DrJ CERTIFICATION

Technical Evaluation Report™

TER 2104-04

Big Timber® CTX Construction Lag Screws Properties – Canada

Western Builders Supply dba Big Timber®

Product:
CTX Construction Lag Screws

Issue Date:
September 29, 2021

Revision Date:
April 12, 2024

Subject to Renewal:
October 1, 2024

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COMPANY INFORMATION:	ADDITIONAL LISTEES:
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DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

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

1 Innovative Product Evaluated[1]

1.1 CTX Construction Lag Screws

2 Applicable Codes and Standards[2]

2.1 *Codes*

2.1.1 *NBC—10, 15, 20: National Building Code of Canada*

2.1.2 *O Reg. 332/12: Ontario Building Code (OBC)*[3]

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

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

2.2.4 *ASTM B117: Standard Test Methods for Mechanical Fasteners in Wood*

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

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

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

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

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

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

2.2.11 *CSA O86: Engineering Design in Wood*

[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 2020 version of the NBC. This alternative solution is also approved for use with the 2010 and 2015 NBC and the standards referenced therein.

[3] References in this TER to the National Building Code of Canada (NBC) apply to the Ontario Building Code (OBC), unless noted otherwise.

3 Performance Evaluation

3.1 Testing and related engineering evaluations are defined as intellectual property and/or trade secrets.[4]

3.2 Big Timber CTX Construction Lag Screws were tested and evaluated to determine their structural resistance properties, which were used to develop design values for limit states design (LSD) in accordance with CSA O86. The following properties were evaluated:

3.2.1 Bending yield in accordance with ASTM F1575

3.2.2 Tensile strength in accordance with AISI S904

3.2.3 Shear strength in accordance with AISI S904

3.2.4 Lateral shear in accordance with ASTM D1761 per CSA O86 Clause 12.11.3[5]

3.2.5 Withdrawal strength in accordance with ASTM D1761 per CSA O86 Clause 12.11.4[6]

3.2.6 Head pull-through in accordance with ASTM D1761 per CSA O86 Clause 12.11.4.3[7]

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

3.3 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this TER.

3.4 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.

3.5 Engineering evaluations are conducted within DrJ's ANAB accredited ICS code scope, which are also its areas of professional engineering competence.[8]

3.6 Any regulation specific issues not addressed in this section are outside the scope of this TER.

4 Product Description and Materials

4.1 CTX Construction Lag Screws have a round washer head with a star drive and are partially threaded. The innovative product evaluated in this TER is shown in **Figure 1**.

Figure 1. Big Timber CTX Construction Lag Screw

4.2 CTX Construction Lag Screws are manufactured using a standard cold-formed process followed by a heat-treating process.

4.3 CTX Construction Lag Screws are coated with a proprietary coating, designated as Bronze Star.

[4] 18 U.S. Code § 1831 - Economic espionage - Whoever, intending or knowing that the offense will benefit any foreign government, foreign instrumentality, or foreign agent, knowingly steals, or without authorization appropriates, takes, carries away, or conceals, or by fraud, artifice, or deception obtains a trade secret shall be fined not more than $5,000,000 or imprisoned not more than 15 years, or both. Any organization that commits any offense described shall be fined not more than the greater of $10,000,000 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. https://www.law.cornell.edu/uscode/text/18/part-I/chapter-90.

[5] 2014 CSA O86 Clause 12.11.4

[6] 2014 CSA O86 Clause 12.11.5

[7] 2014 CSA O86 Clause 12.11.5.3

[8] ANAB is part of the USMCA and IAF MLA, where the purpose of these agreements are to ensure mutual recognition of accredited certification and validation/verification statements between agreement signatories, and subsequent acceptance of ANAB accredited certification and validation/verification statements by professional engineers based upon having one universal approval process for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction.

4.4 CTX screws approved for use in chemically treated or untreated lumber where ASTM A153, Class D coatings are approved for use in accordance with NBC Subsection 5.9.1. [9]

4.4.1 The proprietary coating has been tested and found to exceed the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (NBC Subsection 5.9.1[10]), allowing for its use in pressure treated wood.

4.5 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.

4.6 The fasteners evaluated in this TER are set forth in **Table 1**.

[9] O Reg. 332/12 Subsection 5.10.1

[10] O Reg. 332/12 Subsection 5.10.1

Table 1. Fastener Specifications

Fastener Name	Designation	Head in (mm)		Nominal Length[1] in (mm)	Thread Length[1] in (mm)	Shank Diameter[2] in (mm)	Thread Diameter in (mm)		Specified Minimum Core Hardness[4] (HV 0.3)	Nominal Bending Yield, f_{yb} psi (MPa)	Factored Fastener Strength lbf (kN)	
		Diameter	Drive Type				Minor	Major			Tensile	Shear[3]
CTX	14 x 1"	0.531 (13.5)	Torx 25	1 (25)	1 (25)	0.168 (4.3)	0.146 (3.7)	0.242 (6.2)	355	141,300 (975)	1,675 (7.4)	1,305 (5.8)
	14 x 1 1/2"			1 1/2 (38)	1 1/2 (38)							
	14 x 2"			2 (51)	2 (51)							
	14 x 2 1/2"			2 1/2 (64)	2 1/4 (57)							
	14 x 3"			3 (76)	2 (51)							
	14 x 4"			4 (102)	2 (51)							
	14 x 5"			5 (127)	3 (76)							
	14 x 6"			6 (152)	3 (76)							
	15 x 2"	0.620 (15.7)	Torx 30	2 (51)	1 1/2 (38)	0.202 (5.1)	0.179 (4.6)	0.275 (7.0)	355	151,600 (1,045)	2,655 (11.8)	1,835 (8.2)
	15 x 2 1/2"			2 1/2 (64)	1 1/2 (38)							
	15 x 3"			3 (76.)	2 (51)							
	15 x 3 1/2"			3 1/2 (89)	2 1/2 (64)							
	15 x 4"			4 (102)	2 1/2 (64)							
	15 x 5"			5 (127)	3 (76)							
	15 x 6"			6 (152)	3 (76)							
	17 x 4"	0.675 (17.1)	Torx 40	4 (102)	2 1/2 (64)	0.226 (5.7)	0.210 (5.3)	0.295 (7.5)	355	170,500 (1,175)	3,330 (14.8)	2,230 (9.9)
	17 x 5"			5 (127)	3 (76)							
	17 x 6"			6 (152)	3 (76)							
	17 x 7"			7 (178)	3 1/2 (89)							
	17 x 8"			8 (203)	4 (102)							
	17 x 10"			10 (254)	4 (102)							
	17 x 12"			12 (305)	4 (102)							
	17 x 14"			14 (356)	5 (127)							
	17 x 16"			16 (406)	5 (127)							

SI: 25.4 mm = 1 in, 1 N = 0.225 lb, 1 MPa = 145 psi

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.

5 Applications

5.1 *General*

5.1.1 CTX Construction Lag Screws are used to attached wood framing members in conventional light-frame construction and provide resistance against withdrawal, head pull-through, axial, and shear loads. See **Section 6** for installation requirements.

5.1.2 CTX Construction Lag Screws are installed without lead holes, as prescribed in CSA O86 Article 12.11.2.1.

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 CTX Construction Lag Screws is governed by the applicable code and the provisions for wood screws in CSA O86.

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 *CTX Factored Lateral Design Values (N_r)*

5.3.1 The factored lateral design values for shear load perpendicular to grain and parallel to grain for CTX Construction Lag Screws in sawn lumber are specified in **Table 2**.

Table 2. CTX Screw Factored Lateral Design Values for Connections in Solid Sawn Lumber (N_r)

Fastener Name	Designation	Nominal Length in (mm)	Thread Length in (mm)	Minimum Side Member Thickness in (mm)	Minimum Main Member Penetration[4] in (mm)	Factored Lateral Design Values,[1,2] lbf (N)	
						Wood Species[3] (Relative Density)	
						HF/SPF (0.42)	
						$N_{r\perp}$	$N_{r\parallel}$
CTX	14 x 2"	2 (51)	2 (51)	3/4 (19.1)	1 1/4 (32)	220 (985)	220 (985)
	14 x 2 1/2"	2 1/2 (64)	2 1/4 (57)	3/4 (19.1)	1 3/4 (45)	365 (1,615)	365 (1,615)
	14 x 3"	3 (76)	2 (51)				
	14 x 4"	4 (102)	2 (51)	1 3/4 (45)	2 1/4 (57)	515 (2,280)	515 (2,280)
	14 x 5"	5 (127)	3 (76)				
	14 x 6"	6 (152)	3 (76)	3 (76)	3 (76)	585 (2,595)	720 (3,205)
	15 x 2 1/2"	2 1/2 (64)	1 1/2 (38)	3/4 (19.1)	1 1/4 (32)	310 (1,385)	310 (1,385)
	15 x 3"	3 (76)	2 (51)	3/4 (19.1)	2 1/4 (57)	365 (1,630)	420 (1,875)
	15 x 3 1/2"	3 1/2 (89)	2 1/2 (64)				
	15 x 4"	4 (102)	2 1/2 (64)	1 1/2 (38)	2 1/2 (64)	915 (4,070)	870 (3,875)
	15 x 5"	5 (127)	3 (76)				
	15 x 6"	6 (152)	3 (76)	2 (51)	4 (102)	610 (2,720)	720 (3,210)
	17 x 4"	4 (102)	2 1/2 (64)	1 1/2 (38)	2 1/2 (64)	1,065 (4,735)	770 (1,065)
	17 x 5"	5 (127)	3 (76)				
	17 x 6"	6 (152)	3 (76)				
	17 x 7"	7 (178)	3 1/2 (89)	2 3/4 (70)	4 1/4 (108)	650 (2,895)	970 (4,315)
	17 x 8"	8 (203)	4 (102)				
	17 x 10"	10 (254)	4 (102)	3 1/2 (89)	6 1/2 (165)	710 (3,165)	1,190 (5,295)
	17 x 12"	12 (305)	4 (102)				
	17 x 14"	14 (356)	5 (127)				
	17 x 16"	16 (406)	5 (127)				

SI: 25.4 mm = 1 in, 1 N = 0.225 lb

1. $N_{r\perp}$ = Lateral Design Values Perpendicular to Grain, $N_{r\parallel}$ = Lateral Design Values Parallel to Grain.
2. Tabulated values are for a standard load duration. Values shall be factored by all applicable modification factors per CSA O86.
3. Factored lateral design values apply to two-member single shear connections where both members are of the same relative density, and the fastener is oriented perpendicular to grain. Where the members are of different relative densities, use the lower of the two.
4. Fastener main member penetration is the length embedded in the main member, including the tip.

5.4 *CTX Factored Withdrawal Design Values (P_{rw}) in Side Grain Applications*

5.4.1 The design provisions for withdrawal noted in CSA O86 Subsection 12.11.4[11] apply to CTX Construction Lag Screws, unless otherwise noted in this TER. Factored withdrawal design values per millimeter of threaded shank penetration for CTX Construction Lag Screws are specified in **Table 3**.

Table 3. CTX Screw Factored Withdrawal Design Values (P_{rw}) – Side Grain Applications

Fastener Name	Designation	Nominal Length in (mm)	Thread Length in (mm)	Factored Withdrawal Design Values,[1,2,3] lbf/in (N/mm)
				Wood Species (Relative Density)
				HF/SPF (0.42)
CTX	14 x 1"	1 (25)	1 (25)	200 (35)
	14 x 1 1/2"	1 1/2 (38)	1 1/2 (38)	
	14 x 2"	2 (51)	2 (51)	
	14 x 2 1/2"	2 1/2 (64)	2 1/4 (57)	370 (65)
	14 x 3"	3 (76)	2 (51)	
	14 x 4"	4 (102)	2 (51)	
	14 x 5"	5 (127)	3 (76)	
	14 x 6"	6 (152)	3 (76)	
	15 x 2"	2 (51)	1 1/2 (38)	230 (40)
	15 x 2 1/2"	2 1/2 (64)	1 1/2 (38)	
	15 x 3"	3 (76)	2 (51)	
	15 x 3 1/2"	3 1/2 (89)	2 1/2 (64)	315 (55)
	15 x 4"	4 (102)	2 1/2 (64)	
	15 x 5"	5 (127)	3 (76)	
	15 x 6"	6 (152)	3 (76)	
	17 x 4"	4 (102)	2 1/2 (64)	230 (40)
	17 x 5"	5 (127)	3 (76)	
	17 x 6"	6 (152)	3 (76)	
	17 x 7"	7 (178)	3 1/2 (89)	315 (55)
	17 x 8"	8 (203)	4 (102)	
	17 x 10"	10 (254)	4 (102)	
	17 x 12"	12 (305)	4 (102)	
	17 x 14"	14 (356)	5 (127)	
	17 x 16"	16 (406)	5 (127)	

SI: 25.4 mm = 1 in, 1 kN/m = 737.6 lb/ft

1. Tabulated values are for a standard load duration. Values shall be factored by all applicable modification factors per CSA O86 for wood screws.
2. Minimum fastener penetration into main member of 1" (25.4 mm) is required. Fastener penetration is the threaded length embedded in the main member, excluding the tip.
3. The full factored design withdrawal value is equal to the tabulated withdrawal value multiplied by the length of the threaded portion of the fastener embedded in the main member.

[11] 2014 CSA O86 Clause 12.11.5

5.5 *CTX Factored Head Pull-Through Design Values (P_{pt})*

5.5.1 The factored design values for head pull-through for CTX Construction Lag Screws are specified in **Table 4**.

Table 4. CTX Screw Factored Head Pull-Through Design Values (P_{pt})

Fastener Name	Designation	Nominal Length in (mm)	Thread Length in (mm)	Factored Head Pull-Through Design Value,[1,2] lbf (N)
				Wood Species (Relative Density)
				HF/SPF (0.42)
CTX	14 x 1"	1 (25)	1 (25)	110 (495)
	14 x 1 1/2"	1 1/2 (38)	1 1/2 (38)	
	14 x 2"	2 (51)	2 (51)	
	14 x 2 1/2"	2 1/2 (64)	2 1/4 (57)	
	14 x 3"	3 (76)	2 (51)	
	14 x 4"	4 (102)	2 (51)	
	14 x 5"	5 (127)	3 (76)	
	14 x 6"	6 (152)	3 (76)	
	15 x 2"	2 (51)	1 1/2 (38)	
	15 x 2 1/2"	2 1/2 (64)	1 1/2 (38)	
	15 x 3"	3 (76)	2 (51)	
	15 x 3 1/2"	3 1/2 (89)	2 1/2 (64)	
	15 x 4"	4 (102)	2 1/2 (64)	
	15 x 5"	5 (127)	3 (76)	
	15 x 6"	6 (152)	3 (76)	
	17 x 4"	4 (102)	2 1/2 (64)	
	17 x 5"	5 (127)	3 (76)	
	17 x 6"	6 (152)	3 (76)	
	17 x 7"	7 (178)	3 1/2 (89)	
	17 x 8"	8 (203)	4 (102)	
	17 x 10"	10 (254)	4 (102)	
	17 x 12"	12 (305)	4 (102)	
	17 x 14"	14 (356)	5 (127)	
	17 x 16"	16 (406)	5 (127)	

SI: 25.4 mm = 1 in, 1 N = 0.225 lb

1. Tabulated values are for a standard load duration. Values shall be factored by all applicable modification factors per CSA O86 for wood screws.
2. Pull-through design value applies to connections having a minimum wood side member thickness of 3/4".

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

6 Installation

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

6.2 In the event of a conflict between the manufacturer installation instructions this TER and the applicable building code, the more restrictive shall govern.

6.3 Minimum penetration is 1" (25.4 mm), unless otherwise noted in this TER. Install fasteners with the underside of the head flush to the surface of the wood member.

6.4 Lead holes are not required.

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

6.6 Minimum requirements for screw spacing, edge distance, and end distance shall be in accordance with **Table 5**.

Table 5. CTX Screw Spacing, Edge Distance, and End Distance Requirements

Symbol	Dimension	Minimum Spacing[1,2] (mm)		
		Wood Species (Relative Density)		
		HF/SPF (0.42)		
		CTX 14	CTX 15	CTX 17
S_P	Spacing parallel to grain	98	112	120
S_Q	Spacing perpendicular to grain	49	56	60
a	End distance parallel to grain	74	84	90
e	Edge distance perpendicular to grain	25	28	30

SI: 1 in = 25.4 mm
1. Table values are based on the major thread diameter from **Table 1** in accordance with CSA O86 Table 12.25.
2. Spacing, edge distances, and end distances 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 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:

7.1.1 Bending yield testing in accordance with ASTM F1575

7.1.2 Shear and tensile testing in accordance with ASTM S904

7.1.3 Lateral strength testing in accordance with ASTM D1761

7.1.4 Withdrawal strength testing in accordance with ASTM D1761

7.1.5 Head pull-through testing in accordance with ASTM D1761

7.1.6 Corrosion resistance testing in accordance with ASTM B117 and ASTM G85

7.2 Calculations for factored lateral design values in accordance with CSA O86 and accepted engineering practice.

7.3 Information contained herein is the result of testing and/or data analysis by sources that conform to the evaluation requirements of NBC Volume 1 Relationship of the NBC to Standards Development and Conformity Assessment and/or professional engineering regulations. DrJ relies upon accurate data to perform its ISO/IEC 17065 evaluations.

7.4 Where appropriate, DrJ's analysis is based on provisions that have been codified into law through provincial, territorial, or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ analysis may use code-adopted provisions as a control sample. A control sample versus a test sample establishes an innovative product as being equivalent to that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety.

7.5 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, Listings, certified reports, duly authenticated reports from approved agencies, and research reports prepared by approved agencies and/or approved sources provided by the suppliers of products, materials, designs, assemblies and/or methods of construction. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this TER, may be dependent upon published design properties by others.

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

7.7 Where additional condition of use and/or code compliance information is required, please search for CTX Construction Lag Screws on the DrJ Certification website.

8 Findings

8.1 As delineated in **Section 3**, CTX Construction Lag Screws have performance characteristics that were tested and/or meet pertinent standards and is suitable for use pursuant to its specified purpose.

8.2 When used and installed in accordance with this TER and the manufacturer installation instructions, CTX Construction Lag Screws shall be approved for the following applications:

8.2.1 Use as fasteners in accordance with required codes and the design properties listed above.

8.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Western Builders Supply dba Big Timber.

8.4 This innovative product has been evaluated in the context of the codes listed in **Section 2** and are compliant with all known provincial, territorial and local building codes. Where there are known variations in provincial, territorial or local codes applicable to this TER, they are listed here.

8.4.1 No known variations

8.5 NBC Volume 1 Relationship of the NBC to Standards Development and Conformity Assessment:

> **Certification**
> Certification is the confirmation by an independent organization that a product, service, or system meets a requirement…Certification bodies publish lists of certified products and companies…Several organizations, including the Canadian Construction Materials Centre (CCMC), offer such evaluation services.
>
> **Evaluation**
> An evaluation is a written opinion by an independent professional organization that a product will perform its intended function. An evaluation is very often done to determine the ability of an innovative product, for which no standards exist, to satisfy the intent of the Code requirement...

8.6 ISO/IEC 17065 accredited third-party certification bodies,[12] including but not limited to, Standards Council of Canada (SCC)[13] and ANSI National Accreditation Board (ANAB),[14] confirm that product certification bodies have the expertise to provide technical evaluation services within their scope of accreditation. All SCC and ANAB product certification bodies meet NBC requirements to offer evaluation services for alternative solutions.[15]

8.6.1 DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131[16] and employs professional engineers.[17]

8.7 Through ANAB accreditation and the IAF Multilateral Agreements, this TER can be used to obtain innovative product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – "*certified once, accepted everywhere*." IAF specifically says, "*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope*."[18]

8.8 Product certification organizations, accredited by the SCC and ANAB, are defined as equivalent evaluation services:

8.8.1 Canada-United States-Mexico Agreement (CUSMA), Article 11.6 Conformity Assessment confirms mutual recognition by stating, "*...each Party shall accord to conformity assessment bodies located in the territory of another Party treatment no less favorable than that it accords to conformity assessment bodies located in its own territory or in the territory of the other Party*."

8.8.2 The SCC National Conformity Assessment Principles states, "*SCC is a member of a number of international organizations developing voluntary conformity assessment agreements that help ensure the international acceptance of Canadian conformity assessment results. Signatories to these agreements (like SCC) recognize each other's accreditations as being equivalent to their own*."[19]

8.9 Building official approval of a licensed professional engineer is performed by verifying the professional engineer and/or their business entity are listed by the engineering regulators of the relevant jurisdiction.

9 Conditions of Use

9.1 Material properties shall not fall outside the boundaries defined in **Section 3**.

9.2 As defined in **Section 3**, 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.

9.3 Wood member moisture content shall be less than or equal to nineteen percent (19%) for sawn lumber.

9.4 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this TER.

[12] https://anabpd.ansi.org/Accreditation/product-certification/DirectoryListingAccredited?menuID=1&prgID=1

[13] https://iaf.nu/en/member-details/?member_id=91

[14] https://iaf.nu/en/member-details/?member_id=14

[15] NBC Division A Clause A-1.2.1.1.(1)(b) provides information on code compliance via alternative solutions and defines alternative solutions as "...achiev[ing] at least the minimum level of performance required by Division B." NBC Division C Section 2.3 includes additional guidance for documentation of alternative solutions.

[16] https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?&prgID=1&OrgId=2125&statusID=4

[17] Through ANAB accreditation and the IAF MLA, DrJ certification can be used to obtain material, product, design, or method of construction approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – "*certified once, accepted everywhere*".

[18] https://iaf.nu/en/about-iaf-mla/#:~:text=required%20to%20recognise

[19] The National Conformity Assessment Principles states, "*Product regulations and standards may vary from country to country. If these are set arbitrarily, they could be deemed as protectionist. The World Trade Organization (WTO) Agreement on Technical Barriers to Trade (TBT Agreement) is intended to ensure that technical regulations, standards and conformity assessment procedures of member countries do not create unnecessary obstacles to trade. Under the TBT Agreement, members of the WTO agree to use international standards, including conformity assessment standards and guides, as a basis for their technical requirements.*"

9.5 Where required by 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 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.

9.7 Where required by regulation and enforced by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed:

9.7.1 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.

9.7.2 This TER and the installation instructions shall be submitted at the time of permit application.

9.7.3 This innovative product has an internal quality control program and a third-party quality assurance program in accordance with ISO/IEC 17065 certification procedures.

9.7.4 At a minimum, this innovative product shall be installed per **Section 6** of this TER.

9.7.5 This TER shall be reviewed for code compliance by the AHJ in concert with the duties and powers granted to the building official by the provincial regulations governing such duties and powers.

9.7.6 The application of this innovative product in the context of this TER, is dependent on the accuracy of the construction documents, implementation of installation instructions, inspections, and any other regulatory requirements that may apply.

9.8 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 designer (i.e., owner).

9.9 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent.

9.10 The implementation of this TER for this innovative product is dependent on the design, quality control, third-party quality assurance, proper implementation of installation instructions, inspections, and any other code or regulatory requirements that may apply.

10 Identification

10.1 The innovative product listed in **Section 1.1** is identified by a label on the board or packaging material bearing the manufacturer 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 status of this TER, contact DrJ Certification.

12 Legislation that Authorizes New Product Approval in International Markets is Found in Appendix A

12.1 Big Timber CTX Construction Lag Screws have been tested by an ISO/IEC 17025 accredited laboratory and/or evaluated to be in conformance with accepted engineering practice to ensure durable, livable and safe construction.

12.2 This TER is published by an ISO/IEC 17065 accredited certification body with the expertise to evaluate products, materials, designs, services, assemblies and/or methods of construction.

12.3 This TER meets the legislative intent and definition of a duly authenticated report, which shall be accepted by the AHJ, unless there are specific reasons why the alternative shall not be approved as provided for in writing.

Appendix A

1 Legislation that Authorizes New Product Approval in Canada

1.1 The Competition Act is a Canadian federal law governing competition law in Canada. The Act contains both criminal and civil provisions aimed at preventing anti-competitive practices in the marketplace. The Act is enforced and administered by the Competition Bureau, whose regulations encourage the approval of NBC referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:

1.1.1 Advance Innovation,

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

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

1.2 **Approved by International Jurisdictions**: The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade (TBT) agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements proclaim the desire of both countries to have their markets open to innovation.

1.3 These agreements:

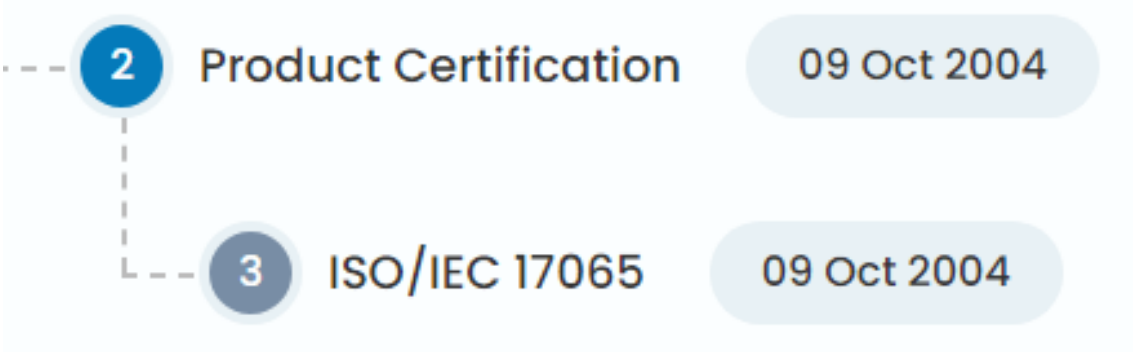
1.3.1 Permit participation of conformity assessment bodies located in the territories of other Members (defined as GATT Countries) under conditions no less favourable than those accorded to bodies located within their territory or the territory of any other country,

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

1.3.3 State that conformity assessment procedures are not prepared, adopted, or applied with a view to or with the effect of creating unnecessary obstacles to international trade. This means that conformity assessment procedures shall not be more strict or be applied more strictly than is necessary to give the importing Member adequate confidence that products conform to the applicable technical regulations or standards.

1.4 To this end, Canada operates an accreditation system as follows:

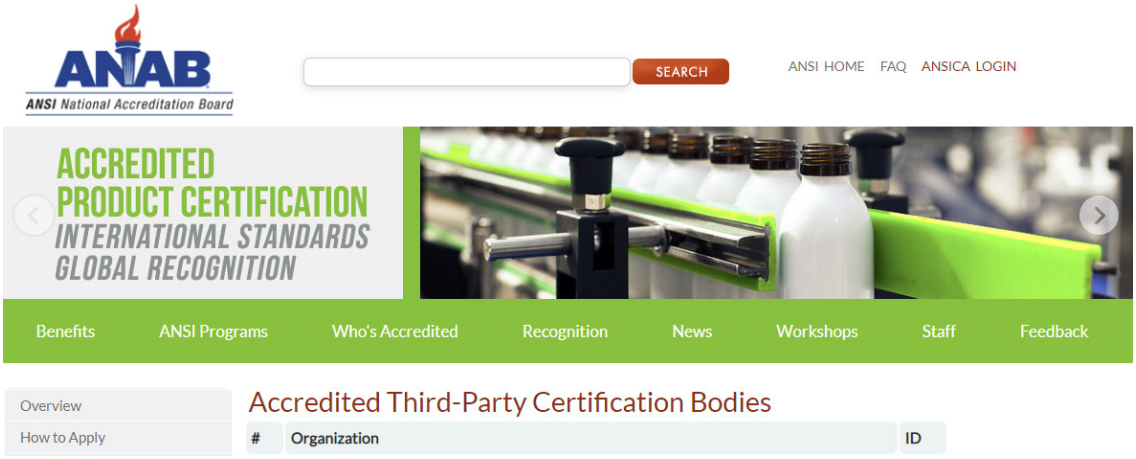
1.5 This includes ISO/IEC 17065 product certification as follows:



1.6 Similarly, the United States operates multiple accreditation process with ANAB being the most prominent ISO/IEC 17065 product certification organization as follows:

1.7 This includes ISO/IEC 17065 product certification as follows:

1.8 The list of ANAB accredited ISO/IEC 17065 product certification organizations can be found at the following link: https://anabpd.ansi.org/Accreditation/product-certification/DirectoryListingAccredited?menuID=1&prgID=1



1.9 Approval is granted via International Agreement, where the purpose of the IAF MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories. Subsequent acceptance of accredited certification and validation/verification statements is required so that one accreditation can be used for the timely approval of innovative materials, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.

1.10 Consequently, these agreements permit product approval of innovative Australian and New Zealand products into US markets and vice-versa.

1.11 Finally, a question that often arises is, why do these agreements exist? In addition, another question is why is the ISO/IEC 17065 accredited third-party certification process so important?

1.11.1 The answer is because all countries desire to protect the intellectual property and trade secrets of their country's businesses.

1.11.2 In the US this protection is provided by 18 U.S. Code § 1831 Under Economic Espionage, where it states "whoever, intending or knowing that the offense will benefit any foreign government, foreign instrumentality, or foreign agent, knowingly steals, or without authorization appropriates, takes, carries away, or conceals, or by fraud, artifice, or deception obtains a trade secret shall be fined not more than $5,000,000 or imprisoned not more than 15 years, or both."

1.11.3 Any organization that commits any offense described shall be fined not more than the greater of $10,000,000 or three (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.[20]

1.11.4 Protection of intellectual property and trade secrets reinforces the value of the IAF MLA, the GATT/TBT and the ISO/IEC 17065 product approval process.

1.11.5 The goal is to protect everyone's best interests while also facilitating economic freedom and opportunity by promoting free and fair competition in the marketplace.

[20] https://www.law.cornell.edu/uscode/text/18/part-I/chapter-90