida**: Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation by:

1.6.1 A certification mark or listing of an approved certification agency,

1.6.2 A test report from an approved testing laboratory,

1.6.3 A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, or

1.6.4 A product evaluation report based upon testing, comparative or rational analysis, or a combination thereof, developed, signed and sealed by a professional engineer or architect, licensed in Florida.

1.6.5 For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods:

1.6.5.1 A certification mark, listing or label from a commission-approved certification agency indicating that the product complies with the code,

1.6.5.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,

1.6.5.3 A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code,

1.6.5.4 A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code, or

1.6.5.5 A statewide product approval issued by the Florida Building Commission.

1.6.6 The Florida Department of Business and Professional Regulation (DBPR) website provides a listing of companies certified as a Product Evaluation Agency (i.e., EVLMiami 13692), a Product Certification Agency (i.e., CER10642), and as a Florida Registered Engineer (i.e., ANE13741).

1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA])**: A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation 553.842 and 553.8425.

1.8 **Approved by New Jersey**: Pursuant to the 2018 Building Code of New Jersey in IBC Section 1707.1 General,[46] it states: "*In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)*".[47] Furthermore N.J.A.C 5:23-3.7 states: "*Municipal approvals of alternative materials, equipment, or methods of construction*."

1.8.1 **Approvals**: Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability, and safety of those conforming with the requirements of the regulations.

1.8.1.1 A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of the above.

1.8.1.2 Reports of engineering findings issued by nationally recognized evaluation service programs such as but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of the above.

1.8.2 The New Jersey Department of Community Affairs has confirmed that technical evaluation reports, from any accredited entity listed by ANAB, meets the requirements of item the previous paragraph, given that the listed entities are no longer in existence and/or do not provide "*reports of engineering findings*."

1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards**: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[48] and Part 3280,[49] the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform to the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow:

1.9.1 "*All construction methods shall be in conformance with accepted engineering practices*."

1.9.2 "*The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur*."

1.9.3 "*The design stresses of all materials shall conform to accepted engineering practice*."

1.10 **Approval by US, Local and State Jurisdictions in General**: In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:

1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.[50]

1.10.2 For innovative alternatives and/or methods of construction, the building official shall accept Duly Authenticated Reports from approved agencies with respect to the quality and manner of use of new materials or assemblies.[51]

1.10.2.1 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is in the ANAB directory.

1.10.2.2 An approved source is "approved" when an RDP is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[52]

1.10.3 The design strengths and permissible stresses of any structural material…shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.[53]

1.11 **Approval by International Jurisdictions**: The USMCA and GATT agreements provide for approval of innovative materials, designs, services, and/or methods of construction through the Agreement on Technical Barriers to Trade and the IAF Multilateral Recognition Arrangement (MLA), where these agreements:

1.11.1 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.

1.11.2 **Approved**: The purpose of the MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA and subsequently, acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, designs, services, and/or methods of construction.

1.11.3 ANAB is an IAF-MLA signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope, shall be approved.[54]

1.11.4 Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.[55]

1.12 Approval equity is a fundamental commercial and legal principle.[56]

Issue Date: May 12, 2023
Subject to Renewal: July 1, 2025

# FBC Supplement to Report Number 2212-01

REPORT HOLDER: Screw Products, Inc.

## 1 Evaluation Subject

1.1 Axis, Pico, Aura and Epic Fasteners

## 2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show Axis, Pico, Aura and Epic Fasteners, recognized in Report Number 2212-01, have 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—20, 23: Florida Building Code – Building*

2.2.2 *FBC-R—20, 23: Florida Building Code – Residential*

## 3 Conclusions

3.1 Axis, Pico, Aura and Epic Fasteners, described in Report Number 2212-01, comply with the FBC-B and FBC-R and are 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 report, 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.

3.2.3 FBC-B Section 1603.1 replaces IBC Section 1603.1.

## 4 Conditions of Use

4.1 Axis, Pico, Aura and Epic Fasteners, described in Report Number 2212-01, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 2212-01.

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: May 12, 2023
Subject to Renewal: July 1, 2025

# CBC and CRC Supplement to Report Number 2212-01

REPORT HOLDER: Screw Products, Inc.

## 1 Evaluation Subject

1.1 Axis, Pico, Aura and Epic Fasteners

## 2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show Axis, Pico, Aura and Epic Fasteners, recognized in Report Number 2212-01 have also been evaluated for compliance with the codes listed below:

2.2 *Applicable Code Editions*

2.2.1 *CBC—19, 22: California Building Code (Title 24, Part 2)*

2.2.2 *CRC—19, 22: California Residential Code (Title 24, Part 2.5)*

2.2.3 *CEC —19, 22: California Energy Code (Title 24, Part 6)*

## 3 Conclusions

3.1 Axis, Pico, Aura and Epic Fasteners, described in Report Number 2212-01, comply with the CBC and CRC and are 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 report, they are listed here:

3.2.1 No variations.

## 4 Conditions of Use

4.1 Axis, Pico, Aura and Epic Fasteners, described in Report Number 2212-01, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 2212-01.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of CBC and CRC, as applicable.

Issue Date: May 12, 2023
Subject to Renewal: July 1, 2025

# LABC and LARC Supplement to Report Number 2212-01

REPORT HOLDER: Screw Products, Inc.

## 1 Evaluation Subject

1.1 Axis, Pico, Aura and Epic Fasteners

## 2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show Axis, Pico, Aura and Epic Fasteners, recognized in Report Number 2212-01, have 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 Axis, Pico, Aura and Epic Fasteners, described in Report Number 2212-01, comply 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 applicable to this report, 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 Axis, Pico, Aura and Epic Fasteners, described in Report Number 2212-01, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 2212-01.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of LABC Chapter 16 and Chapter 17, as applicable.

# Notes

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

2 2018 IBC Section 2304.10.5

3 2018 IBC Section 2304.10.5

4 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1702

5 Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review https://www.justice.gov/atr/mission and https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11

6 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests%20as

7 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706:~:text=shall%20conform%20to%20the%20specifications%20and%20methods%20of%20design%20of%20accepted%20engineering%20practice

8 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies

9 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2

10 https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_agency

11 https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_source

12 https://www.law.cornell.edu/uscode/text/18/1832 (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of $5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

13 https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

14 https://www.cbitest.com/accreditation/

15 https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104:~:text=to%20enforce%20the%20provisions%20of%20this%20code

16 https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11:~:text=Where%20the%20alternative%20material%2C%20design%20or%20method%20of%20construction%20is%20not%20approved%2C%20the%20building%20official%20shall%20respond%20in%20writing%2C%20stating%20the%20reasons%20why%20the%20alternative%20was%20not%20approved AND https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#105.3.1:~:text=If%20the%20application%20or%20the%20construction%20documents%20do%20not%20conform%20to%20the%20requirements%20of%20pertinent%20laws%2C%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%2C%20stating%20the%20reasons%20therefore

17 https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.11

18 https://iaf.nu/en/about-iaf-mla/#:~:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope

19 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

20 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission

21 Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.

22 All references to the FBC-B and FBC-R are the same as the 2021 IBC and 2021 IRC unless otherwise noted in the Florida Supplement at the end of this report.

23 All references to the CBC and CRC are the same as the 2018 IBC and 2018 IRC, respectively, unless otherwise noted in the supplement at the end of this document.

24 All references to the LABC and LARC are the same as the 2018 IBC and 2018 IRC, respectively, unless otherwise noted in the supplement at the end of this document.

25 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2(Listed%20or%20certified); https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#listed AND https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#labeled

26 https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1703.4

27 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades

28 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur

29 Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.

30 See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.

31 2018 IFC Section 104.9

32 Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

33 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1

34 Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.

35 http://www.drjengineering.org/AppendixC AND https://www.drjcertification.org/cornell-2016-protection-trade-secrets

36 https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years

37 https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided

38 https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2

39 IBC 2021, Section 1706.1 Conformance to Standards

40 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

41 See Section 11 for the distilled building code definition of **Approved**

42 Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

43 https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

44 New York City, The Rules of the City of New York, § 101-07 Approved Agencies

45 New York City, The Rules of the City of New York, § 101-07 Approved Agencies

46 https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

47 https://www.nj.gov/dca/divisions/codes/codreg/ucc.html

48 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14

49 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

50 IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.

51 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.

52 https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

53 IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.

54 https://iaf.nu/en/about-iaf-mla/#:~:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope

55 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

56 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission