



CERTIFICATION



Approved. Sealed. Code Compliant.

Technical Evaluation Report

TER 1907-04

Big Timber® Multi-Ply Applications

**Western Builders Supply DBA
Big Timber®**

Products:

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

Issue Date:

April 21, 2021

Revision Date:

September 26, 2022

Subject to Renewal:

October 1, 2023



COMPANY
INFORMATION:

Western Builders Supply DBA Big Timber®
53 N 15th St Ste 1
Billings, MT 59101-2501

406-252-6309

sales@bigtimberfasteners.com

bigtimberfasteners.com

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

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

1 Products Evaluated¹

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

2 Applicable Codes and Standards^{2,3}

2.1 Codes

- 2.1.1 *IBC—15, 18, 21: International Building Code®*
- 2.1.2 *IRC—15, 18, 21: International Residential Code®*

2.2 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 A510: Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel*
- 2.2.5 *ASTM A580: Standard Specification for Stainless Steel Wire*
- 2.2.6 *ASTM B117: Standard Test Methods for Operating Salt Spray (Fog) Apparatus*
- 2.2.7 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood*
- 2.2.8 *ASTM D2395: Standard Test Methods for Density and Specific Gravity (Relative Density) of Wood and Wood-Based Materials*

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

² Unless otherwise noted, all references in this TER are from the 2021 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2018 versions of the referenced codes and the standards referenced therein.

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

- 2.2.9 *ASTM D2915: Standard Practice for Sampling and Data-Analysis for Structural Wood and Wood-Based Products*
- 2.2.10 *ASTM D4442: Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials*
- 2.2.11 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*
- 2.2.12 *ASTM G85: Standard Practice for Modified Salt Spray (Fog) Testing*

3 Performance Evaluation

- 3.1 All of the Big Timber® screws in this TER were evaluated for their ability to provide multi-ply attachment in trusses, sawn lumber, and structural composite lumber (SCL) applications.
- 3.2 Unless otherwise noted, use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this TER.
- 3.3 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.4 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 screw has a 1200hr Bronze coating for exterior use and the YTX screw has a gold zinc coating for interior use. 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 (Figure 8).



Figure 8. WTX Wafer Head Screw

4.1.6 All of the 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, 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.
- 4.3 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](#) and [IRC Section R317.3](#).
- 4.3.1 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 2304.10.6](#)⁴ and [IRC Section R317.3](#)), allowing for its use in pressure-treated wood.
 - 4.3.2 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.
- 4.4 The STX and SCTX fasteners are approved for use in chemically-treated wood with exposure to saltwater, including coastal construction applications.

⁴ [2018 IBC Section 2304.10.5](#)



4.5 The CTX fasteners evaluated in this TER are set forth in Table 1.

Table 1. CTX Fastener Specifications

Fastener Name	Designation	Head		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 (in)	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	0.675	Torx 40	6	3	0.226	0.210	0.295	355	170,500	1,850	1,240
	17 x 4			4	2½							
	17 x 5			5	3							
	17 x 6			6	3							
	17 x 7			7	3½							

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.

4.6 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		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 (in)	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	2½							
BL 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							

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.

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

Table 3. BTX and YTX Fastener Specifications

Fastener Name	Designation	Head		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 (in)	Drive Type				Minor	Major			Tensile	Shear ³									
BTX YTX	9 x 3	0.344	T25	3	1½	0.135	0.122	0.175	355	211,000	820	595									
	10 x 3			3	1½																
	10 x 3½			3½	2																
	10 x 4			0.374	T25								4	2	0.151	0.134	0.209	355	205,000	960	710
	10 x 5												5	2½							
	10 x 6												6	2½							
10 x 6	6	2½																			
BTX	14 x 5	0.465	T30	5	2½	0.169	0.145	0.232	286	211,000	1,270	960									
	14 x 6			6	2½																
	14 x 7			7	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.

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

Table 4. STX and SCTX Fastener Specifications

Fastener Name	Designation	Head		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 (in)	Drive Type				Minor	Major		Tensile	Shear ³
STX	9 x 3	0.350	T25	3	1½	0.130	0.110	0.181	122,000	375	340
	10 x 3	0.376	T25	3	1½	0.145	0.126	0.193	124,000	440	420
	10 x 3½			3½	2						
	10 x 4			4	2						
SCTX	15 x 3	0.620	Torx 30	3	2	0.202	0.179	0.275	111,000	855	725
	15 x 3½			3½	2½						
	15 x 4			4	2½						
	15 x 5			5	3						
	15 x 6			6	3						
	15 x 7			7	3½						

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.

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

Table 5. WTX Fastener Specifications

Fastener Name	Designation	Head		Nominal Length ¹ (in)	Thread Length ¹ (in)	Shank Diameter ² (in)	Thread Diameter (in)		Specified Minimum Core Hardness ⁴ (HV 0.30)	Nominal Bending Yield, f_{yb} (psi)	Allowable Fastener Strength (lbf)	
		Diameter (in)	Drive Type				Minor	Major			Tensile	Shear ³
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 5"			5	2							
	15 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.
2. Shank diameter based on manufactured thickness.
3. Shear strength applicable at both the smooth shank and thread diameter.
4. Based on a 300 gram load using the Vickers indenter.

5 Applications

5.1 General

- 5.1.1 All of the Big Timber® screws in this TER are used for attaching multi-ply wood members including trusses, sawn lumber, and SCL products.
- 5.1.2 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

5.2 Design

- 5.2.1 Design of Big Timber® screws is 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 Multi-ply Connection Design Values

- 5.3.1 Sawn lumber design values are provided for assemblies with two, three, or four plies. Sawn lumber assemblies are detailed in Figure 9.

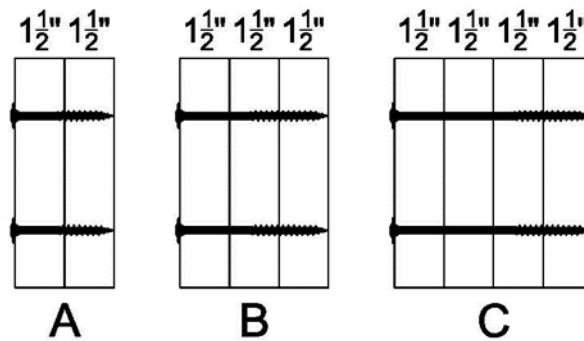


Figure 9. Big Timber® Screw Sawn Lumber Assemblies

- 5.3.2 SCL design values are provided for assemblies with two, three, or four plies. SCL assemblies are detailed in Figure 10.

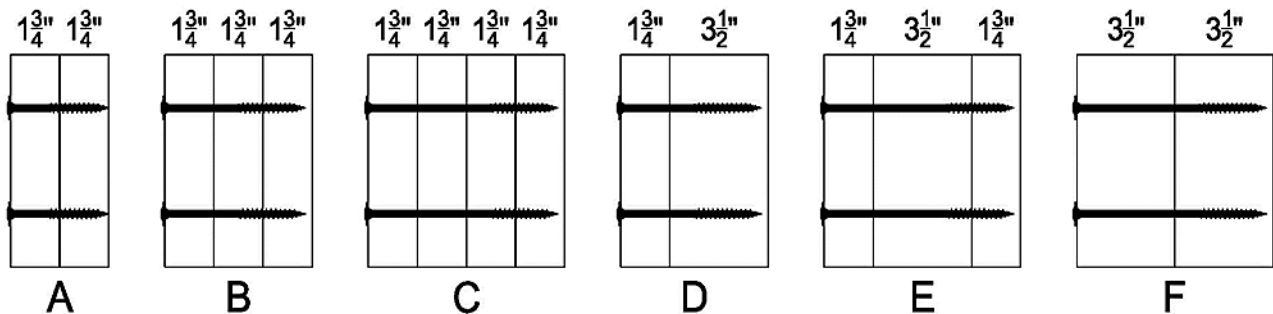


Figure 10. Big Timber® Screw SCL Assemblies

5.3.3 CTX fasteners used in sawn lumber assemblies, with the tabulated fastener spacing along the length of the beam, have the design values set forth in Table 6. Assemblies are detailed in Figure 9.

Table 6. CTX Screw Allowable Lateral Design Values (plf) in Sawn Lumber Assemblies^{2,3,4}

Fastener	Assembly	Members	Fastener Length ¹ (in)	SPF/HF (SG=0.42)						DF/SP (SG=0.50)					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
				Number of Fasteners per Row											
				2	3	2	3	2	3	2	3	2	3	2	3
CTX14	A	2-ply 1½"	3	485	730	365	550	245	370	575	865	430	645	290	435
	B	3-ply 1½"	4	365	550	275	415	185	280	430	645	325	490	215	325
	C	4-ply 1½"	6	325	490	245	370	165	250	380	570	285	430	190	285
CTX15	A	2-ply 1½"	3	520	780	390	585	260	390	685	1030	515	775	345	520
	B	3-ply 1½"	4	545	820	410	615	275	415	710	1065	535	805	355	535
	C	4-ply 1½"	6	345	520	260	390	175	265	460	690	345	520	230	345
CTX17	B	3-ply 1½"	4	625	940	470	705	315	475	800	1200	600	900	400	600
	C	4-ply 1½"	6	360	540	270	405	180	270	500	750	375	565	250	375

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

1. Fastener length is measured from the underside of the head to the tip.
2. Wood framing shall be any species with specific gravity, SG, of 0.42 or greater.
3. Allowable design values are based on a load duration factor $C_D = 1.0$ and shall be multiplied by all applicable adjustment factors per the *NDS*.
4. For top-loaded members with even loading across the width of the entire assembly, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. (on-center) between fasteners in the same row.

5.3.4 CTX fasteners used for SCL assemblies, with the tabulated fastener spacing along the length of the beam, have the design values set forth in Table 7. Assemblies are detailed in Figure 10.

Table 7. CTX Screw Allowable Lateral Design Values (plf) in SCL Assemblies^{2,3,4}

Fasteners	Assembly	Members	Fastener Length ¹ (in)	12" o.c.		16" o.c.		24" o.c.	
				Number of Fasteners per Row					
				2	3	2	3	2	3
CTX14	B	3-ply 1¼"	5	675	1015	510	765	340	510
	D	2-ply 1¼" & 3½"	5	675	1015	510	765	340	510
CTX15	A	2-ply 1¼"	3½	685	1030	515	775	345	520
	B	3-ply 1¼"	5	1015	1525	765	1150	510	765
	D	2-ply 1¼" & 3½"	5	1015	1525	765	1150	510	765
CTX17	B	3-ply 1¼"	5	1125	1690	845	1270	565	850
	C	4-ply 1¼"	7	585	880	440	660	295	445
	D	2-ply 1¼" & 3½"	5	1125	1690	845	1270	565	850
	E	3-ply 1¼" & 3½"	7	585	880	440	660	295	445
	F	2-ply 3½"	7	1120	1680	840	1260	560	840

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

1. Fastener length is measured from the underside of the head to the tip.
2. SCL shall have a specific gravity, SG, of 0.50 or greater. Thicknesses listed in Figure 10 are a minimum.
3. Allowable design values are based on a load duration factor of $C_D = 1.0$ and shall be multiplied by all applicable adjustment factors per the *NDS*.
4. For top-loaded members with even loading across the width of the entire assembly, and a depth of 18" or less, fasteners shall be installed in two (2) rows with a maximum distance of 24" o.c. between fasteners in the same row. Use three (3) rows for members deeper than 18".

5.3.5 BL and GL fasteners used in sawn lumber assemblies, with the tabulated fastener spacing along the length of the beam, have the design values set forth in Table 8. Assemblies are detailed in Figure 9.

Table 8. BL and GL Screw Allowable Lateral Design Values (plf) in Sawn Lumber Assemblies^{2,3,4}

Fastener	Assembly	Members	Fastener Length ¹ (in)	SPF/HF (SG=0.42)						DF/SP (SG=0.50)					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
				Number of Fasteners per Row											
2	3	2	3	2	3	2	3	2	3	2	3	2	3		
BL14	B	3-ply 1½"	4	385	580	290	435	195	295	525	790	395	595	265	400
	C	4-ply 1½"	6	345	520	260	390	175	265	470	705	355	535	235	355
BL17 GL17	B	3-ply 1½"	4	480	720	360	540	240	360	560	840	420	630	280	420
	C	4-ply 1½"	6	705	1060	530	795	355	535	705	1060	530	795	355	535

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

1. Fastener length is measured from the underside of the head to the tip.
2. Wood framing shall be any species with specific gravity, SG, of 0.42 or greater.
3. Allowable design values are based on a load duration factor $C_D = 1.0$ and shall be multiplied by all applicable adjustment factors per the *NDS*.
4. For top-loaded members with even loading across the width of the entire assembly, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. (on-center) between fasteners in the same row.

5.3.6 BL and GL fasteners used in SCL assemblies, with the tabulated fastener spacing along the length of the beam, have the design values set forth in Table 9. Assemblies are detailed in Figure 10.

Table 9. BL and GL Screw Allowable Lateral Design Values (plf) in SCL Assemblies^{2,3,4}

Fastener	Assembly	Members	Fastener Length ¹ (in)	12" o.c.		16" o.c.		24" o.c.	
				Number of Fasteners per Row					
				2	3	2	3	2	3
BL14	B	3-ply 1¼"	5	525	790	395	595	265	400
	C	4-ply 1¼"	7	680	1020	510	765	340	510
	D	2-ply 1¼" & 3½"	5	525	790	395	595	265	400
	E	3-ply 1¼" & 3½"	7	680	1020	510	765	340	510
	F	2-ply 3½"	7	1020	1530	765	1150	510	765
BL17 GL 17	B	3-ply 1¼"	5	795	1195	600	900	400	600
	C	4-ply 1¼"	7	705	1060	530	795	355	535
	D	2-ply 1¼" & 3½"	5	795	1195	600	900	400	600
	E	3-ply 1¼" & 3½"	7	705	1060	530	795	355	535
	F	2-ply 3½"	7	1060	1590	795	1195	530	795

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

1. Fastener length is measured from the underside of the head to the tip.
2. SCL shall have a specific gravity, SG, of 0.50 or greater. Thicknesses listed in Figure 10 are a minimum.
3. Allowable design values are based on a load duration factor of $C_D = 1.0$ and shall be multiplied by all applicable adjustment factors per the *NDS*.
4. For top-loaded members with even loading across the width of the entire assembly, and a depth of 18" or less, fasteners shall be installed in two (2) rows with a maximum distance of 24" o.c. between fasteners in the same row. Use three (3) rows for members deeper than 18".

5.3.7 BTX and YTX fasteners used in sawn lumber assemblies, with the tabulated fastener spacing along the length of the beam, have the design values set forth in Table 10. Assemblies are detailed in Figure 9.

Table 10. BTX and YTX Screw Allowable Lateral Design Values (plf) in Sawn Lumber Assemblies^{2,3,4}

Fastener	Assembly	Members	Fastener Length ¹ (in)	SPF/HF (SG=0.42)						DF/SP (SG=0.50)					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
				Number of Fasteners per Row											
2	3	2	3	2	3	2	3	2	3	2	3	2	3		
BTX9 YTX9	A	2-ply 1½"	3	640	960	480	720	320	480	840	1260	630	945	420	630
BTX10 YTX10	A	2-ply 1½"	3	660	990	495	745	330	495	660	990	495	745	330	495
	B	3-ply 1½"	4	495	745	370	555	250	375	495	745	370	555	250	375
	C	4-ply 1½"	6	440	660	330	495	220	330	440	660	330	495	220	330
BTX14	C	4-ply 1½"	6	750	1125	565	850	375	565	920	1380	690	1035	460	690

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

1. Fastener length is measured from the top of the head to the tip.
2. Wood framing shall be any species with specific gravity, SG, of 0.42 or greater.
3. Allowable design values are based on a load duration factor $C_D = 1.0$ and shall be multiplied by all applicable adjustment factors per the *NDS*.
4. For top-loaded members with even loading across the width of the entire assembly, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. (on-center) between fasteners in the same row.

5.3.8 BTX and YTX fasteners used in SCL assemblies, with the tabulated fastener spacing along the length of the beam, have the design values set forth in Table 11. Assemblies are detailed in Figure 10.

Table 11. BTX Screw Allowable Lateral Design Values (plf) in SCL Assemblies^{2,3,4}

Fastener	Assembly	Members	Fastener Length ¹ (in)	12" o.c.		16" o.c.		24" o.c.	
				Number of Fasteners per Row					
				2	3	2	3	2	3
BTX10 YTX10	A	2-ply 1¼"	3½	580	870	435	655	290	435
	B	3-ply 1¼"	5	465	700	350	525	235	355
	D	2-ply 1¼" & 3½"	5	465	700	350	525	235	355
BTX14	B	3-ply 1¼"	5	1035	1555	780	1170	520	780
	C	4-ply 1¼"	7	920	1380	690	1035	460	690
	D	2-ply 1¼" & 3½"	5	1035	1555	780	1170	520	780
	E	3-ply 1¼" & 3½"	7	920	1380	690	1035	460	690
	F	2-ply 3½"	7	1580	2370	1190	1785	790	1185

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

1. Fastener length is measured from the top of the head to the tip.
2. SCL shall have a specific gravity, SG, of 0.50 or greater. Thicknesses listed in Figure 9 are a minimum.
3. Allowable design values are based on a load duration factor of $C_D = 1.0$ and shall be multiplied by all applicable adjustment factors per the *NDS*.
4. For top-loaded members with even loading across the width of the entire assembly, and a depth of 18" or less, fasteners shall be installed in two (2) rows with a maximum distance of 24" o.c. between fasteners in the same row. Use three (3) rows for members deeper than 18".

5.3.9 STX and SCTX fasteners use in sawn lumber assemblies, with the tabulated fastener spacing along the length of the beam, have the design values set forth in Table 12. Assemblies are detailed in Figure 9.

Table 12. STX and SCTX Screw Allowable Lateral Design Values (plf) in Sawn Lumber Assemblies^{2,3,4}

Fastener	Assembly	Members	Fastener Length ¹ (in)	SPF/HF (SG=0.42)						DF/SP (SG=0.50)					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
				Number of Fasteners per Row											
				2	3	2	3	2	3	2	3	2	3	2	3
STX9	A	2-ply 1½"	3	260	390	195	295	130	195	305	460	230	345	155	235
STX10	A	2-ply 1½"	3	340	510	255	385	170	255	400	600	300	450	200	300
	B	3-ply 1½"	4	255	385	190	285	130	195	300	450	225	340	150	225
SCTX15	A	2-ply 1½"	3	500	750	375	565	250	375	585	880	440	660	295	445
	B	3-ply 1½"	4	375	565	280	420	190	285	440	660	330	495	220	330
	C	4-ply 1½"	6	335	505	250	375	170	255	390	585	295	445	195	295

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

1. Fastener length is measured from the top of the head to the tip.
2. Wood framing shall be any species with specific gravity, SG, of 0.42 or greater.
3. Allowable design values are based on a load duration factor $C_D = 1.0$ and shall be multiplied by all applicable adjustment factors per the *NDS*.
4. For top-loaded members with even loading across the width of the entire assembly, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. (on-center) between fasteners in the same row.

5.3.10 STX and SCTX fasteners used in SCL assemblies, with the tabulated fastener spacing along the length of the beam, have the design values set forth in Table 13. Assemblies are detailed in Figure 10.

Table 13. STX and SCTX Screw Allowable Lateral Design Values (plf) in SCL Assemblies^{2,3,4}

Fastener	Assembly	Members	Fastener Length ¹ (in)	12" o.c.		16" o.c.		24" o.c.	
				Number of Fasteners per Row					
				2	3	2	3	2	3
STX10	A	2-ply 1¼"	3½	400	600	300	450	200	300
SCTX15	A	2-ply 1¼"	3½	585	880	440	660	295	445
	B	3-ply 1¼"	5	440	660	330	495	220	330
	C	4-ply 1¼"	7	390	585	295	445	195	295
	D	2-ply 1¼" & 3½"	5	440	660	330	495	220	330
	E	3-ply 1¼" & 3½"	7	390	585	295	445	195	295
	F	2-ply 3½"	7	585	880	440	660	295	445

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

1. Fastener length is measured from the top of the head to the tip.
2. SCL shall have a specific gravity, SG, of 0.50 or greater. Thicknesses listed in Figure 10 are a minimum.
3. Allowable design values are based on a load duration factor of $C_D = 1.0$ and shall be multiplied by all applicable adjustment factors per the NDS.
4. For top-loaded members with even loading across the width of the entire assembly, and a depth of 18" or less, fasteners shall be installed in two (2) rows with a maximum distance of 24" o.c. between fasteners in the same row. Use three (3) rows for members deeper than 18".

5.3.11 WTX fasteners used in sawn lumber assemblies, with the tabulated fastener spacing along the length of the beam, have the design values set forth in Table 14. Assemblies are detailed in Figure 9.

Table 14. WTX Screw Allowable Lateral Design Values (plf) in Sawn Lumber Assemblies^{2,3,4}

Fastener	Assembly	Members	Fastener Length ¹ (in)	SPF/HF (SG=0.42)						DF/SP (SG=0.50)					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
				Number of Fasteners per Row											
2	3	2	3	2	3	2	3	2	3	2	3	2	3		
WTX15	A	2-ply 1½"	3	800	1200	600	900	400	600	1000	1500	750	1125	500	750
	B	3-ply 1½"	4	590	885	445	670	295	445	750	1125	565	850	375	565
	C	4-ply 1½"	6	535	805	400	600	270	405	665	1000	500	750	335	505

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

1. Fastener length is measured from the top of the head to the tip.
2. Wood framing shall be any species with specific gravity, SG, of 0.42 or greater.
3. Allowable design values are based on a load duration factor $C_D = 1.0$ and shall be multiplied by all applicable adjustment factors per the NDS.
4. For top-loaded members with even loading across the width of the entire assembly, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. (on-center) between fasteners in the same row.

5.3.12 WTX fasteners used in SCL assemblies, with the tabulated fastener spacing along the length of the beam, have the design values set forth in Table 15. Assemblies are detailed in Figure 10.

Table 15. WTX Screw Allowable Lateral Design Values (plf) in SCL Assemblies^{2,3,4}

Fastener	Assembly	Members	Fastener Length ¹ (in)	12" o.c.		16" o.c.		24" o.c.	
				Number of Fasteners per Row					
				2	3	2	3	2	3
WTX15	A	2-ply 1¼"	3½	1000	1500	750	1125	500	750
	B	3-ply 1¼"	5	750	1125	565	850	375	565
	D	2-ply 1¼" & 3½"	5	750	1125	565	850	375	565

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

1. Fastener length is measured from the top of the head to the tip.
2. SCL shall have a specific gravity, SG, of 0.50 or greater. Thicknesses listed in Figure 9 are a minimum.
3. Allowable design values are based on a load duration factor of $C_D = 1.0$ and shall be multiplied by all applicable adjustment factors per the *NDS*.
4. For top-loaded members with even loading across the width of the entire assembly, and a depth of 18" or less, fasteners shall be installed in two (2) rows with a maximum distance of 24" o.c. between fasteners in the same row. Use three (3) rows for members deeper than 18".

6 Installation

- 6.1 Installation shall comply with the manufacturer's installation instructions, this TER, the approved construction documents, and the applicable building code.
- 6.2 In the event of a conflict between the manufacturer's installation instructions and this TER, the more restrictive shall govern.
- 6.3 *Installation Procedure*
 - 6.3.1 All of the Big Timber® screws evaluated in this TER shall be installed using a high-torque low speed drill in accordance with the manufacturer's installation instructions, applicable code, the approved construction documents, this TER, *NDS*, and standard framing practice as applied to wood fasteners.
 - 6.3.2 Each fastener shall be installed using the appropriate driver bit and never struck with a hammer. Do not overdrive.
 - 6.3.3 Install Big Timber® screws such that as many threads fully engage the main member (final member in multi-ply assembly) as possible when head is fully seated against the lumber.
 - 6.3.4 Lead holes are not required.
 - 6.3.5 For applications outside the scope of this TER, an engineered design is required.



6.3.6 Minimum requirement for fastener spacing, edge distance, and end distance shall be in accordance with Table 16.

Table 16. Minimum Spacing, Edge Distance, and End Distance Requirements

Connection Geometry	Minimum Spacing/Distance (in)								
	STX9	BTX9 YTX9	STX10	BTX10, YTX10	CTX14, BTX14	BL14	CTX15, SCTX15, WTX15	BL17, GL17	CTX17
Edge Distance – Load in any direction	$\frac{3}{8}$		$\frac{1}{2}$		$1\frac{1}{2}$	$\frac{5}{8}$	$1\frac{1}{8}$		
End Distance – Load parallel to grain, towards end	2	$2\frac{1}{4}$		$2\frac{3}{8}$	$2\frac{5}{8}$	$2\frac{7}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$
End Distance – Load parallel to grain, away from end	$1\frac{3}{8}$		$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{4}$
End Distance – Load perpendicular to grain	$1\frac{1}{8}$		$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{4}$
Spacing between Fasteners in a Row – Parallel to grain	2	$2\frac{1}{4}$		$2\frac{3}{8}$	$2\frac{5}{8}$	$2\frac{7}{8}$	$3\frac{1}{8}$	$3\frac{3}{8}$	$3\frac{3}{8}$
Spacing between Fasteners in a Row – Perpendicular to grain	$1\frac{1}{8}$		$1\frac{1}{2}$	$1\frac{5}{8}$	$1\frac{3}{4}$	$1\frac{7}{8}$	$2\frac{1}{8}$	$2\frac{1}{4}$	$2\frac{1}{4}$
Spacing between Rows of Fasteners – In-line	$\frac{3}{4}$		$\frac{7}{8}$		1	$1\frac{1}{8}$		$1\frac{1}{8}$	
Spacing between Rows of Fasteners – Staggered	$\frac{3}{8}$		$\frac{1}{2}$		$\frac{5}{8}$				

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.

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 that 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 products listed in Section 1.1 are approved for the following:
 - 8.1.1 To provide multi-ply attachment in trusses, sawn lumber, and SCL assemblies.
- 8.2 Building codes require data from valid research reports be obtained from approved sources (i.e., licensed registered design professionals [RDPs]).
 - 8.2.1 Building official approval of a licensed RDP is performed by verifying the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.
- 8.3 Agencies who are accredited through ISO/IEC 17065 have met the code requirements for approval by the building official. DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131 and employs RDPs.
- 8.4 Through ANAB accreditation and the IAF MLA, DrJ certification can be used to obtain Product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – “certified once, accepted everywhere.”
- 8.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10⁵ 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 The Big Timber® screws in this TER shall be designed in accordance with accepted engineering practice for the conditions not covered in this TER.
- 9.2 Moisture content shall be less than or equal to 19% for sawn lumber and less than 16% for SCL products.
- 9.3 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this TER (except only for the STX and SCTX screws).
- 9.4 Design properties shall not exceed those described in Section 5.
- 9.5 When required by legal stipulation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:
 - 9.5.1 This TER and the installation instructions shall be submitted at the time of permit application.
 - 9.5.2 Any calculations, required to show compliance with this TER, incorporated as part of the construction documents that are to be examined for conformance to the requirements of the pertinent laws shall conform to accepted engineering practice, and be approved when requirements of the pertinent laws are met.
- 9.6 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.
- 9.7 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 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.

⁵ 2018 IFC Section 104.9



- 9.10 This TER shall be reviewed for code compliance by the AHJ in concert with IBC Section 104.
- 9.11 The implementation of this TER for this Product is dependent on the design, quality control, third-party quality assurance, proper implementation of installation instructions, inspections required by IBC Section 110.3, and any other code or regulatory requirements that may apply.

10 Identification

- 10.1 The products 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.