Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

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Big Timber® Screws for Use in Deck Ledger Applications

Trade Secret Report Holder:

Western Builders Supply dba Big Timber®

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CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 06 05 23 - Wood, Plastic, and Composite Fastenings Section: 06 11 00 - Wood Framing Section: 06 15 00 - Wood Decking

1 Innovative Products Evaluated[1]

1.1 Big Timber Screws:

1.1.1 BL Log, Timber, and Landscape Screws

1.1.2 CTX Construction Lag Screws

1.1.3 GL Gray Structural Screws

1.1.4 WTX Wafer Head Wood Screws

2 Product Description and Materials

2.1 The innovative products evaluated in this report are shown in **Figure 1**, **Figure 2**, **Figure 3**, and **Figure 4**.

Figure 1. CTX Construction Lag Screw

Figure 2. BL Log, Timber, and Landscaping Screw

Figure 3. GL Gray Structural Screw

Figure 4. WTX Wafer Head Screw

2.2 Big Timber Screws are set forth in **Table 1**.

Table 1. Big Timber Screws Specifications

Fastener Name	Designation	Head (in)		Nominal Length[1] (in)	Thread Length[1] (in)	Shank Diameter[2] (in)	Thread Diameter (in)		Specified Minimum Core Hardness[4] (HV 0.3)	Nominal Bending Yield,[6] F_{yb} (psi)	Allowable Fastener Strength (lb)	
		Diameter	Drive Type				Minor	Major			Tensile	Shear[3]
CTX[(1)]	15 x 3 1/2"	0.620	T30	3 1/2	2 1/2	0.202	0.179	0.275	355	151,600	1,475	1,020
	15 x 4"			4	2 1/2							
	15 x 5"			5	3							
	15 x 6"			6	3							
	17 x 4"	0.675	T40	4	2 1/2	0.226	0.210	0.295	355	170,500	1,850	1,240
	17 x 5"			5	3							
	17 x 6"			5	3							
BL[(1)]	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							
GL[(1)]	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							
WTX[(5)]	15 x 3 1/2"	0.659	T30	3 1/2	2	0.205	0.187	0.274	286	190,000	1,545	1,165
	15 x 4"			4	2							
	15 x 4 1/2"			4 1/2	2							
	15 x 5"			5	2							
	15 x 6"			6	2 1/2							
	15 x 8"			8	2 1/2							

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

1. Fastener length is measured from the 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. Fastener length is measured from the top of the head to the tip. Thread length includes tapered tip.
6. Bending yield strength is determined in accordance with ASTM F1575 and is based on the minor diameter.

2.3 Big Timber Screws are manufactured using a standard cold-formed process, followed by a heat-treating process, and then are subsequently coated.

2.3.1 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.

2.3.2 BL screws are coated with a proprietary coating designated as Black Log, which exceeds the protections provided by hot-dipped galvanized coatings conforming to ASTM A153.

2.3.3 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.

2.3.4 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.

2.4 Big Timber Screws are approved for use in chemically treated or untreated lumber where ASTM A153, Class D coatings are approved for use in accordance with IBC Section 2304.10 and IRC Section R304.3.[2]

2.4.1 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 (IBC Section 2304.10.6[3] and IRC Section R304.3[4]), allowing for its use in pressure-treated wood, provided the conditions set forth by the pressure-treated lumber manufacturer be met, including appropriate strength reductions.

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

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

3 Definitions[5]

3.1 New Materials[6] are defined as building materials, equipment, appliances, systems, or methods of construction, not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.[7] The design strength and permissible stresses shall be established by tests[8] and/or engineering analysis.[9]

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

3.2.1 These reports utilize intellectual property and/or trade secrets to create public domain material properties for commercial end-use.

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

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

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

3.5 Testing and/or inspections conducted for this duly authenticated report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed RDP.

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

3.6 The regulatory authority shall enforce[17] the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing[18] stating the nonconformance and the path to its cure.

3.7 The regulatory authority shall accept duly authenticated reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.[19]

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

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

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

4.1 *Local, State, and Federal*

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

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

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

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

4.2 *Standards*

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

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

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

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

4.2.5 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood and Wood-Based Materials*

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

4.3 *Regulations*

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

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

5 Listed[28]

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

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 Big Timber Screws are self-tapping fasteners used for attaching the deck ledger to the band joist of a building in accordance with IBC Section 1604.8.3 and IRC Section R507.9. See **Section 9** for installation requirements.

6.2 Big Timber Screws can be used for attaching ledger boards to wall studs with zero, one, or two layers of GWB between the ledger and the wall studs.

6.3 Big Timber Screws may be installed without lead holes, as prescribed in the NDS.

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

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

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

6.7 *Reference Design Values for Deck Ledger to Band Joist Attachment*

6.7.1 Big Timber Screws are designed for attaching the deck ledger to the band joist of a building in accordance with IBC Section 1604.8.3 and IRC Section R507.9. This connection is shown in **Figure 5**.

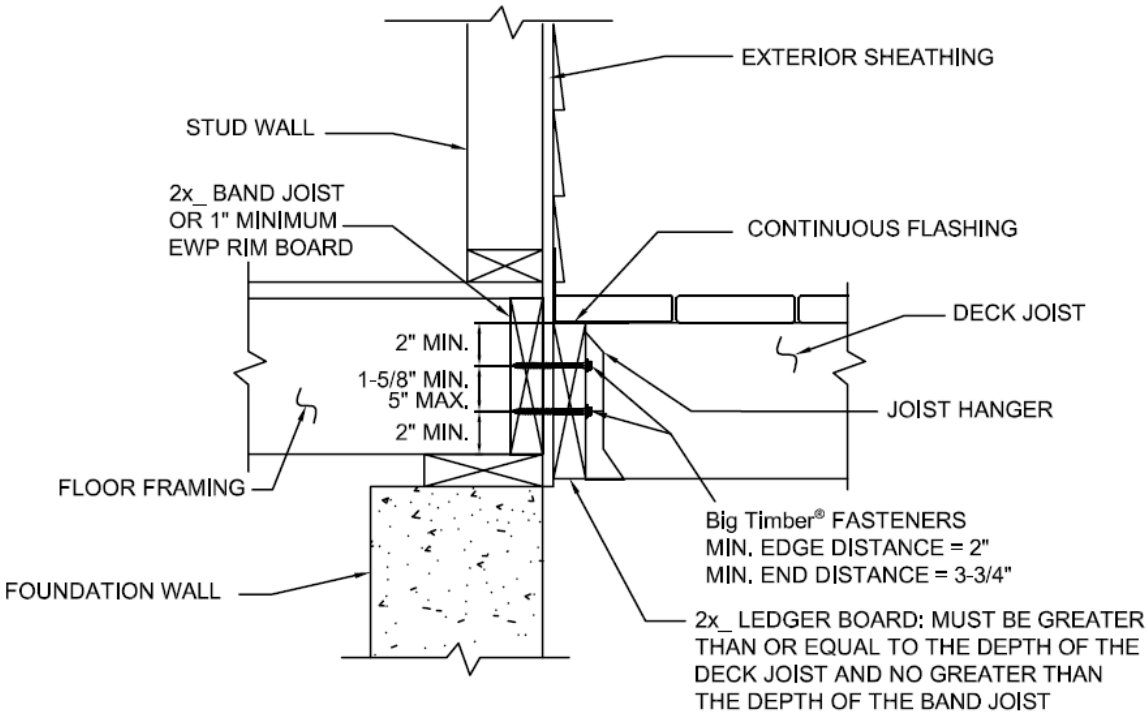

Figure 5. Big Timber Deck Ledger Connection to Band Joist

6.7.2 The IRC provides prescriptive fastener spacing for the attachment of a deck ledger to a rim joist with 1/2" diameter lag screws or through bolts as shown in IRC Table R507.9.1.3(1).

6.7.2.1 **Table 2** provides the Big Timber Screws spacing required to provide performance at least equivalent to the lag screws found in IRC Table R507.9.1.3(1) in accordance with IBC Section 104.2.3,[29] IBC Section 1604.8.3, IRC Section R104.2.2,[30] and IRC Section R507.9, in accordance with generally accepted engineering practice.

6.7.2.1.1 **Table 2** provides screw spacing for materials found in IRC Section R507.9, as well as a wider range of materials commonly used for rim joists. Screw spacing values are provided for two loading conditions.

6.7.2.2 When installed in accordance with the spacing requirements of **Table 2**, Big Timber Screws provide equivalent performance to IRC Table R507.9.1.3(1).

Table 2. Screw Spacing for Items in IRC Table R507.9.1.3(1) and Other Materials and Loading Conditions[1]

Fastener Designation[2,8] (in)	Load Case[9]	2x Nominal Ledger Species[3,4,5]	Band Joist Material[6,7]	Maximum On-Center Spacing of Fasteners (in)						
				Maximum Deck Joist Spans (ft)						
				Up to 6'	Up to 8'	Up to 10'	Up to 12'	Up to 14'	Up to 16'	Up to 18'
CTX 15 x 4" CTX 15 x 5" CTX 15 x 6" CTX 17 x 4" CTX 17 x 5" CTX 17 x 6"	LL + DL 40 + 10	HF	2x Sawn Lumber	18	13	10	8	7	6	5
			1 1/8" OSB	24	18	12	10	9	8	7
		SP	2x Sawn Lumber	22	16	12	10	8	7	6
			1 1/8" OSB	23	17	13	11	9	8	7
	SL + DL 50 + 10	HF	2x Sawn Lumber	14	11	8	7	6	5	4
			1 1/8" OSB	20	13	10	8	7	6	5
		SP	2x Sawn Lumber	18	12	10	8	7	6	5
			1 1/8" OSB	19	14	11	9	8	7	6
CTX 15 x 4" CTX 15 x 5" CTX 15 x 6" CTX 17 x 4" CTX 17 x 5" CTX 17 x 6"	SL + DL 60 + 10	HF	2x Sawn Lumber	12	9	7	6	5	4	4
			1 1/8" OSB	17	11	9	7	6	5	5
		SP	2x Sawn Lumber	14	11	8	7	6	5	4
			1 1/8" OSB	16	12	9	8	6	6	5
	SL + DL 70 + 10	HF	2x Sawn Lumber	11	8	6	5	4	4	3
			1 1/8" OSB	13	10	8	6	5	5	4
		SP	2x Sawn Lumber	12	9	7	6	5	4	4
			1 1/8" OSB	14	10	8	7	6	5	4

Table 2. Screw Spacing for Items in IRC Table R507.9.1.3(1) and Other Materials and Loading Conditions[1]

Fastener Designation[2,8] (in)	Load Case[9]	2x Nominal Ledger Species[3,4,5]	Band Joist Material[6,7]	Maximum On-Center Spacing of Fasteners (in)						
				Maximum Deck Joist Spans (ft)						
				Up to 6'	Up to 8'	Up to 10'	Up to 12'	Up to 14'	Up to 16'	Up to 18'
BL 17 x 4" BL 17 x 5" BL 17 x 6" GL 17 x 4" GL 17 x 5" GL 17 x 6"	LL + DL 40 + 10	HF	2x Sawn Lumber	22	17	12	10	8	7	6
			1 1/8" OSB	23	17	11	9	8	7	6
		SP	2x Sawn Lumber	24	18	12	10	8	7	6
			1 1/8" OSB	26	20	16	13	11	10	9
	SL + DL 50 + 10	HF	2x Sawn Lumber	18	12	10	8	7	6	5
			1 1/8" OSB	19	12	9	8	6	6	5
		SP	2x Sawn Lumber	20	13	10	8	7	6	5
			1 1/8" OSB	22	16	13	11	9	8	7
	SL + DL 60 + 10	HF	2x Sawn Lumber	16	10	8	7	6	5	4
			1 1/8" OSB	16	10	8	6	5	5	4
		SP	2x Sawn Lumber	17	11	8	7	6	5	4
			1 1/8" OSB	19	14	11	9	8	7	6
BL 17 x 4" BL 17 x 5" BL 17 x 6" GL 17 x 4" GL 17 x 5" GL 17 x 6"	SL + DL 70 + 10	HF	2x Sawn Lumber	12	9	7	6	5	4	4
			1 1/8" OSB	12	9	7	6	5	4	4
		SP	2x Sawn Lumber	13	9	7	6	5	4	4
			1 1/8" OSB	16	13	10	8	7	6	5

Table 2. Screw Spacing for Items in IRC Table R507.9.1.3(1) and Other Materials and Loading Conditions[1]

Fastener Designation[2,8] (in)	Load Case[9]	2x Nominal Ledger Species[3,4,5]	Band Joist Material[6,7]	Maximum On-Center Spacing of Fasteners (in)						
				Maximum Deck Joist Spans (ft)						
				Up to 6'	Up to 8'	Up to 10'	Up to 12'	Up to 14'	Up to 16'	Up to 18'

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

1. Based on load duration of 1.0. Spacing may be adjusted by the applicable load duration as specified in the NDS.
2. Fasteners are required to have full thread penetration into the main member. Excess fastener length extending beyond the main member is not reflected in the table above.
3. Solid-sawn ledgers shall be HF or SP species (specific gravity of 0.43 and 0.55, respectively) and designed by others.
4. Minimum ledger board requirements: 1 1/2" thickness and 7 1/4" depth
5. Ledger materials tested in the wet service condition.
6. A maximum 1/2" structural sheathing may be installed between the ledger and band joist. Up to 1/2" thickness of stacked washers shall be permitted to substitute for up to 1/2" on allowable sheathing thickness where combined with wood structural panel or lumber sheathing.
7. Minimum band joist requirements: SPF (specific gravity of 0.42) solid-sawn lumber 1 1/2" thick and 7 1/4" depth; OSB 1 1/8" thick and 7 1/4" depth.
8. Fasteners shall be installed per **Section 9** of this report.
9. Snow load shall not be assumed to act concurrently with live load.

6.8 *Reference Lateral Design Values for Deck Ledger to Stud Attachment*

6.8.1 *Without GWB Interlayer:*

6.8.1.1 Installation details for ledger to stud connections without GWB for 2 x 6, 2 x 8, and 2 x 10 ledgers are shown in **Figure 6**, **Figure 7**, and **Figure 8**, respectively.

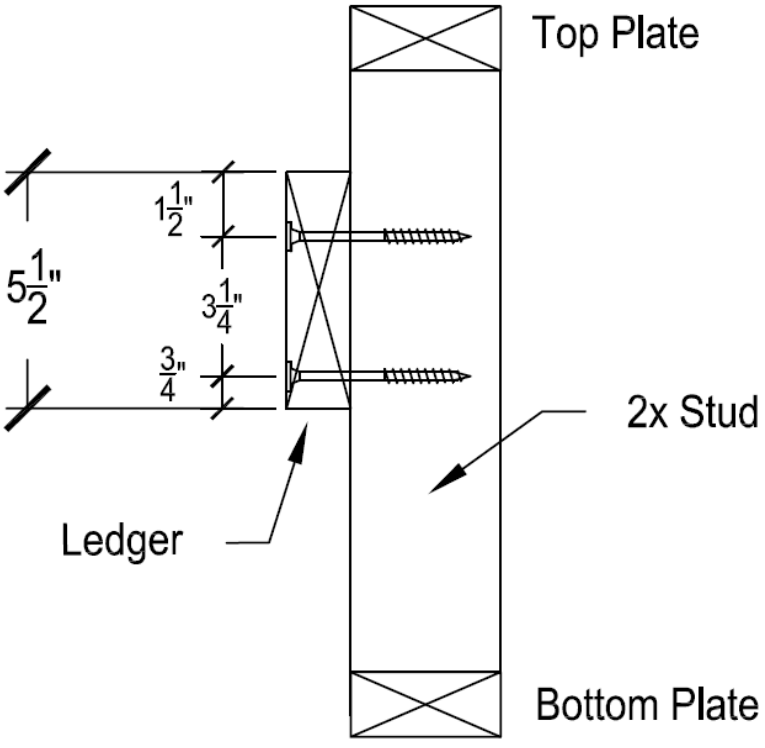

Figure 6. 2 x 6 Ledger Directly Attached to Stud

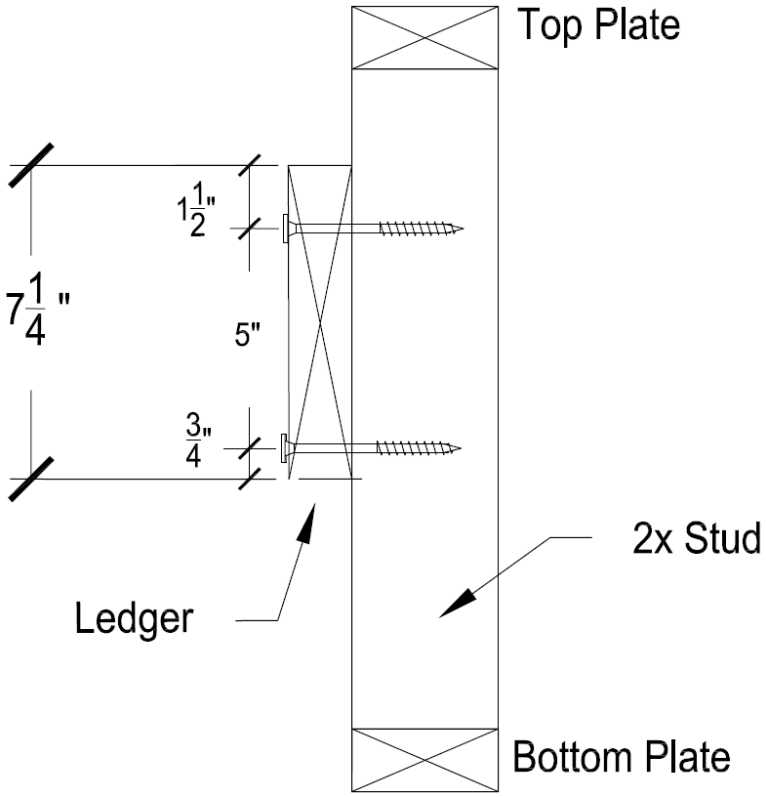

Figure 7. 2 x 8 Ledger Directly Attached to Stud

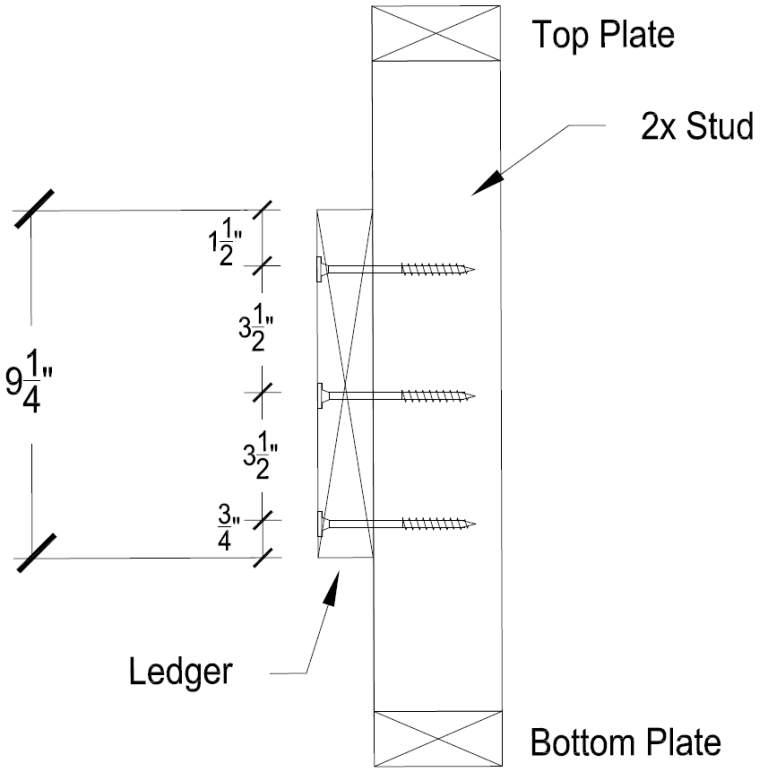

Figure 8. 2 x 10 Ledger Directly Attached to Stud

6.8.2 *With One Layer GWB Interlayer:*

6.8.2.1 Installation details for ledger to stud connections with a single layer of GWB for 2 x 6, 2 x 8, and 2 x 10 ledgers are shown in **Figure 9**, **Figure 10**, and **Figure 11**, respectively.

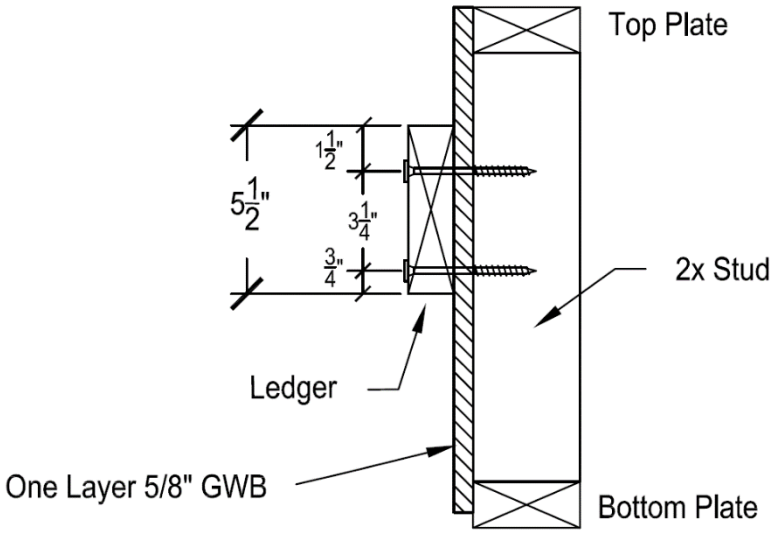

Figure 9. 2 x 6 Ledger Attached to Stud Through One Layer of GWB

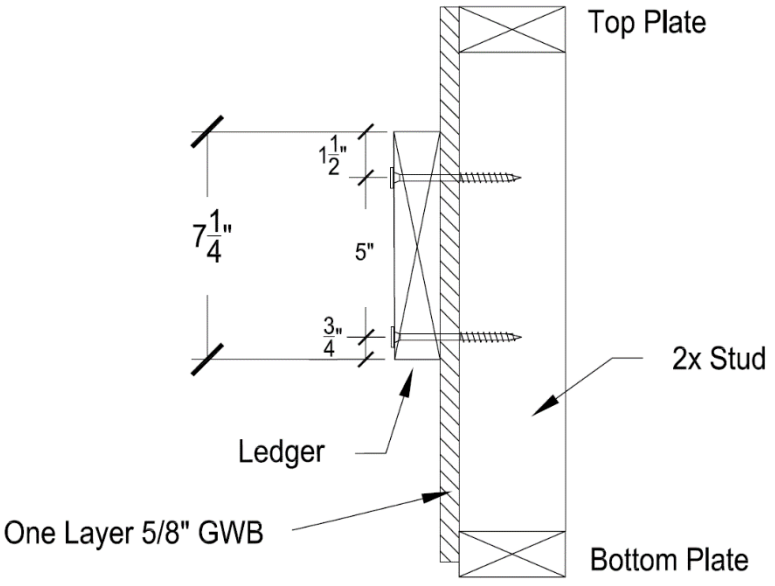

Figure 10. 2 x 8 Ledger Attached to Stud Through One Layer of GWB

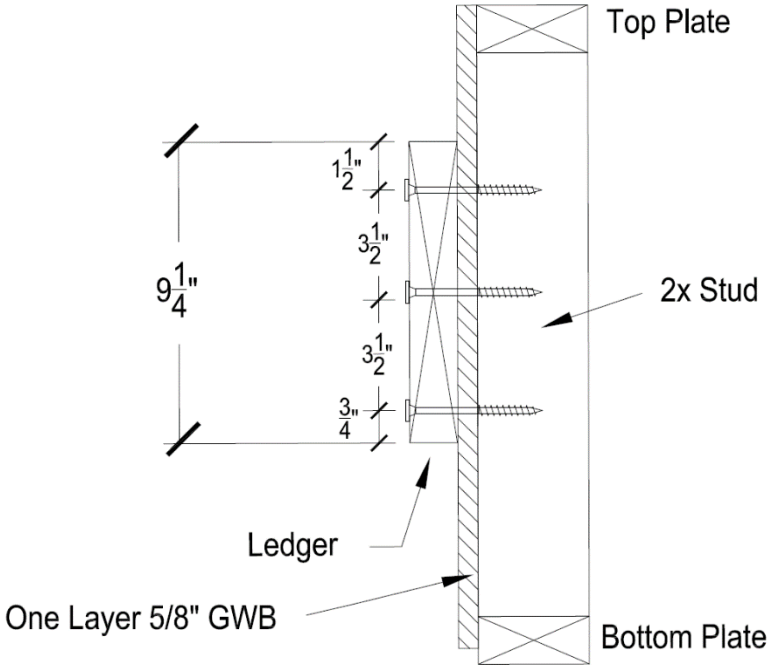

Figure 11. 2 x 10 Ledger Attached to Stud Through One Layer of GWB

6.8.3 *With Two Layers GWB Interlayer:*

6.8.3.1 Installation details for ledger to stud connections with a double layer of GWB for 2 x 6, 2 x 8, and 2 x 10 ledgers are shown in **Figure 12**, **Figure 13**, and **Figure 14**, respectively.

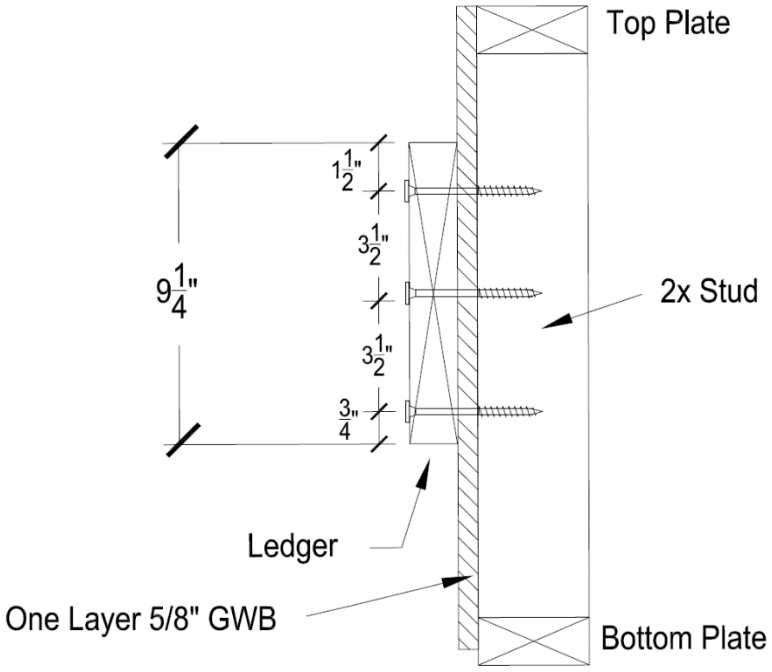

Figure 12. 2 x 6 Ledger Attached to Stud Through Two Layers of GWB

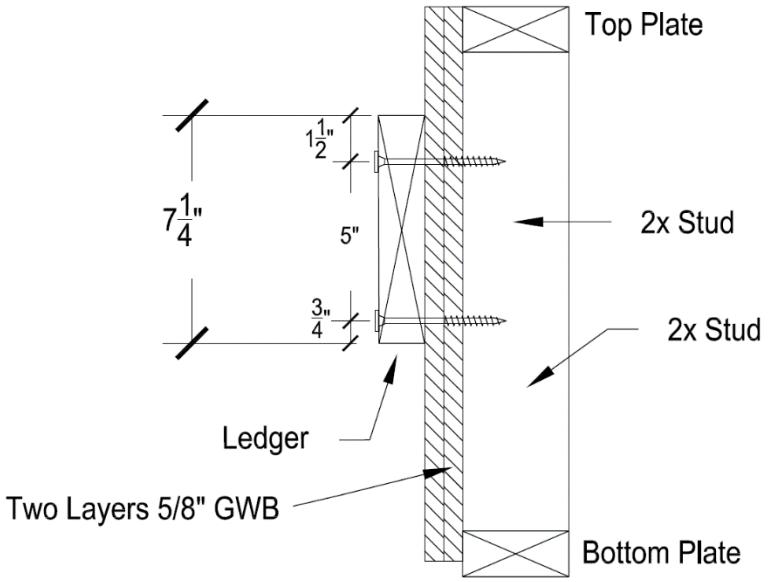

Figure 13. 2 x 8 Ledger Attached to Stud Through Two Layers of GWB

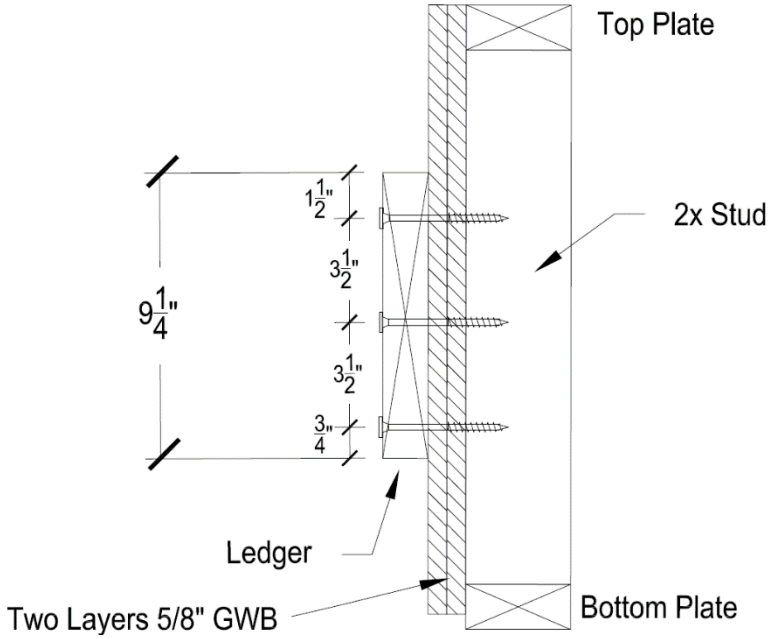

Figure 14. 2 x 10 Ledger Attached to Stud Through Two Layers of GWB

6.9 Reference lateral design values for the deck ledger to stud connections detailed in **Figure 6** through **Figure 14**, are provided in **Table 3**.

6.9.1 The values in **Table 3** apply where the ledger is applied either directly over the studs or with up to two layers of 5/8" GWB between the ledger and studs.

Table 3. Design Values for Ledger to Stud Attachment

Fastener	Minimum Fastener Length[6] (in)	Minimum Penetration into Main Member (in)	Layers of GWB[8]	Allowable Load per Stud Connection[3,4,5,7] (lb)		
				Ledger Size[1,2]		
				2 x 6	2 x 8	2 x 10
CTX 15	3 1/2	2	0	295	295	475
		1 3/8	1	320	320	475
	5	2 1/4	2	570	570	570
BL 17	4	2 1/2	0	370	370	370
		1 7/8	1	315	315	435
	5	2 1/4	2	370	370	435
GL 17	4	2 1/2	0	370	370	370
		1 7/8	1	315	315	435
	5	2 1/4	2	370	370	435
WTX 15	3 1/2	2	0	265	265	500
		1 3/8	1	380	380	575
	5	2 1/4	2	470	470	650

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

1. Two fasteners are required for 2 x 6 and 2 x 8 ledger connections. Three fasteners are required for 2 x 10 ledger connections. Additional fasteners are prohibited.
2. SPF ledger with minimum specific gravity of 0.42.
3. The tabulated values apply where the ledger is installed either directly over the studs or with up to two layers of 5/8" gypsum between the ledger and studs.
4. Allowable loads shall be limited to parallel-to-grain loaded solid sawn main members (minimum 2" nominal). Wood side members shall be loaded perpendicular to grain.
5. Allowable loads are shown at the wood load duration factor of C_D = 1.00. Loads may be increased for load duration as permitted by the building code up to a C_D = 1.60. All adjustment factors shall be applied per NDS. For in-service moisture content greater than nineteen percent (19%), use Wet Service Factor (C_M) = 0.70.
6. Fasteners shall be centered in the stud and spaced as shown in **Figure 6** through **Figure 14**. The stud minimum end distance is 6 3/4" when loaded toward the end and 4" when loaded away from the end. The ledger end distance is 6" for full values. For ledger end distances under 6", the reference connection design values shall be adjusted in accordance with NDS Section 12.5.
7. For LRFD values, the reference connection design values shall be adjusted in accordance with NDS Section 11.3.
8. Gypsum wallboard (GWB) must be attached as required per the building code.

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

7 Certified Performance[31]

7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.[32]

7.2 The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.[33]

8 Regulatory Evaluation and Accepted Engineering Practice

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

8.1.1 Big Timber Screws were evaluated to determine:

8.1.1.1 Use for attachment of deck ledgers to the building structure. This application includes attachments to Spruce Pine-Fir (SPF) band joists[34] and Oriented Strand Board (OSB) band joists.

8.1.1.2 Lateral strength of ledger connections to wood-framed walls. This application includes zero, one, or two layers of $^{5}/_{8}$" GWB between the ledger and the wall studs.

8.1.2 For conventionally framed buildings, the deck ledger is required to be attached to the band joist in accordance with IBC Section 1604.8.3 or IRC Section R507.9, as applicable.

8.1.2.1 As in some truss installations where a band joist is not used, an engineered design is required.[35]

8.2 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified[36] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[37] respectively.

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

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

9 Installation

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

9.2 In the event of a conflict between the manufacturer installation instructions and this report, contact the manufacturer for counsel on the proper installation method.

9.3 *Installation Procedure*

9.3.1 Lead holes are not required but may be used where lumber is prone to splitting.

9.3.2 Big Timber Screws shall be installed with the appropriate rotating powered driver. Do not overdrive.

9.3.3 Install Big Timber Screws so that the threads fully engage the band joist material and the fastener tip extends beyond the back face of the band joist material when fully seated against the installed ledger.

9.3.4 For deck ledger connections, stagger the Big Timber Screws from the top to the bottom along the length of the ledger while maintaining the required edge and end distances.

9.3.4.1 **Figure 5** provides a deck ledger installation detail, including minimum required spacing, end, and edge distances.

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

10 Substantiating Data

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

10.1.1 Deck ledger assembly testing in accordance with ASTM D1761

10.2 Properties for Big Timber CTX Construction Lag Screws from Report Number 1907-01

10.3 Properties for Big Timber BL and GL Screws from Report Number 1907-02

10.4 Properties for Big Timber WTX Wood Screws from Report Number 1911-04

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

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

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

10.8 *Testing and Engineering Analysis*

10.8.1 The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.[38]

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

11 Findings

11.1 As outlined in **Section 6**, Big Timber Screws have performance characteristics that were tested and/or meet applicable regulations. In addition, they are suitable for use pursuant to its specified purpose.

11.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, Big Timber Screws shall be approved for the following applications:

11.2.1 Big Timber Screws provide an equivalent connection as that required by IBC Section 1604.8.3 and IRC Section R507.9.

11.2.2 Big Timber Screws may be used to secure ledger boards into studs with zero, one, or two layers of GWB in between.

11.3 Unless exempt by state statute, when Big Timber Screws are to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.

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

11.5 IBC Section 104.2.3[39] (IRC Section R104.2.2[40] and IFC Section 104.2.3[41] are similar) in pertinent part state:

> **104.2.3 Alternative Materials, Design and Methods of Construction and Equipment.** The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative is not specifically prohibited by this code and has been approved.

11.6 **Approved:**[42] Building regulations require that the building official shall accept duly authenticated reports.[43]

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

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

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

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

11.8 Through the IAF Multilateral Arrangement (MLA), this duly authenticated report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 duly authenticated reports are equivalent.[44]

12 Conditions of Use

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

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

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

12.4 When required by adopted legislation and enforced by the building official, also known as the Authority Having Jurisdiction (AHJ) in which the project is to be constructed:

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

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

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

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

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

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

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

12.5 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *"the building official shall make, or cause to be made, the necessary tests and investigations; or the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.2.3"*, all of IBC Section 104, and IBC Section 105.3.

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

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

13 Identification

13.1 Big Timber Screws (BL Log, Timber, and Landscape Screws, CTX Construction Lag Screws, GL Gray Structural Screws, and WTX Wafer Head Wood Screws), as listed in **Section 1.1**, are identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.

13.2 Additional technical information can be found at bigtimberfasteners.com.

14 Review Schedule

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

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

Notes

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

2 2021 IRC Section R317.3

3 2018 IBC Section 2304.10.5

4 2021 IRC Section R317.3

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

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

7 Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review https://www.justice.gov/atr/mission and https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3

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

9 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.1:~:text=Conformance%20to%20Standards-,The%20design%20strengths%20and%20permissible%20stresses,-of%20any%20structural

10 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20make%2C%20or%20cause%20to%20be%20made%2C%20the%20necessary%20tests%20and%20investigations%3B%20or%20the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.2.3.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

29 2021 IBC Section 104.11

30 2021 IRC Section R104.11

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

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

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

[34] The term *"band joist"* is used throughout this report. Other regional terms synonymous with band joist include rim board, band board, header board, and header joist.

[35] For guidance on designing the connection of the deck ledger to trusses where a band joist is not used, see SBCA Research Report, Deck Ledger Attachment to Residential Wood Truss Floor Systems.

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

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

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

[39] 2021 IBC Section 104.11

[40] 2021 IRC Section R104.11

[41] 2018: https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9 AND 2021: https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11

[42] Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 (https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#201.4) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

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

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