



**CERTIFICATION**



**Approved. Sealed. Code Compliant.**

**Technical Evaluation Report**

**TER 1907-05**

Big Timber® Cladding Attachment  
through Foam Sheathing

**Western Builders Supply  
DBA Big Timber®**

**Products:**

**Big Timber® CTX, BL, GL, BTX,  
YTX, STX, SCTX, and WTX  
Screws**

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April 12, 2021

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October 1, 2022



COMPANY  
INFORMATION:

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DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

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

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## 1 PRODUCT EVALUATED<sup>1</sup>

- 1.1 CTX Construction Lag Screws
- BL Log, Timber & Landscape Screws
- GL Gray Structural Screws
- BTX and YTX General Purpose Screws
- STX and SCTX Stainless Screws
- WTX Wafer Head Screws

## 2 APPLICABLE CODES AND STANDARDS<sup>2,3</sup>

### 2.1 Codes

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

### 2.2 Standards and Referenced Documents

- 2.2.1 *AISI S904: Standard Test Methods for Determining the Tensile and Shear Strength of Screws*
- 2.2.2 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*
- 2.2.3 *ASTM A153: Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*
- 2.2.4 *ASTM A493: Standard Specification for Stainless Steel Wire and Wire Rods for Cold Heading and Cold Forging*
- 2.2.5 *ASTM A510: Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel*
- 2.2.6 *ASTM B117: Standard Test Methods for Operating Salt Spray (Fog) Apparatus*
- 2.2.7 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*

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<sup>1</sup> For more information, visit [drjcertification.org](http://drjcertification.org) or call us at 608-310-6748.

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

<sup>3</sup> All terms defined in the applicable building codes are italicized.

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

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

### 3 PERFORMANCE EVALUATION

- 3.1 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.
- 3.2 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this TER, with the exception of stainless steel screws (STX and SCTX).
  - 3.2.1 STX and SCTX screws are allowed for use in locations exposed to saltwater or saltwater spray.
- 3.3 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.4 Any engineering evaluation conducted for this TER was performed within DrJ's ANAB "accredited ICS code scope" and/or the defined professional engineering scope of work on the dates provided herein.

### 4 PRODUCT DESCRIPTION AND MATERIALS

#### 4.1 *Fastener Descriptions*

- 4.1.1 CTX 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

- 4.1.2 BL and GL screws have a hex washer head and are partially threaded. The BL and GL screws are shown in Figure 2 and Figure 3, respectively.



FIGURE 2. BL LOG, TIMBER & LANDSCAPING SCREW



FIGURE 3. GL GRAY STRUCTURAL SCREW

- 4.1.3 BTX and YTX screws have a round flat head with a star drive (torx screw) and are partially threaded. The BTX and YTX 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)

- 4.1.4 STX and SCTX Stainless screws are made from Grade 316 stainless steel. The STX screw has a round flat head with ribs and a star drive (torx screw) and is partially threaded (Figure 6). The SCTX screw has a round washer head and a star drive (torx screw) and is partially threaded (Figure 7).



FIGURE 6. STX GENERAL PURPOSE STAINLESS STEEL SCREW



FIGURE 7. SCTX CONSTRUCTION LAG STAINLESS STEEL SCREW

- 4.1.5 WTX screws have a round wafer head with a star drive (torx screw) and are partially threaded. The product evaluated in this TER is shown in Figure 8.



FIGURE 8. WTX WAFER HEAD SCREW

- 4.1.6 Screws evaluated in this TER are manufactured using a standard cold-formed process, followed by a heat-treating process, with the exception of the STX and SCTX, which do not undergo a heat-treating process.

#### 4.2 Fastener Coatings

- 4.2.1 CTX 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*.
- 4.2.2 BL and WTX screws are coated with a proprietary coating, designated as Black, which exceeds the protections provided by hot-dipped galvanized coatings conforming to *ASTM A153*.
- 4.2.3 GL 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*.
- 4.2.4 BTX screws are coated with a proprietary coating, designated as Bronze, which exceeds the protections provided by hot-dipped galvanized coatings conforming to *ASTM A153*.
- 4.2.5 YTX screws are coated with a proprietary zinc coating, designated as Gold Star.

- 4.2.6 CTX, BL, GL, BTX, STX, SCTX, and WTX fasteners 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<sup>4</sup> and IRC Section R317.3.
- 4.2.6.1 The proprietary coating and stainless material have been tested and found to exceed the protection provided by code-approved hot-dipped galvanized coatings meeting *ASTM A153, Class D* (IBC Section 2304.10.5<sup>5</sup> and IRC Section R317.3), allowing for its use in pressure-treated wood.
- 4.2.7 Fasteners are approved for use in fire-retardant-treated lumber, provided the conditions set forth by the fire-retardant-treated lumber manufacturer are met, including appropriate strength reductions.
- 4.2.8 Only the STX and SCTX fasteners are approved for use in chemically-treated wood with exposure to saltwater, including coastal construction applications.
- 4.3 The CTX fasteners evaluated in this TER are set forth in Table 1.

TABLE 1. CTX FASTENER SPECIFICATIONS

Fastener Name	Designation	Head (in)		Nominal Length <sup>1</sup> (in)	Thread Length <sup>1</sup> (in)	Shank Diameter <sup>2</sup> (in)	Thread Diameter (in)		Specified Minimum Core Hardness <sup>4</sup> (HV 0.3)	Nominal Bending Yield, $f_{yb}$ (psi)	Allowable Fastener Strength (lbf)	
		Diameter	Drive Type				Minor	Major			Tensile	Shear <sup>3</sup>
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.

<sup>4</sup> 2012 IBC Section 2304.9

<sup>5</sup> 2012 IBC Section 2304.9.5



4.4 The BL and GL fasteners evaluated in this TER are set forth in Table 2.

TABLE 2. BL AND GL FASTENER SPECIFICATIONS

Fastener Name	Designation	Head (in)		Nominal Length <sup>1</sup> (in)	Thread Length <sup>1</sup> (in)	Shank Diameter <sup>2</sup> (in)	Thread Diameter (in)		Specified Minimum Core Hardness <sup>4</sup> (HV 0.3)	Nominal Bending Yield, f <sub>yb</sub> (psi)	Allowable Fastener Strength (lbf)	
		Diameter	Drive Type				Minor	Major			Tensile	Shear <sup>3</sup>
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	2½							
	14 x 8"			8	2½							
	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.



4.5 The BTX and YTX fasteners evaluated in this TER are set forth in Table 3.

TABLE 3. BTX AND YTX FASTENER SPECIFICATIONS

Fastener Name(s)	Designation	Head (in)		Nominal Length <sup>1</sup> (in)	Thread Length <sup>1</sup> (in)	Shank Diameter <sup>2</sup> (in)	Thread Diameter (in)		Specified Minimum Core Hardness <sup>4</sup> (HV 0.3)	Nominal Bending Yield, f <sub>yb</sub> (psi)	Allowable Fastener Strength (lbf)	
		Diameter	Drive Type				Minor	Major			Tensile	Shear <sup>3</sup>
BTX	10 x 3"	0.374	Torx 25	3	1½	0.151	0.134	0.209	355	205,000	960	710
	10 x 3½"			3½	2							
	10 x 4"			4	2							
	10 x 5"			5	2½							
	10 x 6"			6	2½							
	14 x 5"	0.465	Torx 30	5	2½	0.169	0.145	0.232	286	211,000	1,270	960
	14 x 6"			6	2½							
	14 x 7"			7	2½							
14 x 8"	8			2½								
YTX	10 x 3"	0.374	Torx 25	3	1½	0.151	0.134	0.209	355	205,000	960	710
	10 x 3⅛"			3⅛	1½							
	10 x 3½"			3½	2							
	10 x 4"			4	2							
	10 x 5"			5	2½							
	10 x 6"			6	2½							

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.

4.6 The STX and SCTX fasteners evaluated in this TER are set forth in Table 4.

TABLE 4. STX AND SCTX FASTENER SPECIFICATIONS

Fastener Name(s)	Designation	Head (in)		Nominal Length <sup>1</sup> (in)	Thread Length <sup>1</sup> (in)	Shank Diameter <sup>2</sup> (in)	Thread Diameter (in)		Nominal Bending Yield, $f_{yb}$ (psi)	Allowable Fastener Strength (lbf)	
		Diameter	Drive Type				Minor	Major		Tensile	Shear <sup>3</sup>
STX	10 x 3½"	0.376	Torx 25	3½	2	0.145	0.126	0.193	124,000	440	420
	10 x 4"			4	2						
SCTX	15 x 3½"	0.620	Torx 30	3½	2½	0.202	0.179	0.275	111,000	855	725
	15 x 4"			4	2½						
	15 x 5"			5	3						
	15 x 6"			6	3						
	15 x 7"			7	3½						
	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.

4.7 The WTX fasteners evaluated in this TER are set forth in Table 5.

TABLE 5. WTX FASTENER SPECIFICATIONS

Fastener Name	Designation	Head (in)		Nominal Length <sup>1</sup> (in)	Thread Length <sup>1</sup> (in)	Shank Diameter <sup>2</sup> (in)	Thread Diameter (in)		Specified Minimum Core Hardness <sup>4</sup> (HV 0.3)	Nominal Bending Yield, $f_{yb}$ (psi)	Allowable Fastener Strength (lbf)	
		Diameter	Drive Type				Minor	Major			Tensile	Shear <sup>3</sup>
WTX	15 x 3"	0.659	Torx 30	3	2¾	0.205	0.187	0.274	286	190,000	1,545	1,165
	15 x 3½"			3½	2							
	15 x 4"			4	2							
	15 x 4½"			4½	2							
	15 x 5"			5	2							
	15 x 6"			6	2½							
	15 x 8"			8	2½							

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 15x3" 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.



## 5 APPLICATIONS

### 5.1 General

- 5.1.1 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.
- 5.1.2 Big Timber® screws are installed without lead holes, as prescribed in *NDS*.
- 5.1.3 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

### 5.2 Design

- 5.2.1 Design of Big Timber® screws are governed by the applicable code and the provisions for dowel type fasteners in *NDS*.
- 5.2.2 Unless otherwise noted, adjustment of the design stresses for duration of load shall be in accordance with the applicable code.

### 5.3 Procedure for Calculating Fastener Spacing

- Step 1: Determine the spacing between studs or framing members, either 16" or 24" o.c. (on-center).
- Step 2: Calculate the correct thickness of rigid foam, up to 4", needed to obtain the required insulation effect or R-value.
- Step 3: Choose the furring or sheathing (substrate) material to which the cladding will be affixed:
  1. Minimum ¾" x 3½" wood furring
  2. Minimum ¾" or Wood Structural Panel (WSP) sheathing

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

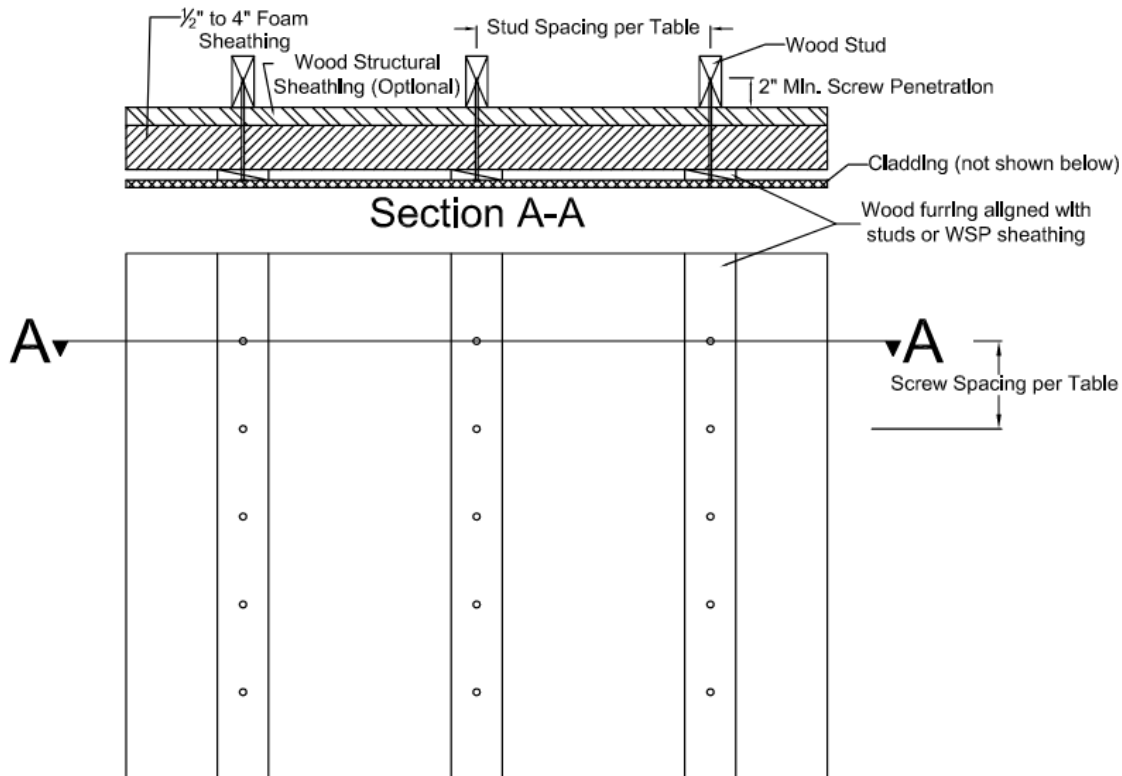


FIGURE 9. ELEVATION VIEW OF WALL ASSEMBLY WITH VERTICALLY ORIENTED WOOD FURRING

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

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.
2. Wood furring may add up to 1 psf of additional weight; wood sheathing may add up to 1.5 psf, depending on thickness.

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 5.4.

#### 5.4 Fastening Design Tables

5.4.1 Refer to Table 7, Table 8, Table 9, Table 10, Table 11, Table 12, Table 13, Table 14, Table 15, and Table 16 for recommended fastener spacing for cladding over foam.

5.4.1.1 Table 6 provides notes that apply to the design tables in Section 5.4.

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, SG, 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 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's installation requirements (e.g., 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.

TABLE 7. CTX14 FASTENER SPACING TO SUPPORT CLADDING WEIGHT FOR VARIOUS THICKNESSES OF FOAM SHEATHING

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 3/2" 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		-												
		5	1.0		20	12	8		7	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		20	8	7	5	4	-	24	16	8		6	5	
			2.5									12	8	7	5	4	
			3.0									8	6	4	-	-	
		24 o.c.	4		0.5	24	20	12	8		7	24		16	12	8	
					1.0		-										
			5		1.0		12	8	7	6	5	24	16	12	8	7	6
					1.5		20	8	7	5	4		-	12	8	7	5
	2.0			5	4				-								
	6		2.0	16	8		7	5	4	-	20	8	7	5	4	-	
			2.5								16		8	6	4	-	
			3.0								12		7	4	-	-	
	SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m <sup>2</sup> 1. See Table 6 for notes.																



TABLE 8. CTX15 FASTENER SPACING TO SUPPORT CLADDING WEIGHT FOR VARIOUS THICKNESSES OF FOAM SHEATHING

Fastener	Stud Spacing (in)	Minimum Fastener Length (in)	Foam Thickness (in)	Maximum Fastener Spacing (in)															
				Using 3/8" WSP Sheathing						Using 3/4" x 3/2" 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	20	16	24						20				
			1.0			16	12			-									
		5	1.0		16		12	8	24	24	20	16	12						
			1.5			8	7	20		16	12	8							
			2.0			-													
		6	2.0		12	8	8	7	24	20	12	8							
			2.5				7	6	24	20	12	8	7						
			3.0				6	5	-										
		24 o.c.	4		0.5	24	24	24	16	12	24						20	16	12
					1.0			16	8			-							
			5		1.0		16		12	8	24	24	20	12	8				
					1.5			8	7	6		24	20	12	8	7			
	2.0			-															
	6		2.0	12	8		7	6	5	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<sup>2</sup>

1. See Table 6 for notes.



TABLE 10. BL14 FASTENER SPACING TO SUPPORT CLADDING WEIGHT FOR VARIOUS THICKNESSES OF FOAM SHEATHING

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	20	16	24						20			
			1.0			24	16	12			-							
		5	1.0		16		12	8	24	20	16	12	8					
			1.5			8	7	-										
		6	2.0		20	12	8	7	6	24	20	12	8		7			
			2.5			16	8	6	5	-								
		7	3.0		16		8	6	5	24	16	12	8	7	6			
			3.0			12	6	4			-							
		8	4.0		12		6	4			24	12	8	7	6	5		
			4.0															
		24 o.c.	4		0.5	20	24	24	16	12			24			20	16	12
					1.0			16	12	8			-					
			5		1.0		16		12	8	7	6	24	20	12	8		7
					1.5			-										
	6		2.0	12	8		7	6	5	24	16	12	8	7	6			
			2.5		6		5	4	12		8	7	6	5				
	7		3.0	8	7		5	4	-									
			3.0		24		12	8	6	5	4							
	8		4.0	8	5		4	-	-	24	12	8	6	5	4			
			4.0		20		8	6	5	4	-							

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>  
 1. See Table 6 for notes.



TABLE 11. BL17 AND GL17 FASTENER SPACING TO SUPPORT CLADDING WEIGHT FOR VARIOUS THICKNESSES OF FOAM SHEATHING

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 3/2" 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	24	24	24	24	24	24	24	24	24	24	24	24	24																											
			1.0																					-																										
		5	1.0																					24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24				
			1.5																																												20	16		
			2.0																																												-			
		6	2.0																					24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24				
			2.5																																												20	16	12	
			3.0																																												-			
		7	3.0																					24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24				
			4.0																																												-			
		9	4.0																					20	12	8	8	7	24	16	12	8	24	16	12	8														
		24 o.c.	4																					0.5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24					
	1.0			-																																														
	5		1.0	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24																						24				
			1.5																																												20	16	12	
			2.0																																												-			
	6		2.0	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24																						24				
			2.5																																												20	16	12	8
			3.0																																												-			
	7		3.0	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24																						24				
			4.0																																												-			
	9		4.0	12	8	7	5	4	24	16	8	6	5																																					

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>  
 1. See Table 6 for notes.



TABLE 12. BTX10 AND YTX10 FASTENER SPACING TO SUPPORT CLADDING WEIGHT FOR VARIOUS THICKNESSES OF FOAM SHEATHING

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 3/2" 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	-									
			55		1.0	20	12	8	8	7	-						
		1.0			16	8	7	5	24	20	12	8	7				
		6	2.0		12	8	6	5	4	-							
			2.0		20	8	7	5	4	24	16	8	7	5			
		2.5	8			6	4	-	12	8	7	5	4				
		3.0	16		-												
		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		20	8	7	5	4	24	16	12	8	7	6
	1.5			8	6			4	12	8	7	5	4				
	6		2.0	16	8		6	4	-								
			2.0	12	7		5	-	-	20	8	7	5	4	-		
	2.5		7		5		-	-	16	8	6	4	-				
	3.0		12	6	4		-	-	-								

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>  
 1. See Table 6 for notes.



TABLE 13. BTX14 FASTENER SPACING TO SUPPORT CLADDING WEIGHT FOR VARIOUS THICKNESSES OF FOAM SHEATHING

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 3/2" 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	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	16	8	7	5	4	24	20	12	8	7					
			2.5				6	4	16		8	7	5						
			3.0				12	6	4		-								
			3.0				6	4	24		12	8	7	6	5				
		7	4.0	16	8	6	4	-	24	-									
			4.0							20	8	7	5	4	-				
			-																
			-																
		24 o.c.	5	0.5	24	24	16	12	8	24	24	20	12	8					
				1.0		16	12	8	7		6	20	12	8	7				
				1.5		12	8	7	5		4	16	8	6	5				
				2.0		20	7	5	4		-	-							
	6		2.0	24	8	6	4	-	24	12	8	7	5	4					
			2.5						20	8	7	5	4	-					
			3.0						16	5	4	-							
			3.0						20	8	6	5	4	-					
	7		4.0	12	6	4	-	-	-										
			4.0						12	7	5	-							
			-																
			-																

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>  
 1. See Table 6 for notes.



TABLE 14. STX10 FASTENER SPACING TO SUPPORT CLADDING WEIGHT FOR VARIOUS THICKNESSES OF FOAM SHEATHING

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 3/2" 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						-						
	24 o.c.	3.5	0.5		12	8	7	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/m<sup>2</sup>  
 1. See Table 6 for notes.



TABLE 15. SCTX15 FASTENER SPACING TO SUPPORT CLADDING WEIGHT FOR VARIOUS THICKNESSES OF FOAM SHEATHING

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			20	12		8	7	24		16	12	8			
			1.0		-						24		16	12	8			
		5	1.0		16	12		8	7	6	24		16	12	8			
			1.5			-						24	16	12	8			
		6	2.0		12	8	7	6	24		20	12	8		7			
			2.5				7	6	24	16	12	8	7	6				
			3.0			6	5	4	-									
		7	3.0		8	6	4	-		-		24	16	8	6	5		
			4.0					-						-				
		8	4.0		16	8	6	4	-		24	12	8	6	5	4		
		24 o.c.	3.5		0.5	24	24	20	16	12	8	-				24	20	16
	0.5			-						-								
	4		1.0	20	12		8		7	24		16	12	8				
			1.0		-						24		16	12	8			
	5		1.5	12	8		7	6	5	24	16	12	8	7	6			
			2.0				6	4	-									
	6		2.0	8	6		4	-		-		24	12	8	7	6	5	
			2.5					6	4	24	12	8	6	5	4			
			3.0					5	4	-								
	7		3.0	16	8		5	4	-		-		20	8	7	5	4	-
			4.0						-						-			
	8		4.0	12	6		4	-	-		-		16	8	5	4	-	

SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>

1. See Table 6 for notes.



TABLE 16. WTX15 FASTENER SPACING TO SUPPORT CLADDING WEIGHT FOR VARIOUS THICKNESSES OF FOAM SHEATHING

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	24	24	24	-														
			0.5									24														
		4	1.0			24	24	24	24	24	24	24	24	24	24	20	16	-								
			1.0															24		20	16					
		4.5	1.5				24	16	12	12	12	12	12	12	12	12	-									
			1.5														24		16	12						
		5	2.0					24	20	12	12	12	12	12	12	12	12	24	20	16	12	8				
			2.0																				-			
		6	2.5						24	16	12	12	12	12	12	12	12	12	24	16	12	8	8			
			2.5																					-		
		8	3.0							24	20	12	8	8	8	8	8	8	8	24	16	12	8	8		
			3.0																						-	
	8	4.0	24	16	8						8	8	8	8	8	8	8	24	16	12	8	7	6			
		4.0																						-		
	24 o.c.	3.5		0.5	24	24					24	16	16	16	16	16	16	16	16	16	16	16	16			
				0.5																				24		
		4		1.0			24				24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	
				1.0																						-
		4.5		1.5				24			16	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
				1.5																						-
		5		2.0					24		20	12	12	12	12	12	12	12	12	12	12	12	12	12	12	
				2.0																						-
		6		2.5						24	16	12	8	8	8	8	8	8	8	24	20	12	8	7	6	
				2.5																						-
		8	3.0	24							12	8	7	7	7	7	7	7	7	24	16	8	6	5	4	
			3.0																							-
		8	4.0								24	20	8	7	5	4	4	4	4	4	24	12	8	6	5	4
			4.0																							

Sl: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m<sup>2</sup>

1. See Table 6 for notes.



## 6 INSTALLATION

- 6.1 Installation shall comply with the manufacturer’s installation instructions and this TER. In the event of a conflict between the manufacturer’s installation instructions and this TER, the more restrictive shall govern.
- 6.2 Big Timber® fasteners shall be installed using the appropriate rotating driver.
- 6.3 Fasteners shall not be struck with a hammer during installation.
- 6.4 Lead holes are not required.
- 6.5 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.
- 6.6 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.
- 6.7 For applications outside the scope of this TER, an engineered design is required.
- 6.8 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

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 the more restrictive.

## 7 SUBSTANTIATING DATA

- 7.1 Connection design value calculations by DrJ Engineering, LLC in accordance with *NDS* and accepted engineering practice.
- 7.2 Properties for Big Timber® CTX Construction Lag Screws are from DrJ [TER 1907-01](#).
- 7.3 Properties for Big Timber® BL Log, Timber & Landscape Screws and GL Gray Structural Screws are from DrJ [TER 1907-02](#).
- 7.4 Properties for Big Timber® BTX and YTX General Purpose Screws are from DrJ [TER 1911-01](#).
- 7.5 Properties for Big Timber® STX and SCTX Stainless Screws are from DrJ [TER 1911-02](#).
- 7.6 Properties for Big Timber® WTX Wafer Head Screws are from DrJ [TER 1911-04](#).
- 7.7 Information contained herein is the result of testing and/or data analysis by sources which conform to [IBC Section 1703](#) and/or [professional engineering regulations](#). DrJ relies upon accurate data to perform its ISO/IEC 17065 evaluations.
- 7.8 Where appropriate, DrJ's analysis is based on provisions that have been codified into law through state or local adoption of codes and standards. The providers of the codes and standards are legally responsible for their content. DrJ analysis may use code-adopted provisions as a control sample. A control sample versus a test sample establishes a product as [being equivalent](#) to that prescribed in this code in quality, *strength*, effectiveness, *fire resistance*, durability, and safety. Where the accuracy of the provisions provided herein is reliant upon the published properties of materials, DrJ relies upon the grade mark, grade stamp, mill certificate, and/or test data provided by material suppliers to be minimum properties. DrJ analysis relies upon these properties to be accurate.

## 8 FINDINGS

- 8.1 When used and installed in accordance with this TER and the manufacturer's installation instructions, the product(s) listed in Section 1.1 are approved for the following:
  - 8.1.1 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.
  - 8.1.2 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.
- 8.2 This product has been evaluated in the context of the codes listed in Section 2 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this TER, they are listed here.
  - 8.2.1 No known variations
- 8.3 Building codes require data from valid [research reports](#) be obtained from [approved sources](#) (i.e., licensed [registered design professionals](#) [RDPs]).
  - 8.3.1 Building official approval of a licensed RDP is performed by verifying the RDP and/or their business entity is listed by the [licensing board](#) of the relevant [jurisdiction](#).
- 8.4 Agencies who are accredited through ISO/IEC 17065 have met the [code requirements](#) for approval by the [building official](#). DrJ is an ISO/IEC 17065 [ANAB-Accredited Product Certification Body – Accreditation #1131](#) and employs RDPs.
- 8.5 Through ANAB accreditation and the [IAF MLA](#), DrJ certification can be used to obtain product approval in any [jurisdiction](#) or country that has [IAF MLA Members & Signatories](#) to meet the [Purpose of the MLA](#) – “certified once, accepted everywhere.”

8.6 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.9 are similar) states:

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

## 9 CONDITIONS OF USE

- 9.1 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this TER, with the exception of the STX and SCTX screws where exposure to saltwater or saltwater spray is allowed.
- 9.2 Install fasteners prior to utility installations in exterior walls to avoid accidental penetration of utilities (e.g. electrical wiring, plumbing, etc.)
- 9.3 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.
- 9.4 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's installation instructions.
  - 9.4.1 For example, if the siding manufacturer requires the fastener for the siding to penetrate more than  $\frac{3}{4}$ " into the furring, a 1" x 4" furring strip (actual dimension of  $\frac{3}{4}$ " x 3 $\frac{1}{2}$ " ) would not be adequate, and a thicker furring strip, such as a 2" x 4", would be required.
- 9.5 Where required by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.
- 9.6 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.7 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (e.g., owner or RDP).
- 9.8 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.9 This product has an internal quality control program and a third-party quality assurance program in accordance with IBC Section 104.4 and Section 110.4 and IRC Section R104.4 and Section R109.2.
- 9.10 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent.
- 9.11 This TER shall be reviewed for code compliance by the AHJ in concert with IBC Section 104.
- 9.12 The implementation of this TER for this product is dependent on the design, quality control, third-party quality assurance, proper implementation of installation instructions, inspections required by IBC Section 110.3, and any other code or regulatory requirements that may apply.

## 10 IDENTIFICATION

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

## 11 REVIEW SCHEDULE

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