# Listing and Technical Evaluation Report™

**A Duly Authenticated Report from an Approved Agency**

**Report No: 1907-05**

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## Big Timber® Cladding Attachment Through Foam Sheathing

**Trade Secret Report Holder:**

## Western Builders Supply dba Big Timber®

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### 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 Big Timber Screws:

1.1.1 CTX Construction Lag Screws

1.1.2 BL Log, Timber, and Landscape Screws

1.1.3 GL Gray Structural Screws

1.1.4 BTX and YTX General Purpose Screws

1.1.5 STX and SCTX Stainless Screws

1.1.6 WTX Wafer Head Screws

## 2 Product Description and Materials

2.1 *Fastener Descriptions*

2.1.1 CTX Construction Lag Screws have a round washer head with a star drive and are partially threaded. The CTX screw is shown in **Figure 1**.



**Figure 1**. CTX Construction Lag Screw


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2.1.2 BL Log, Timber, and Landscape Screws and GL Gray Structural Screws have a hex washer head and are partially threaded. BL Log, Timber, and Landscape Screws and GL Gray Structural Screws are shown in **Figure 2** and **Figure 3**, respectively.



**Figure 2**. BL Log, Timber, and Landscape Screw

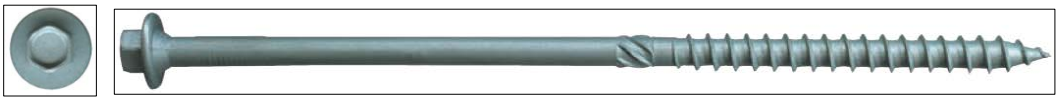


**Figure 3**. GL Gray Structural Screw

2.1.3 BTX and YTX General Purpose Screws have a round flat head with a star drive (Torx screw) and are partially threaded. BTX and YTX General Purpose Screws are shown in **Figure 4** and **Figure 5**, respectively.



**Figure 4**. BTX General Purpose Screw (Exterior Use)



**Figure 5**. YTX General Purpose Screw (Interior Use)

2.1.4 STX and SCTX Stainless Screws are made from Grade 316 stainless steel. The STX Stainless Screw has a round flat head with ribs and a star drive (Torx screw) and is partially threaded, as shown in **Figure 6**. The SCTX Stainless Screw has a round washer head and a star drive (Torx screw) and is partially threaded as shown in **Figure 7**.



**Figure 6**. STX General Purpose Stainless Steel Screw



**Figure 7**. SCTX Construction Lag Stainless Steel Screw


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2.1.5 WTX Wafer Head Wood Screws have a round wafer head with a star drive (Torx screw) and are partially threaded. The WTX screw is shown in **Figure 8**.

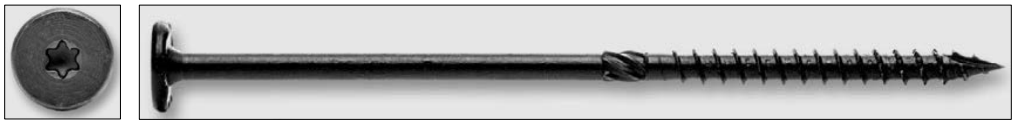


**Figure 8**. WTX Wafer Head Screw

2.1.6 Big Timber Screws are manufactured using a standard cold-formed process, followed by a heat-treating process, with the exception of the STX and SCTX Stainless Screws, which do not undergo a heat-treating process.

2.2 *Fastener Coatings*

2.2.1 CTX Construction Lag Screws are coated with a proprietary coating designated as Bronze Star, which exceeds the protections provided by hot-dipped galvanized coatings conforming to ASTM A153.

2.2.2 BL Log, Timber, and Landscape Screws and WTX Wafer Head Screws are coated with a proprietary coating designated as Black, which exceeds the protections provided by hot-dipped galvanized coatings conforming to ASTM A153.

2.2.3 GL Gray Structural Screws are coated with a proprietary coating designated as Gray Log, which exceeds the protections provided by hot-dipped galvanized coatings conforming to ASTM A153.

2.2.4 BTX General Purpose Screws are coated with a proprietary coating designated as Bronze, which exceeds the protections provided by hot-dipped galvanized coatings conforming to ASTM A153.

2.2.5 YTX General Purpose Screws are coated with a proprietary zinc coating designated as Gold Star.

2.2.6 CTX, BL, GL, BTX, STX, SCTX, and WTX are approved for use in chemically treated or untreated lumber where ASTM A153, Class D coatings are approved for use in accordance with IBC Section 2304.10 and IRC Section R304.3.[2]

2.2.6.1 The proprietary coating and stainless material have been tested and were found to exceed the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (IBC Section 2304.10.6[3] and IRC Section R304.3[4]), allowing for use in pressure-treated wood.

2.2.7 Big Timber Screws are approved for use in fire-retardant treated lumber, provided the conditions set forth by the fire-retardant treated lumber manufacturer be met, including appropriate strength reductions.

2.2.8 Only the STX and SCTX Stainless Screws are approved for use in chemically treated wood with exposure to saltwater, including coastal construction applications.


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2.3 The CTX Construction Lag Screws, evaluated in this report, are specified in **Table 1**.

**Table 1**. CTX Construction Lag Screw Specifications

| Fastener Name | Designation | Head (in) | | Nominal Length[1] (in) | Thread Length[1] (in) | Shank Diameter[2] (in) | Thread Diameter (in) | | Specified Minimum Core Hardness[4] (HV 0.3) | Nominal Bending Yield, $f_{yb}$ (psi) | Allowable Fastener Strength (lbf) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diameter | Drive Type | | | | Minor | Major | | | Tensile | Shear[3] |
| CTX | 14 x 3" | 0.531 | Torx 25 | 3 | 2 | 0.168 | 0.146 | 0.242 | 355 | 141,300 | 930 | 725 |
| | 14 x 4" | | | 4 | 2 | | | | | | | |
| | 14 x 5" | | | 5 | 3 | | | | | | | |
| | 14 x 6" | | | 6 | 3 | | | | | | | |
| | 15 x 3" | 0.620 | Torx 30 | 3 | 2 | 0.202 | 0.179 | 0.275 | 355 | 151,600 | 1,475 | 1,020 |
| | 15 x 3½" | | | 3½ | 2½ | | | | | | | |
| | 15 x 4" | | | 4 | 2½ | | | | | | | |
| | 15 x 5" | | | 5 | 3 | | | | | | | |
| | 15 x 6" | | | 6 | 3 | | | | | | | |
| | 17 x 4" | 0.675 | Torx 40 | 4 | 2½ | 0.226 | 0.210 | 0.295 | 355 | 170,500 | 1,850 | 1,240 |
| | 17 x 5" | | | 5 | 3 | | | | | | | |
| | 17 x 6" | | | 6 | 3 | | | | | | | |
| | 17 x 7" | | | 7 | 3½ | | | | | | | |
| | 17 x 8" | | | 8 | 4 | | | | | | | |

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. Thread length includes tapered tip.
2. Shank diameter based on manufactured thickness. Finished dimensions are larger due to the proprietary coatings added.
3. Shear determined at smooth shank diameter.
4. Based on a 300-gram load using the Vickers indenter.


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2.4 BL Log, Timber, and Landscape Screws and GL Gray Structural Screws are detailed in **Table 2**.

**Table 2**. BL Log, Timber, and Landscape Screws and GL Gray Structural Screws Specifications

| Fastener Name | Designation | Head (in) | | Nominal Length[1] (in) | Thread Length[1] (in) | Shank Diameter[2] (in) | Thread Diameter (in) | | Specified Minimum Core Hardness[4] (HV 0.3) | Nominal Bending Yield, $f_{yb}$ (psi) | Allowable Fastener Strength (lbf) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diameter | Drive Type | | | | Minor | Major | | | Tensile | Shear[3] |
| BL | 14 x 4" | 0.487 | Hex 5/16 | 4 | 2 | 0.189 | 0.171 | 0.258 | 355 | 177,700 | 1,085 | 725 |
| | 14 x 5" | | | 5 | 2 | | | | | | | |
| | 14 x 6" | | | 6 | 2 | | | | | | | |
| | 14 x 7" | | | 7 | 2 1/2 | | | | | | | |
| | 14 x 8" | | | 8 | 2 1/2 | | | | | | | |
| | 17 x 4" | 0.570 | Hex 5/16 | 4 | 2 | 0.224 | 0.211 | 0.297 | 355 | 172,600 | 1,990 | 1,240 |
| | 17 x 5" | | | 5 | 3 | | | | | | | |
| | 17 x 6" | | | 6 | 3 | | | | | | | |
| | 17 x 7" | | | 7 | 3 | | | | | | | |
| | 17 x 9" | | | 9 | 3 | | | | | | | |
| GL | 17 x 4" | 0.570 | Hex 5/16 | 4 | 2 | 0.224 | 0.211 | 0.297 | 355 | 172,600 | 1,990 | 1,240 |
| | 17 x 5" | | | 5 | 3 | | | | | | | |
| | 17 x 6" | | | 6 | 3 | | | | | | | |
| | 17 x 7" | | | 7 | 3 | | | | | | | |
| | 17 x 9" | | | 9 | 3 | | | | | | | |

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. Thread length includes tapered tip.
2. Shank diameter based on manufactured thickness. Finished dimensions are larger, due to the proprietary coatings added.
3. Shear determined at smooth shank diameter.
4. Based on a 300-gram load using the Vickers indenter.


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2.5 The BTX and YTX General Purpose Screws are set forth in **Table 3**.

**Table 3**. BTX and YTX General Purpose Screws Specifications

| Fastener Name | Designation | Head (in) | | Nominal Length[1] (in) | Thread Length[1] (in) | Shank Diameter[2] (in) | Thread Diameter (in) | | Specified Minimum Core Hardness[4] (HV 0.3) | Nominal Bending Yield, $f_{yb}$ (psi) | Allowable Fastener Strength (lbf) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diameter | Drive Type | | | | Minor | Major | | | Tensile | Shear[3] |
| BTX | 10 x 3" | 0.374 | Torx 25 | 3 | 1 1/2 | 0.151 | 0.134 | 0.209 | 355 | 205,000 | 960 | 710 |
| | 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 x 5" | 0.465 | Torx 30 | 5 | 2 1/2 | 0.169 | 0.145 | 0.232 | 286 | 211,000 | 1,270 | 960 |
| | 14 x 6" | | | 6 | 2 1/2 | | | | | | | |
| | 14 x 7" | | | 7 | 2 1/2 | | | | | | | |
| | 14 x 8" | | | 8 | 2 1/2 | | | | | | | |
| | 10 x 3" | 0.374 | Torx 25 | 3 | 1 1/2 | 0.151 | 0.134 | 0.209 | 355 | 205,000 | 960 | 710 |
| | 10 x 3 1/8" | | | 3 1/8 | 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 | | | | | | | |

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. Thread length includes the tapered tip and excludes the knurl.
2. Shank diameter based on manufactured thickness. Finished dimensions are larger, due to the proprietary coatings added.
3. Shear strength applicable at both the smooth shank and thread diameter.
4. Based on a 300-gram load using the Vickers indenter.


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2.6 STX and SCTX Stainless Screws are presented in **Table 4**.

**Table 4**. STX and SCTX Stainless Screws Specifications

| Fastener Name | Designation | Head (in) | | Nominal Length[1] (in) | Thread Length[1] (in) | Shank Diameter[2] (in) | Thread Diameter (in) | | Nominal Bending Yield, $f_{yb}$ (psi) | Allowable Fastener Strength (lbf) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diameter | Drive Type | | | | Minor | Major | | Tensile | Shear[3] |
| STX | 10 x 3 1/2" | 0.376 | Torx 25 | 3 1/2 | 2 | 0.145 | 0.126 | 0.193 | 124,000 | 440 | 420 |
| | 10 x 4" | | | 4 | 2 | | | | | | |
| SCTX | 15 x 3 1/2" | 0.620 | Torx 30 | 3 1/2 | 2 1/2 | 0.202 | 0.179 | 0.275 | 111,000 | 855 | 725 |
| | 15 x 4" | | | 4 | 2 1/2 | | | | | | |
| | 15 x 5" | | | 5 | 3 | | | | | | |
| | 15 x 6" | | | 6 | 3 | | | | | | |
| | 15 x 7" | | | 7 | 3 1/2 | | | | | | |
| | 15 x 8" | | | 8 | 4 | | | | | | |

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. Thread length includes the tapered tip.
2. Shank diameter based on manufactured thickness.
3. Shear strength applicable at both the smooth shank and thread diameter.

2.7 WTX Wafer Head Screws are set forth in **Table 5**.

**Table 5**. WTX Wafer Head Screws Specifications

| Fastener Name | Designation | Head (in) | | Nominal Length[1] (in) | Thread Length[1] (in) | Shank Diameter[2] (in) | Thread Diameter (in) | | Specified Minimum Core Hardness[4] (HV 0.3) | Nominal Bending Yield, $f_{yb}$ (psi) | Allowable Fastener Strength (lbf) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Diameter | Drive Type | | | | Minor | Major | | | Tensile | Shear[3] |
| WTX | 15 x 3" | 0.659 | Torx 30 | 3 | 2 3/4 | 0.205 | 0.187 | 0.274 | 286 | 190,000 | 1,545 | 1,165 |
| | 15 x 3 1/2" | | | 3 1/2 | 2 | | | | | | | |
| | 15 x 4" | | | 4 | 2 | | | | | | | |
| | 15 x 4 1/2" | | | 4 1/2 | 2 | | | | | | | |
| | 15 x 5" | | | 5 | 2 | | | | | | | |
| | 15 x 6" | | | 6 | 2 1/2 | | | | | | | |
| | 15 x 8" | | | 8 | 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 top of the head to the tip. Thread length excludes the knurl. The WTX 15 x 3" is fully threaded (no knurl).
2. Shank diameter based on manufactured thickness. Finished dimensions are larger, due to the proprietary coatings added.
3. Shear determined at thread or smooth shank diameter.
4. Based on a 300-gram load using the Vickers indenter.

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


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## 3 Definitions[5]

3.1 New Materials[6] 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.[7] The design strength and permissible stresses shall be established by tests[8] and/or engineering analysis.[9]

3.2 Duly authenticated reports[10] and research reports[11] are test reports and related engineering evaluations that are written by an approved agency[12] and/or an approved source.[13]

3.2.1 This report utilizes intellectual property and/or trade secrets to create public domain material properties for commercial end-use.

3.2.1.1 This report protects confidential Intellectual Property and trade secrets under the regulation, 18.US.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).[14]

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

3.4 An approved source is *"approved"* when a professional engineer (i.e., Registered Design Professional, hereinafter RDP) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[15]

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 RDP.

3.5.1 The Center for Building Innovation (CBI) is ANAB[16] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[17] 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[18] 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.[19]

3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory. Therefore, recognition of certificates and validation statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope shall be approved.[20] Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,[21] and can be used in any country that is an MLA signatory found at this link: https://iaf.nu/en/recognised-abs/

3.9 Approval equity is a fundamental commercial and legal principle.[22]

## 4 Applicable Local, State, and Federal Approvals; Standards; Regulations[23]

4.1 *Local, State, and Federal*

4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured local jurisdictions: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, St. Louis County, Texas Department of Insurance, and Wichita.[24]

4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured states: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.[25]


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4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[26] and Part 3280[27] pursuant to the use of ISO/IEC 17065 duly authenticated reports.

4.1.4 Approved means complying with the requirements of local, state, or federal legislation.

4.2 *Regulations*

4.2.1 *IBC – 18, 21, 24: International Building Code®*

4.2.2 *IRC – 18, 21, 24: International Residential Code®*

4.3 *Standards*

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

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

4.3.3 *ASTM A153: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*

4.3.4 *ASTM A493: Standard Specification for Stainless Steel Wire and Wire Rods for Cold Heading and Cold Forging*

4.3.5 *ASTM A510: Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel*

4.3.6 *ASTM B117: Standard Test Methods for Operating Salt Spray (Fog) Apparatus*

4.3.7 *ASTM F1575-21: Standard Test Method for Determining Bending Yield Moment of Nails, Spikes, and Dowel-type Threaded Fasteners*

4.3.8 *ASTM G85: Standard Practice for Modified Salt Spray (Fog) Testing*

4.3.9 *AWC TR 12: General Dowel Equations for Calculating Lateral Connection Values*

## 5 Listed[28]

5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (e.g., CBI), an approved agency (e.g., CBI and DrJ), and/or an approved source (e.g., DrJ), or other organization(s) concerned with product evaluation (e.g., DrJ), that maintains periodic inspection (e.g., 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 Big Timber Screws can be used to support the dead load of wall sheathing, furring, and/or cladding when connected to the wall framing through an intermediate layer of foam sheathing.

6.1.2 Big Timber Screws are installed without lead holes, as prescribed in the NDS.

6.1.3 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

6.2 *Design*

6.2.1 Design of Big Timber Screws is governed by the applicable code and the provisions for dowel type fasteners in the NDS.

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


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6.3 *Procedure for Calculating Fastener Spacing*

6.3.1 ***Step 1:*** Determine the spacing between studs or framing members, either 16" or 24" o.c. (on-center).

6.3.2 ***Step 2:*** Calculate the correct thickness of rigid foam (up to 4"), needed to obtain the required insulation effect or R-value.

6.3.3 ***Step 3:*** Choose the furring or sheathing (substrate) material to which the cladding will be affixed:

6.3.3.1 Minimum $^{3}/_{4}$" x $3^{1}/_{2}$" wood furring

6.3.3.2 Minimum $^{3}/_{8}$" or Wood Structural Panel (WSP) sheathing

6.3.3.3 Ensure that the substrate allows for cladding connections that are compliant with the cladding manufacturer installation and connection instructions and meet the applicable building code. See **Figure 9** for an illustration of the wall assembly.

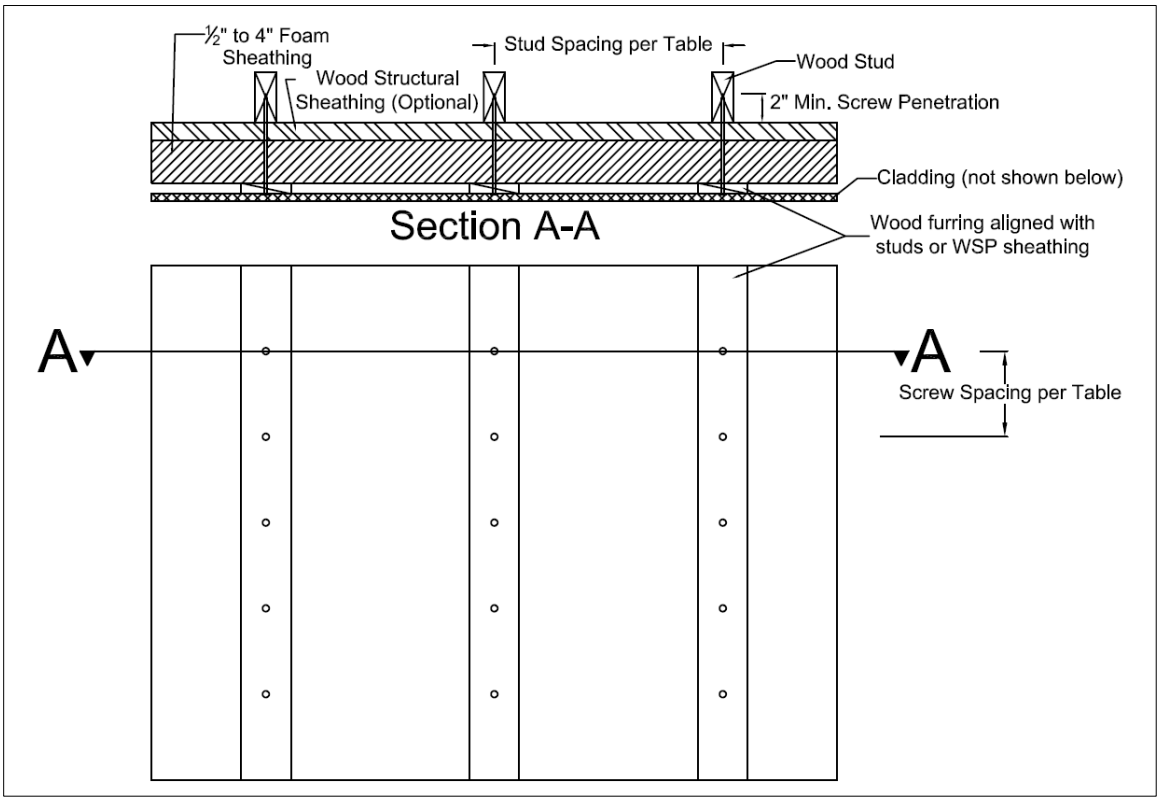



**Figure 9**. Elevation View of Wall Assembly with Vertically Oriented Wood Furring

6.3.4 ***Step 4:*** Determine the actual weight for the cladding materials being installed per square foot, as given by the cladding manufacturer specifications.

6.3.4.1 Typical cladding weights are 1.3-psf for vinyl siding, 2.5-psf for cement board siding, 11-psf for Portland cement stucco and 25-psf for adhered masonry veneer. Use actual weights for materials installed.

6.3.4.2 Wood furring may add up to 1-psf of additional weight. Wood sheathing may add up to 1.5-psf, depending on thickness.

6.3.5 ***Step 5:*** Using these four values together, find the proper fastening pattern of between 6" and 24" o.c. using the appropriate table in **Section 6.4**.


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## 6.4 *Fastening Design Tables*

6.4.1 Refer to **Table 7** through **Table 16** for recommended fastener spacing for cladding over foam.

6.4.1.1 **Table 6** provides notes that apply to the design tables in **Section 6.4**.

**Table 6**. General Cladding Over Foam Connection Table Notes

1. Wood framing (studs) shall be a minimum of 2" nominal thickness.
2. Wood framing and furring shall be minimum Spruce-Pine-Fir or any species with specific gravity of 0.42 or greater.
3. Wood framing, furring, and sheathing shall be designed by others and shall be of adequate size, species, and grade to resist design loads and requirements in accordance with the applicable building code.
4. Furring may be installed vertically or horizontally and shall be installed at the same on-center spacing as the studs. All fasteners shall be installed through the furring and into the studs with a minimum 2" fastener penetration. Alternately, where the furring is installed horizontally, and where the required fastener spacing is 8" o.c. or 12" o.c., the furring may be installed at 16" o.c. or 24" o.c. respectively, provided two (2) fasteners are installed at the stud location. Likewise, where the fastener spacing is 6" o.c., the furring may be installed horizontally at 12" o.c. and two (2) fasteners used at each stud. Where multiple fasteners are used, furring or sheathing (substrate) shall be of adequate size to provide proper edge, end, and fastener spacing distances.
5. Maximum allowable cladding weight shall include weight of furring, sheathing, cladding, and other supported materials.
6. Furring type and thickness shall be selected based on the cladding manufacturer installation requirements (i.e., required fastener penetration into furring).
7. When using horizontal furring or where durability of the furring is a concern due to moisture between the cladding and the sheathing, consideration should be given to using preservative treated furring.
8. When choosing the length of fastener, the thickness of the wood framing shall be considered so that the fastener does not penetrate through the backside of the framing stud.


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**Table 7**. CTX14 Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing[1]

| Fastener | Stud Spacing (in) | Minimum Fastener Length (in) | Foam Thickness (in) | Maximum Spacing of Fasteners (in) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Using 3/8" WSP Sheathing | | | | | | Using 3/4" x 3 1/2" Wood Furring | | | | | |
| | | | | Maximum Cladding Weight (psf) | | | | | | Maximum Cladding Weight (psf) | | | | | |
| | | | | 5 | 10 | 15 | 20 | 25 | 30 | 5 | 10 | 15 | 20 | 25 | 30 |
| CTX14 | 16 o.c. | 4 | 0.5 | 24 | 24 | 20 | 16 | 12 | 8 | 24 | | | 16 | 12 | |
| | | | 1.0 | | 20 | 12 | 8 | | 7 | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | 16 | 12 | 8 | |
| | | | 1.5 | | 16 | 8 | 8 | 6 | 5 | 24 | 20 | 12 | 8 | | 7 |
| | | | 2.0 | | 12 | | 6 | 5 | 4 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | 16 | 8 | | 6 | 5 |
| | | | 2.5 | 20 | 8 | 7 | 5 | 4 | - | | 12 | 8 | 7 | 5 | 4 |
| | | | 3.0 | 16 | | 6 | 4 | - | | - | | | | | |
| | 24 o.c. | 4 | 0.5 | 24 | 20 | 12 | 8 | | 7 | 24 | | 16 | 12 | 8 | |
| | | | 1.0 | | 12 | 8 | 7 | 6 | 5 | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | 16 | 12 | 8 | 7 | 6 |
| | | | 1.5 | 20 | 8 | 7 | 5 | 4 | - | | 12 | 8 | 7 | 5 | 4 |
| | | | 2.0 | 16 | | 5 | 4 | - | | - | | | | | |
| | | 6 | 2.0 | | | | | | | 20 | 8 | 7 | 5 | 4 | - |
| | | | 2.5 | 12 | 7 | 4 | - | - | - | 16 | | 6 | 4 | - | |
| | | | 3.0 | | 6 | | | | | - | | | | | |

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m$^2$

1. See Table 6 for notes.


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**Table 8**. CTX15 Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing[1]

| Fastener | Stud Spacing (in) | Minimum Fastener Length (in) | Foam Thickness (in) | Maximum Fastener Spacing (in) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Using 3/8" WSP Sheathing | | | | | | Using 3/4" x 3 1/2" Wood Furring | | | | | |
| | | | | Maximum Cladding Weight (psf) | | | | | | Maximum Cladding Weight (psf) | | | | | |
| | | | | 5 | 10 | 15 | 20 | 25 | 30 | 5 | 10 | 15 | 20 | 25 | 30 |
| CTX15 | 16 o.c. | 4 | 0.5 | 24 | 24 | 24 | 24 | 20 | 16 | 24 | | | | 20 | |
| | | | 1.0 | | | | 16 | 12 | | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | 24 | 20 | 16 | 12 |
| | | | 1.5 | | | 16 | 12 | 8 | 8 | | | 20 | 16 | 12 | 8 |
| | | | 2.0 | | 20 | 12 | 8 | 8 | 7 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | | 16 | 12 | 8 | |
| | | | 2.5 | | 16 | | | 7 | 6 | 24 | 20 | 12 | 8 | | 7 |
| | | | 3.0 | | | 8 | | 6 | 5 | - | | | | | |
| | 24 o.c. | 4 | 0.5 | | 24 | 24 | 16 | 12 | | 24 | | | 20 | 16 | 12 |
| | | | 1.0 | | | 16 | 12 | 8 | | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | 16 | 12 | 8 | |
| | | | 1.5 | | 16 | 12 | 8 | 7 | 6 | 24 | 20 | 12 | 8 | | 7 |
| | | | 2.0 | | 12 | 8 | 7 | 6 | 5 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | 16 | 12 | 8 | 7 | 6 |
| | | | 2.5 | | | | 6 | 5 | 4 | | 12 | 8 | 7 | 6 | 5 |
| | | | 3.0 | 20 | 8 | 7 | 5 | 4 | - | - | | | | | |

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m$^2$

1. See Table 6 for notes.


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**Table 9**. CTX17 Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing[1]

| Fastener | Stud Spacing (in) | Minimum Fastener Length (in) | Foam Thickness (in) | Maximum Spacing of Fasteners (in) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Using 3/8" WSP Sheathing | | | | | | Using 3/4" x 3 1/2" Wood Furring | | | | | |
| | | | | Maximum Cladding Weight (psf) | | | | | | Maximum Cladding Weight (psf) | | | | | |
| | | | | 5 | 10 | 15 | 20 | 25 | 30 | 5 | 10 | 15 | 20 | 25 | 30 |
| CTX17 | 16 o.c. | 4 | 0.5 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | | | | | |
| | | | 1.0 | | | | | | 20 | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | | | 24 | 20 |
| | | | 1.5 | | | | | 16 | | | | | | 20 | 16 |
| | | | 2.0 | | | | 16 | 12 | 12 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | | | 20 | 16 | 12 |
| | | | 2.5 | | | 20 | 12 | | 8 | | | | 16 | 12 | |
| | | | 3.0 | | | 16 | | 8 | | - | | | | | |
| | | 7 | 3.0 | | 24 | | | | | 24 | 20 | 12 | | | 8 |
| | | | 4.0 | | 20 | 12 | 8 | | 6 | - | | | | | |
| | | 8 | 4.0 | | | | | | | 24 | 16 | 12 | | 8 | |
| | 24 o.c. | 4 | 0.5 | | 24 | 24 | 24 | | 20 | 24 | | | | | 20 |
| | | | 1.0 | | | | 20 | 16 | 12 | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | 24 | 20 | 16 | 12 | |
| | | | 1.5 | | | 20 | 16 | 12 | 8 | | 20 | 16 | 12 | 8 | |
| | | | 2.0 | | | 16 | 12 | 8 | | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | 16 | 12 | | 8 | |
| | | | 2.5 | | 20 | 12 | 8 | | 7 | | | | | | |
| | | | 3.0 | | 16 | | | 7 | 6 | - | | | | | |
| | | 7 | 3.0 | | | 12 | 8 | | | 24 | 20 | 12 | 8 | | 6 |
| | | | 4.0 | | 12 | 8 | 6 | 5 | 4 | - | | | | | |
| | | 8 | 4.0 | | | | | | | 24 | 16 | 8 | | 6 | 5 |

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m$^2$

1. See Table 6 for notes.


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**Table 10**. BL14 Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing[1]

| Fastener | Stud Spacing (in) | Minimum Fastener Length (in) | Foam Thickness (in) | Maximum Spacing of Fasteners (in) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Using 3/8" WSP Sheathing | | | | | | Using 3/4" x 3 1/2" Wood Furring | | | | | |
| | | | | Maximum Cladding Weight (psf) | | | | | | Maximum Cladding Weight (psf) | | | | | |
| | | | | 5 | 10 | 15 | 20 | 25 | 30 | 5 | 10 | 15 | 20 | 25 | 30 |
| BL14 | 16 o.c. | 4 | 0.5 | 24 | 24 | 24 | 24 | 20 | 16 | 24 | | | | | 20 |
| | | | 1.0 | | | | 16 | 12 | | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | | 20 | 16 | 12 |
| | | | 1.5 | | | 16 | 12 | 8 | 8 | 24 | | 20 | 16 | 12 | 8 |
| | | | 2.0 | | 20 | 12 | 8 | | 7 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | | 16 | 12 | 8 | |
| | | | 2.5 | | 16 | | | 7 | 6 | 24 | 20 | 12 | 8 | | 7 |
| | | | 3.0 | | | 8 | | 6 | 5 | - | | | | | |
| | | 7 | 3.0 | | | | 8 | | | 24 | 16 | 12 | 8 | 7 | 6 |
| | | | 4.0 | | 12 | | 6 | 4 | | - | | | | | |
| | | 8 | 4.0 | | | | | | | 24 | 12 | 8 | 7 | 6 | 5 |
| | 24 o.c. | 4 | 0.5 | | 24 | 24 | 16 | 12 | | 24 | | | 20 | 16 | 12 |
| | | | 1.0 | | | 16 | 12 | 8 | | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | 16 | 12 | 8 | |
| | | | 1.5 | | 16 | 12 | 8 | 7 | 6 | 24 | 20 | 12 | 8 | | 7 |
| | | | 2.0 | | 12 | 8 | 7 | 6 | 5 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | 16 | 12 | 8 | 7 | 6 |
| | | | 2.5 | | | | 6 | 5 | 4 | | 12 | 8 | 7 | 6 | 5 |
| | | | 3.0 | 20 | 8 | 7 | 5 | 4 | - | - | | | | | |
| | | 7 | 3.0 | | | | | | | 24 | 12 | 8 | 6 | 5 | 4 |
| | | | 4.0 | 16 | | 5 | 4 | - | | 20 | 8 | 6 | 5 | 4 | - |
| | | 8 | 4.0 | | | | | | | | | | | | |

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m$^2$

1. See Table 6 for notes.


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**Table 11**. BL17 and GL17 Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing[1]

| Fastener | Stud Spacing (in) | Minimum Fastener Length (in) | Foam Thickness (in) | Maximum Spacing of Fasteners (in) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Using 3/8" WSP Sheathing | | | | | | Using 3/4" x 3 1/2" Wood Furring | | | | | |
| | | | | Maximum Cladding Weight (psf) | | | | | | Maximum Cladding Weight (psf) | | | | | |
| | | | | 5 | 10 | 15 | 20 | 25 | 30 | 5 | 10 | 15 | 20 | 25 | 30 |
| BL17 GL17 | 16 o.c. | 4 | 0.5 | 24 | 24 | 24 | 24 | 24 | 24 | 24 | | | | | |
| | | | 1.0 | | | | | | 20 | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | | | | 20 |
| | | | 1.5 | | | | | 16 | | 24 | | | | 20 | 16 |
| | | | 2.0 | | | | 16 | 12 | 12 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | | | 20 | 16 | 12 |
| | | | 2.5 | | | 20 | | | 8 | 24 | | | 16 | 12 | |
| | | | 3.0 | | | 16 | 12 | 8 | | - | | | | | |
| | | 7 | 3.0 | | | | | | | 24 | | 20 | 12 | | 8 |
| | | | 4.0 | | 20 | 12 | 8 | | 7 | - | | | | | |
| | | 9 | 4.0 | | | | | | | 24 | | 16 | 12 | 8 | |
| | 24 o.c. | 4 | 0.5 | | 24 | 24 | 24 | | 20 | 24 | | | | | 20 |
| | | | 1.0 | | | | 20 | 16 | 12 | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | | 20 | 16 | 12 |
| | | | 1.5 | | | 20 | 16 | 12 | 8 | 24 | | 20 | 16 | 12 | 8 |
| | | | 2.0 | | | 16 | 12 | 8 | | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | | 16 | 12 | 8 | |
| | | | 2.5 | | 20 | 12 | 8 | | 7 | | | | | | |
| | | | 3.0 | | 16 | | | 7 | 6 | - | | | | | |
| | | 7 | 3.0 | | | | | | | 24 | 20 | 12 | 8 | | 7 |
| | | | 4.0 | | 12 | 8 | 7 | 5 | 4 | - | | | | | |
| | | 9 | 4.0 | | | | | | | 24 | 16 | 8 | | 6 | 5 |

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

1. See Table 6 for notes.


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**Table 12**. BTX10 and YTX10 Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing[1]

| Fastener | Stud Spacing (in) | Minimum Fastener Length (in) | Foam Thickness (in) | Maximum Spacing of Fasteners (in) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Using 3/8" WSP Sheathing | | | | | | Using 3/4" x 3 1/2" Wood Furring | | | | | |
| | | | | Maximum Cladding Weight (psf) | | | | | | Maximum Cladding Weight (psf) | | | | | |
| | | | | 5 | 10 | 15 | 20 | 25 | 30 | 5 | 10 | 15 | 20 | 25 | 30 |
| BTX10 YTX10 | 16 o.c. | 3.5 | 0.5 | 24 | 24 | 20 | 16 | 12 | 8 | - | | | | | |
| | | 4 | 0.5 | | | | | | | 24 | | | 16 | 12 | |
| | | | 1.0 | | 20 | 12 | 8 | 8 | 7 | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | 16 | 12 | 8 | |
| | | | 1.5 | | 16 | 8 | | 7 | 5 | 24 | 20 | 12 | 8 | | 7 |
| | | | 2.0 | | 12 | | 6 | 5 | 4 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | 16 | 8 | | 7 | 5 |
| | | | 2.5 | 20 | 8 | 7 | 5 | 4 | - | | 12 | 8 | 7 | 5 | 4 |
| | | | 3.0 | 16 | | 6 | 4 | - | | - | | | | | |
| | 24 o.c. | 3.5 | 0.5 | 24 | 20 | 12 | 8 | | 7 | | | | | | |
| | | 4 | 0.5 | | | | | | | 24 | | 16 | 12 | 8 | |
| | | | 1.0 | | 12 | 8 | 7 | 6 | 5 | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | 16 | 12 | 8 | 7 | 6 |
| | | | 1.5 | 20 | 8 | 7 | 5 | 4 | - | | 12 | 8 | 7 | 5 | 4 |
| | | | 2.0 | 16 | | 6 | 4 | - | | - | | | | | |
| | | 6 | 2.0 | | | | | | | 20 | 8 | 7 | 5 | 4 | - |
| | | | 2.5 | 12 | 7 | 5 | - | - | - | 16 | | 6 | 4 | - | |
| | | | 3.0 | | 6 | 4 | | | | - | | | | | |

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m$^2$

1. See Table 6 for notes.


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**Table 13**. BTX14 Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing[1]

| Fastener | Stud Spacing (in) | Minimum Fastener Length (in) | Foam Thickness (in) | Maximum Spacing of Fasteners (in) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Using 3/8" WSP Sheathing | | | | | | Using 3/4" x 3 1/2" Wood Furring | | | | | |
| | | | | Maximum Cladding Weight (psf) | | | | | | Maximum Cladding Weight (psf) | | | | | |
| | | | | 5 | 10 | 15 | 20 | 25 | 30 | 5 | 10 | 15 | 20 | 25 | 30 |
| BTX14 | 16 o.c. | 5 | 0.5 | 24 | 24 | 24 | 20 | 16 | 12 | 24 | | 24 | 20 | 16 | 12 |
| | | | 1.0 | | | 16 | 12 | 8 | 8 | | | 20 | 16 | 12 | 8 |
| | | | 1.5 | | 20 | 12 | 8 | | 7 | | | 16 | 12 | 8 | |
| | | | 2.0 | | 16 | 8 | | 6 | 5 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | 20 | 12 | 8 | | 7 |
| | | | 2.5 | | 12 | | 7 | 5 | 4 | | 16 | 8 | | 7 | 5 |
| | | | 3.0 | | | | 6 | 4 | | - | | | | | |
| | | 7 | 3.0 | | | | | | | 24 | 12 | 8 | 7 | 6 | 5 |
| | | | 4.0 | 16 | 8 | 6 | 4 | - | | - | | | | | |
| | | 8 | 4.0 | | | | | | | 20 | 8 | 7 | 5 | 4 | - |
| | 24 o.c. | 5 | 0.5 | 24 | 24 | 16 | 12 | 8 | | 24 | | 20 | 12 | | 8 |
| | | | 1.0 | | 16 | 12 | 8 | 7 | 6 | 24 | 20 | 12 | 8 | | 7 |
| | | | 1.5 | | 12 | 8 | 7 | 5 | 4 | | 16 | 8 | | 6 | 5 |
| | | | 2.0 | 20 | 8 | 7 | 5 | 4 | - | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | 12 | 8 | 7 | 5 | 4 |
| | | | 2.5 | 16 | | 6 | 4 | - | | 20 | 8 | 7 | 5 | 4 | - |
| | | | 3.0 | | | 5 | | | | - | | | | | |
| | | 7 | 3.0 | | | | | | | 20 | 8 | 6 | 5 | 4 | - |
| | | | 4.0 | 12 | 6 | 4 | - | | | - | | | | | |
| | | 8 | 4.0 | | | | | | | 12 | 7 | 5 | - | | |

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m$^2$

1. See Table 6 for notes.


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**Table 14**. STX10 Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing[1]

| Fastener | Stud Spacing (in) | Minimum Fastener Length (in) | Foam Thickness (in) | Maximum Spacing of Fasteners (in) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Using 3/8" WSP Sheathing | | | | | | Using 3/4" x 3 1/2" Wood Furring | | | | | |
| | | | | Maximum Cladding Weight (psf) | | | | | | Maximum Cladding Weight (psf) | | | | | |
| | | | | 5 | 10 | 15 | 20 | 25 | 30 | 5 | 10 | 15 | 20 | 25 | 30 |
| STX10 | 16 o.c. | 3.5 | 0.5 | 24 | 20 | 12 | 8 | | 7 | - | | | | | |
| | | 4 | 0.5 | | | | | | | 24 | 20 | 16 | 12 | 8 | |
| | | | 1.0 | | 12 | 8 | 7 | 5 | 4 | - | | | | | |
| | 24 o.c. | 3.5 | 0.5 | | | | | 6 | 5 | | | | | | |
| | | 4 | 0.5 | | | | | | | 24 | 16 | 12 | 8 | 7 | 6 |
| | | | 1.0 | 16 | 8 | 6 | 4 | - | | - | | | | | |

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

1. See Table 6 for notes.


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**Table 15**. SCTX15 Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing[1]

| Fastener | Stud Spacing (in) | Minimum Fastener Length (in) | Foam Thickness (in) | Maximum Spacing of Fasteners (in) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Using 3/8" WSP Sheathing | | | | | | Using 3/4" x 3 1/2" Wood Furring | | | | | |
| | | | | Maximum Cladding Weight (psf) | | | | | | Maximum Cladding Weight (psf) | | | | | |
| | | | | 5 | 10 | 15 | 20 | 25 | 30 | 5 | 10 | 15 | 20 | 25 | 30 |
| SCTX15 | 16 o.c. | 3.5 | 0.5 | 24 | 24 | 24 | | 16 | | - | | | | | |
| | | 4 | 0.5 | | | | | | | 24 | | | | 20 | 16 |
| | | | 1.0 | | | 20 | 12 | | 8 | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | | 16 | 12 | |
| | | | 1.5 | | 20 | 12 | 8 | 8 | 7 | 24 | | 16 | 12 | 8 | |
| | | | 2.0 | | 16 | | | 7 | 6 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | 20 | 12 | 8 | | 7 |
| | | | 2.5 | | 12 | 8 | 7 | 5 | 4 | | 16 | | 8 | 7 | 6 |
| | | | 3.0 | | | | 6 | | | - | | | | | |
| | | 7 | 3.0 | | | | | | | 24 | 16 | 8 | | 6 | 5 |
| | | | 4.0 | 16 | 8 | 6 | 4 | - | | - | | | | | |
| | | 8 | 4.0 | | | | | | | 24 | 12 | 8 | 6 | 5 | 4 |
| | 24 o.c. | 3.5 | 0.5 | 24 | 24 | 20 | 16 | 12 | 8 | - | | | | | |
| | | 4 | 0.5 | | | | | | | 24 | | 20 | 16 | 12 | 8 |
| | | | 1.0 | | 20 | 12 | 8 | | 7 | - | | | | | |
| | | 5 | 1.0 | | | | | | | 24 | | 16 | 12 | 8 | |
| | | | 1.5 | | 12 | 8 | 7 | 6 | 5 | 24 | 16 | 12 | 8 | 7 | 6 |
| | | | 2.0 | | | | 6 | 4 | | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | 12 | 8 | 7 | 6 | 5 |
| | | | 2.5 | 16 | 8 | 6 | 4 | - | | | | | 6 | 5 | 4 |
| | | | 3.0 | | | 5 | | | | - | | | | | |
| | | 7 | 3.0 | | | | | | | 20 | 8 | 7 | 5 | 4 | - |
| | | | 4.0 | 12 | 6 | 4 | - | | | - | | | | | |
| | | 8 | 4.0 | | | | | | | 16 | 8 | 5 | 4 | - | |

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m²

1. See Table 6 for notes.


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**Table 16**. WTX15 Fastener Spacing to Support Cladding Weight for Various Thicknesses of Foam Sheathing[1]

| Fastener | Stud Spacing (in) | Minimum Fastener Length (in) | Foam Thickness (in) | Maximum Spacing of Fasteners (in) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Using 3/8" WSP Sheathing | | | | | | Using 3/4" x 3 1/2" Wood Furring | | | | | |
| | | | | Maximum Cladding Weight (psf) | | | | | | Maximum Cladding Weight (psf) | | | | | |
| | | | | 5 | 10 | 15 | 20 | 25 | 30 | 5 | 10 | 15 | 20 | 25 | 30 |
| WTX15 | 16 o.c. | 3.5 | 0.5 | 24 | 24 | 24 | 24 | 24 | | - | | | | | |
| | | 4 | 0.5 | | | | | | | 24 | | | | | |
| | | | 1.0 | | | | | 20 | 16 | - | | | | | |
| | | 4.5 | 1.0 | | | | | | | 24 | | | | 20 | 16 |
| | | | 1.5 | | | | 16 | 12 | 12 | - | | | | | |
| | | 5 | 1.5 | | | | | | | 24 | | | 16 | 12 | |
| | | | 2.0 | | | 20 | 12 | | 8 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | | 20 | 16 | 12 | 8 |
| | | | 2.5 | | | 16 | | 8 | | | | 16 | 12 | 8 | |
| | | | 3.0 | | 20 | 12 | 8 | | 7 | - | | | | | |
| | | 7 | 3.0 | | 20 | 12 | 8 | 8 | 7 | 24 | | 16 | 12 | 8 | |
| | | | 4.0 | | 16 | 8 | | 6 | 5 | - | | | | | |
| | | 8 | 4.0 | | 16 | 8 | 8 | 6 | 5 | 24 | 16 | 12 | 8 | 7 | 6 |
| | 24 o.c. | 3.5 | 0.5 | 24 | 24 | 24 | | 16 | | - | | | | | |
| | | 4 | 0.5 | | | | | | | 24 | | | | 20 | 16 |
| | | | 1.0 | | | 20 | 16 | 12 | 8 | - | | | | | |
| | | 4.5 | 1.0 | | | | | | | 24 | | | 16 | 12 | |
| | | | 1.5 | | | 16 | 12 | 8 | | - | | | | | |
| | | 5 | 1.5 | | | | | | | 24 | | 16 | 12 | 8 | |
| | | | 2.0 | | 20 | 12 | 8 | | 6 | - | | | | | |
| | | 6 | 2.0 | | | | | | | 24 | 20 | 12 | 8 | | 7 |
| | | | 2.5 | | 16 | 8 | | 6 | 5 | | 16 | | 8 | 7 | 6 |
| | | | 3.0 | | 12 | | 7 | 5 | 4 | - | | | | | |
| | | 7 | 3.0 | | | | | | | 24 | 16 | 8 | 8 | 6 | 5 |
| | | | 4.0 | 20 | 8 | 7 | 5 | 4 | | - | | | | | |
| | | 8 | 4.0 | | | | | | - | 24 | 12 | 8 | 6 | 5 | 4 |

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m$^2$

1. See Table 6 for notes.

6.5 Alternative techniques shall be permitted in accordance with accepted engineering practice and experience. These provisions for the use of alternative materials, designs, and methods of construction are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed herein. This includes, but is not limited to, the following areas of engineering: mechanics of materials, structures, building science, and fire science.


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## 7 Certified Performance[29]

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.[30]

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.[31]

## 8 Regulatory Evaluation and Accepted Engineering Practice

8.1 Big Timber Screws comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 Big Timber Screws were evaluated for their ability to support gravity loads in the application of cladding attachment over foam sheathing in wood-frame construction.

8.1.2 With the exception of STX and SCTX Stainless Screws, use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this report.

8.1.2.1 STX and SCTX Stainless Screws are allowed for use in locations exposed to saltwater or saltwater spray.

8.2 Any building code, regulation and/or accepted engineering evaluations (e.g., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified[32] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[33] respectively.

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

## 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, contact the manufacturer for counsel on the proper installation method.

9.3 *Installation Procedure*

9.3.1 Big Timber Screws shall be installed using the appropriate rotating driver.

9.3.2 Big Timber Screws shall not be struck with a hammer during installation.

9.3.3 Lead holes are not required.

9.3.4 Minimum penetration into stud for this application is 2". The fastener head must be installed flush to the surface of the wood member being connected. The fastener must not be overdriven.

9.3.5 Fasteners should be aligned perpendicular to the face of the wall stud so that the point engages the center of the wall stud and at a minimum distance of 3" from the end of the stud or furring material.

9.3.6 For applications outside the scope of this report, an engineered design is required.


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9.3.7 Minimum requirements for fastener spacing, edge distance, and end distance shall be in accordance with **Table 17**.

**Table 17**. Minimum Spacing, Edge Distance, and End Distance Requirements[1]

| Connection Geometry | Minimum Spacing/Distance (in) | | | | | | |
|---|---|---|---|---|---|---|---|
| | STX10 | BTX10, YTX10 | CTX14, BTX14 | BL14 | CTX15, SCTX15, WTX15 | BL17, GL17 | CTX17 |
| Edge Distance – Load in any direction | 3/8 | 1/2 | | | 5/8 | | |
| End Distance – Load parallel to grain, towards end | 2 1/4 | 2 3/8 | 2 5/8 | 2 7/8 | 3 1/8 | 3 3/8 | 3 3/8 |
| End Distance – Load parallel to grain, away from end | 1 1/2 | 1 5/8 | 1 3/4 | 1 3/4 | 2 1/8 | 2 1/4 | 2 1/4 |
| End Distance – Load perpendicular to grain | 1 1/2 | 1 5/8 | 1 3/4 | 1 3/4 | 2 1/8 | 2 1/4 | 2 1/4 |
| Spacing between Fasteners in a Row – Parallel to grain | 2 1/4 | 2 3/8 | 2 5/8 | 2 7/8 | 3 1/8 | 3 3/8 | 3 3/8 |
| Spacing between Fasteners in a Row – Perpendicular to grain | 1 1/2 | 1 5/8 | 1 3/4 | 1 7/8 | 2 1/8 | 2 1/4 | 2 1/4 |
| Spacing between Rows of Fasteners – In-line | 3/4 | 7/8 | | 1 | 1 1/8 | | 1 1/8 |
| Spacing between Rows of Fasteners – Staggered | 3/8 | 1/2 | | | 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 more restrictive.

## 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 Connection design value calculations by DrJ Engineering, LLC in accordance with NDS and accepted engineering practice.

10.1.2 Properties for Big Timber CTX Construction Lag Screws are from Report Number 1907-01.

10.1.3 Properties for Big Timber BL Log, Timber, and Landscape Screws and GL Gray Structural Screws are from Report Number 1907-02.

10.1.4 Properties for Big Timber BTX and YTX General Purpose Screws are from Report Number 1911-01.

10.1.5 Properties for Big Timber STX and SCTX Stainless Screws are from Report Number 1911-02.

10.1.6 Properties for Big Timber WTX Wafer Head Screws are from Report Number 1911-04.

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 an RDP. Accuracy of external test data and resulting analysis is relied upon.

10.3 Where applicable, 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.


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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*

10.5.1 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.[34]

10.6 Where additional condition of use and/or regulatory compliance information is required, please search for Big Timber Screws on the DrJ Certification website.

## 11 Findings

11.1 As outlined in **Section 6**, Big Timber Screws have performance characteristics that were tested and/or meet applicable regulations. In addition, they 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, Big Timber Screws shall be approved for the following applications:

11.2.1 Acceptable use as an alternative material, design, and method of construction for the attachment of furring, sheathing, or cladding over foam sheathing and into wood framing.

11.2.2 Big Timber Screws meet the requirements of the listed editions of the IBC and IRC for supporting to the dead weight of wall sheathing, furring and/or cladding when connected to the wall framing through an intermediate layer of foam sheathing in conventional light-frame wood construction.

11.3 Unless exempt by state statute, when Big Timber Screws 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 Western Builders Supply.

11.5 IBC Section 104.2.3[35] (IRC Section R104.2.2[36] and IFC Section 104.2.3[37] are similar) in pertinent part state:

> 104.2.3 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, provided that any such alternative is not specifically prohibited by this code and has been approved.

11.6 **Approved:**[38] Building regulations require that the building official shall accept duly authenticated reports.[39]

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 Arrangement (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.[40]


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## 12 Conditions of Use

12.1 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.

12.2 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this report, with the exception of the STX and SCTX Stainless Screws, where exposure to saltwater or saltwater spray is allowed.

12.3 Install fasteners prior to utility installations in exterior walls to avoid accidental penetration of utilities (e.g., electrical wiring, plumbing, etc.)

12.4 Foam sheathing shall be minimum Type II (expanded polystyrene) or Type X (extruded polystyrene) per ASTM C578 or Type 1 (polyiso) per ASTM C1289. Types with greater compressive strength are also acceptable.

12.5 Ensure furring or sheathing material provides adequate substrate and thickness for the application of the siding fastener per the code requirements for siding application and the siding manufacturer installation instructions.

12.5.1 For example, if the siding manufacturer requires the fastener for the siding to penetrate more than $^{3}/_{4}$" into the furring, a 1" x 4" furring strip (actual dimension of $^{3}/_{4}$" x $3^{1}/_{2}$") would not be adequate, and a thicker furring strip, such as a 2" x 4", would be required.

12.6 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:

12.6.1 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.

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

12.6.3 At a minimum, these innovative products shall be installed per **Section 9**.

12.6.4 The review of this report by the AHJ shall comply with IBC Section 104.2.3.2 and IBC Section 105.3.1.

12.6.5 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.7.2, IBC Section 110.4, IBC Section 1703, IRC Section R104.7.2, and IRC Section R109.2.

12.6.6 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.

12.7 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *"the building official shall make, or cause to be made, the necessary tests and investigations; or 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 Section 104.2.3"*, all of IBC Section 104, and IBC Section 105.3.

12.8 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).

12.9 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.


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## 13 Identification

13.1 Big Timber Screws (CTX Construction Lag Screws, BL Log, Timber, and Landscape Screws, GL Gray Structural Screws, BTX and YTX General Purpose Screws, STX and SCTX Stainless Screws, and WTX Wafer Head Screws), as 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.marmonfasteners.com/big-timber-us.

## 14 Review Schedule

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

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


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# Notes

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

2 2021 IRC Section R317.3

3 2018 IBC Section 2304.10.5

4 2021 IRC Section R317.3

5 Capitalized terms and responsibilities are defined pursuant to the applicable building code, applicable reference standards, the latest edition of TPI 1, the NDS, AISI S202, US professional engineering law, Canadian building code, Canada professional engineering law, Qualtim External Appendix A: Definitions/Commentary, Qualtim External Appendix B: Project/Deliverables, Qualtim External Appendix C: Intellectual Property and Trade Secrets, definitions created within Design Drawings and/or definitions within Reference Sheets. Beyond this, terms not defined shall have ordinarily accepted meanings as the context implies. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

6 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1702

7 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/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3

8 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.2:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests

9 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/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.1:~:text=Conformance%20to%20Standards-,The%20design%20strengths%20and%20permissible%20stresses,-of%20any%20structural

10 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20make%2C%20or%20cause%20to%20be%20made%2C%20the%20necessary%20tests%20and%20investigations%3B%20or%20the%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%20104.2.3.

11 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4.2

12 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_agency

13 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_source

14 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.

15 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/

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

17 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.1:~:text=directed%20to%20enforce%20the%20provisions%20of%20this%20code

18 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3 AND https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#105.3.1

19 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1

20 https://iaf.nu/en/about-iaf-mla/#:~:text=Once%20an%20accreditation%20body%20is%20a%20signatory%20of%20the%20IAF%20MLA%2C%20it%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

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

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

23 Unless otherwise noted, the links referenced herein use un-amended versions of the 2024 International Code Council (ICC) 2024 International Code Council (ICC) model codes as foundation references. Mississippi versions of the IBC 2024 and the IRC 2024 are un-amended. This material, product, design, service and/or method of construction also complies with the 2000-2012 versions of the referenced codes and the standards referenced therein. As pertinent to this technical and code compliance evaluation, CBI and/or DrJ staff have reviewed any state or local regulatory amendments to assure this report is in compliance.

24 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by the local jurisdiction. https://up.codes/codes/general

25 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by state. https://up.codes/codes/general

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

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

28 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2(Listed%20or%20certified); https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#listed AND https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#labeled

29 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4

30 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


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[31] 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

[32] 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.

[33] https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?prgID=1&orgID=2125&statusID=4#:~:text=Bill%20Payment%20Date-,Accredited%20Scopes,-13%20ENVIRONMENT.%20HEALTH

[34] See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition: https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

[35] 2021 IBC Section 104.11

[36] 2021 IRC Section R104.11

[37] 2018: https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9 AND 2021: https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11

[38] 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 (https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#201.4) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

[39] https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1

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


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