Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

Report No: 1609-08

Issue Date: July 10, 2017

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Subject to Renewal: October 1, 2027

SFS Group USA, Inc. ConnexTite™ Fasteners

Trade Secret Report Holder:

SFS Group USA, Inc.

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CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES Section: 06 05 23 - Wood, Plastic, and Composite Fastenings

1 Innovative Product Evaluated[1]

1.1 SFS Group USA, Inc. ConnexTite Fasteners

2 Product Description and Materials

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

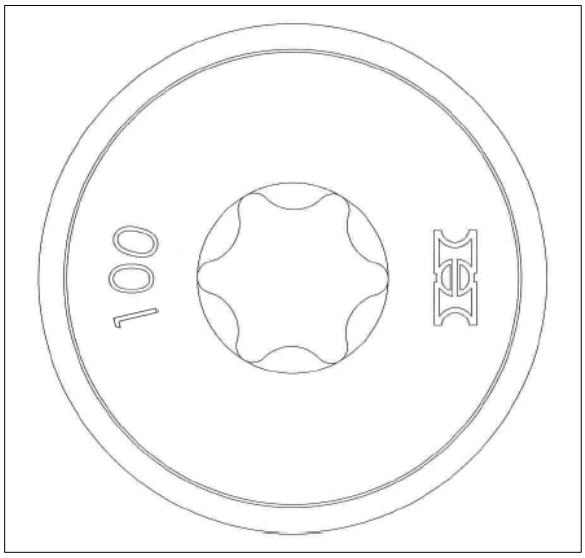

Figure 1. ConnexTite Fasteners Flange Head Detail

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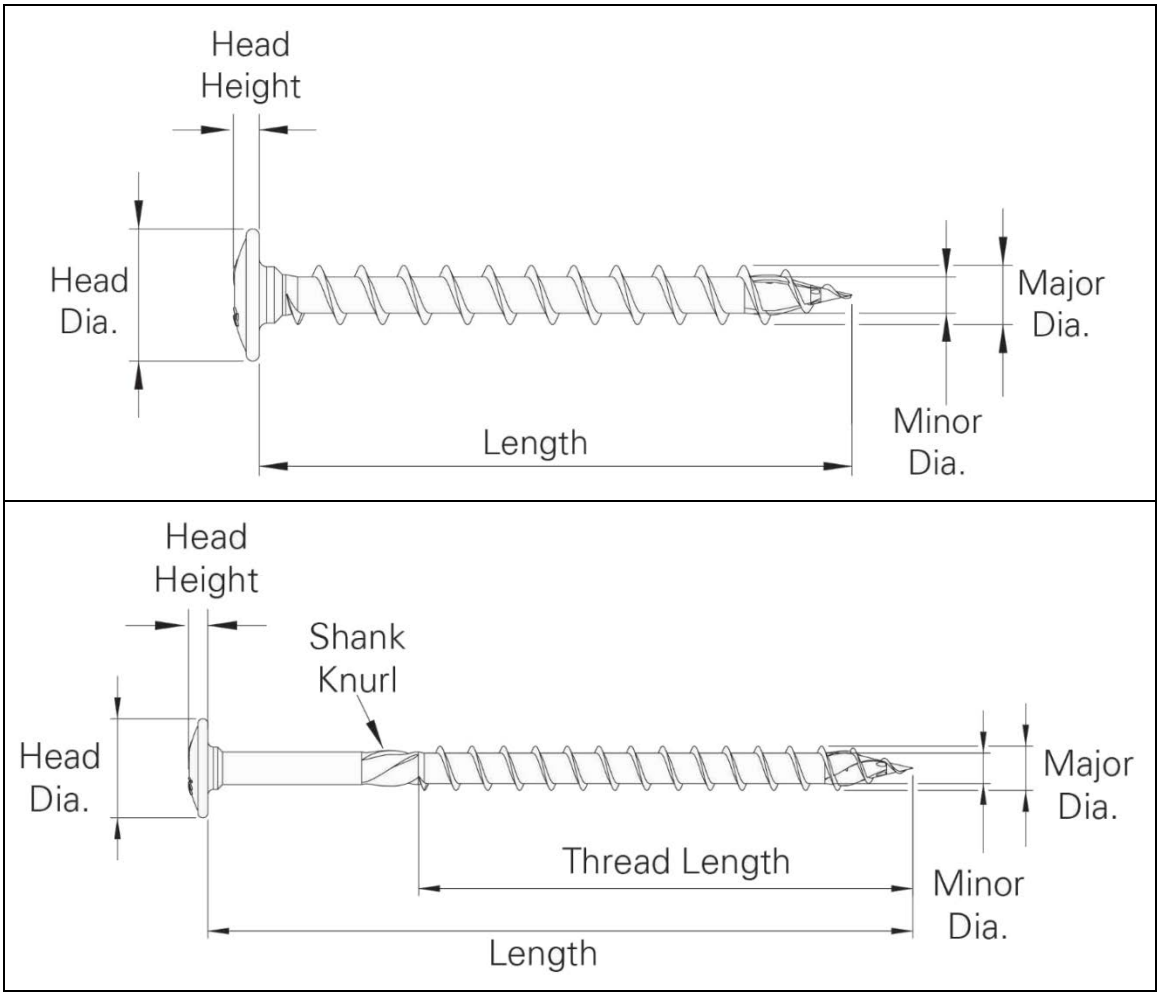

Figure 2. ConnexTite Fasteners Flange Head Fully Threaded and Partially Threaded Fastener Details

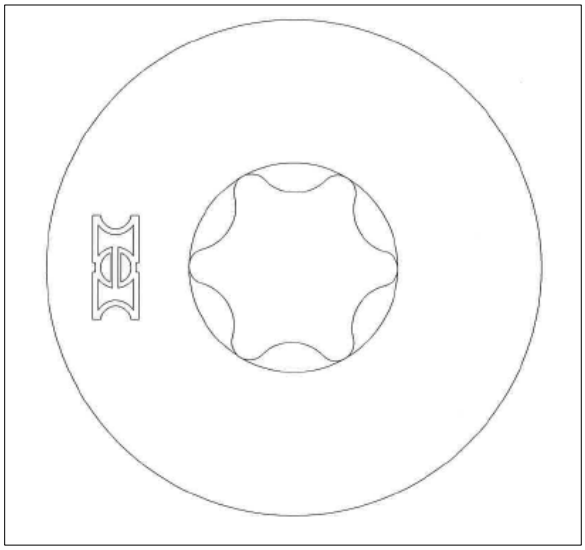

Figure 3. ConnexTite Fasteners Countersunk Head Detail

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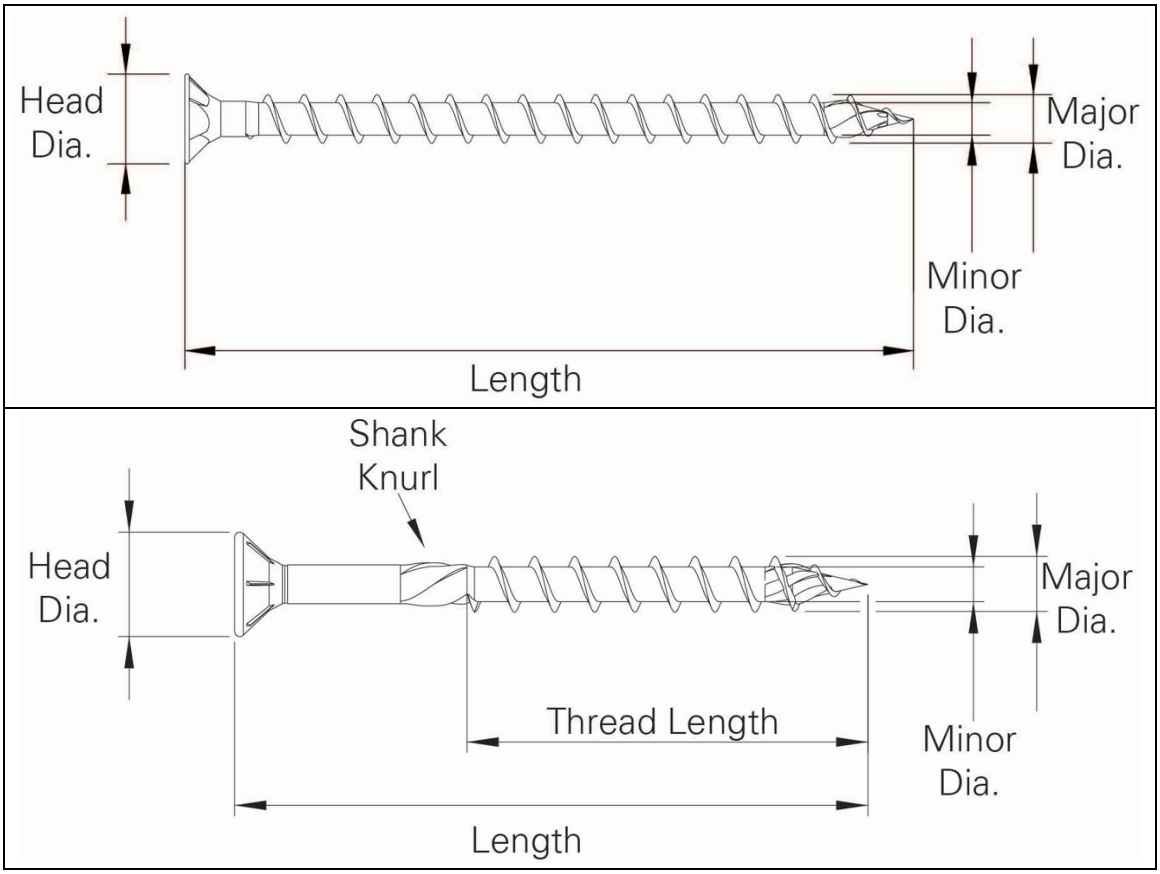

Figure 4. ConnexTite Fasteners Countersunk Head Fully Threaded and Partially Threaded Fastener Details

2.2 ConnexTite Fasteners are manufactured from cold-formed, heat-treated, carbon steel.

2.3 ConnexTite Fasteners are available in lengths up to 19$^{3}/_{4}$".

2.4 ConnexTite Fasteners may be treated with either a proprietary corrosion resistant coating or a zinc plating.

2.5 *Corrosion Resistant Fasteners*

2.5.1 ConnexTite Fasteners are designed for exterior use and may be used where fasteners are required to exhibit corrosion resistance when exposed to adverse environmental conditions and/or in preservative treated wood subject to the limitations of **Section 9**.

2.5.2 ConnexTite Fasteners are coated with a proprietary coating system that meets or exceeds the corrosion protection of hot-dipped galvanizing per ASTM A153 in accordance with IBC Section 2304.10 and IRC Section R304.3.[2]

2.5.3 ConnexTite Fasteners are alternatives to hot-dip zinc galvanized fasteners.

2.5.4 ConnexTite Fasteners 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.

2.6 *Zinc-Plated Fasteners*

2.6.1 ConnexTite Fasteners are zinc-plated per ASTM F1941.

2.6.2 Zinc-plated fasteners are approved for interior dry use only.

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2.7 ConnexTite Fasteners are specified in **Table 1**. For additional fastener sizes, please refer to **Appendix A**, **Table 8**, **Table 9**, and **Table 10**.

Table 1. ConnexTite Fasteners Specifications

Fastener Name	Nominal Fastener Diameter (in)	Head (in)		Shank Diameter[1] (in)	Thread Diameter (in)		Nominal Bending Yield, F_{yb}, (psi)		Allowable Fastener Strength (lbs)	
		Diameter	Height		Minor[2]	Major	Transition Zone	Shank	Tensile	Shear
ConnexTite Fastener Flange Head	1/4	0.552	0.094	0.173	0.148	0.244	202,000	237,000	970	485
	5/16	0.709	0.148	0.228	0.207	0.315	168,000	179,000	1810	905
	3/8	0.877	0.161	0.279	0.253	0.393	156,000	203,000	2545	1275
ConnexTite Fastener Countersunk Head	1/4	0.457	-	0.173	0.148	0.244	202,000	237,000	970	485
	5/16	0.583	-	0.228	0.207	0.315	168,000	179,000	1810	905
	3/8	0.728	-	0.279	0.253	0.393	156,000	203,000	2545	1275

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

1. Shank diameter based on manufactured thickness. Finished dimensions are larger in the plated condition due to the proprietary coatings added.
2. Minor thread diameter value is calculated as the average of the upper and lower tolerances.

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

3 Definitions[3]

3.1 New Materials[4] 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.[5] The design strength and permissible stresses shall be established by tests[6] and/or engineering analysis.[7]

3.2 Duly authenticated reports[8] and research reports[9] are test reports and related engineering evaluations that are written by an approved agency[10] and/or an approved source.[11]

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

3.2.1.1 This report protects confidential Intellectual Property and trade secrets under the regulation, 18.US.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).[12]

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.[13]

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[14] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[15] 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[16] stating the nonconformance and the path to its cure.

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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.[17]

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.[18] Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,[19] 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.[20]

4 Applicable Local, State, and Federal Approvals; Standards; Regulations[21]

4.1 *Local, State, and Federal*

4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured local jurisdictions: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, St. Louis County, Texas Department of Insurance, and Wichita.[22]

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.[23]

4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[24] and Part 3280[25] pursuant to the use of ISO/IEC 17065 duly authenticated reports.

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

4.2 *Regulations*

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

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

4.3 *Standards*

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

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

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

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

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

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

4.3.7 *ASTM F1941: Standard Specification for Electrodeposited Coatings on Mechanical Fasteners*

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5 Listed[26]

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

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 *General*

6.1.1 ConnexTite Fasteners are self-tapping fasteners used for connections in conventional light frame construction and provide resistance against withdrawal, axial, and shear loads. See **Section 9** for installation requirements.

6.1.2 ConnexTite Fasteners can be used in applications including timber construction work (staircase construction and interior finishing), structural, and general timber construction work on rafter insulation and façade attachment.

6.1.3 ConnexTite Fasteners are installed without lead holes as prescribed in the NDS.

6.2 *Design*

6.2.1 Design of ConnexTite Fasteners is governed by the applicable code and the provisions for dowel type fasteners in the NDS.

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

6.3 *ConnexTite Fasteners Reference Withdrawal Design Values*

6.3.1 The design provisions for withdrawal noted in NDS Table 12.2B apply to ConnexTite Fasteners, unless otherwise noted in this report.

6.3.2 Reference withdrawal design values for ConnexTite Fasteners in select lumber species are presented in **Table 2**.

Table 2. ConnexTite Fasteners Reference Withdrawal Design Values for Face Grain Applications

Nominal Fastener Diameter (in)	Allowable Withdrawal Design Values by Species[1,2,3] (lbs/in)		
	Species (Specific Gravity)		
	SPF (0.42)	DF (0.50)	SP (0.55)
1/4	95	135	220
5/16	120	180	255
3/8	130	205	280

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

1. Values are stated in lbf/in of thread engagement.
2. Values shall be adjusted by all applicable adjustment factors per NDS Section 11.3 for wood screws.
3. Fastener penetration is the threaded length embedded in the main member, including the tip.

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6.4 *ConnexTite Fasteners Head Pull-Through Design Values*

6.4.1 The reference design values for head pull-through for ConnexTite Fasteners are specified in **Table 3**.

Table 3. ConnexTite Fasteners Reference Head Pull-Through Design Values

Minimum Side Member Thickness (in)	Nominal Fastener Diameter (in)	Head Diameter Measured (in)	Allowable Head Pull-Through by Species[1] (lbs)					
			Species (Specific Gravity)					
			SPF (0.42)		DF (0.50)		SP (0.55)	
			Flange	Countersunk	Flange	Countersunk	Flange	Countersunk
3/4	1/4	0.552	155	130	220	185	265	225
	5/16	0.705	195	165	275	235	335	280
	3/8	0.877	250	205	355	290	430	355
1 1/2	1/4	0.552	310	265	440	370	535	450
	5/16	0.705	390	330	550	465	670	565
	3/8	0.877	500	410	710	585	860	705

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

1. Values shall be adjusted by all applicable adjustment factors per NDS Section 11.3 for wood screws.

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6.5 *ConnexTite Fasteners Reference Lateral Design Values – Face Grain Applications*

6.5.1 The reference lateral design values for shear load perpendicular and parallel to grain for ConnexTite Fasteners are specified in **Table 4** and **Table 5**.

Table 4. ConnexTite Fasteners Reference Lateral Design Values Using Dimensional Lumber

Fastener Head Type	Nominal Fastener Diameter (in)	Fastener Length (in)	Side Member Thickness (in)	Minimum Penetration into Main Member (in)	Lateral Design Values[1,2] (lbs)					
					Species (Specific Gravity)					
					SPF (0.42)		DF (0.50)		SP (0.55)	
					Z Para	Z Perp	Z Para	Z Perp	Z Para	Z Perp
Flange	1/4	2 3/8	1 1/2	7/8	115	90	140	110	160	125
		2 3/4		1 1/4	130	105	165	135	190	155
		3 1/8		1 1/2	145	115	175	140	190	155
		4		2 1/2						
		≥ 4 3/4		3 1/4						
	5/16	2 3/4		1 1/4	155	125	215	170	525	550
		3 1/8		1 5/8	175	140	245	195		
		4		2 1/2	195	155				
		4 3/4		3 1/4						
		≥ 5 1/2		4						
	3/8	3 1/8		1 5/8	180	145	250	200	300	240
		4		2 1/2	220	175	280		315	255
		4 3/4		3 1/4						
		≥ 5 1/2		4						
Countersunk	1/4	2 3/8		7/8	115	90	140	110	160	125
		2 3/4		1 1/4	130	105	165	135	190	155
		3 1/8		1 5/8	145	115	175	140		
		3 1/2		2						
		≥ 4		2 1/2						
	5/16	3 1/8		1 5/8	175	140	245	195	285	225
		3 1/2		2	195	155				
		≥ 4		2 1/2						
	3/8	3 1/8		1 5/8	180	145	250	200	300	240
		4		2 1/2	220	175	280	220	315	255
		≥ 4 3/4		3 1/4						

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

1. Reference lateral design values apply to two-member single shear connections where both members are of the same specific gravity and the fastener is oriented perpendicular to grain. Where the members are of different specific gravities, use the lower of the two.
2. Values shall be adjusted by all applicable adjustment factors per NDS Section 11.3 for wood screws.

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Table 5. ConnexTite Fasteners Reference Lateral Design Values Using Engineered Lumber

Fastener Head Type	Nominal Fastener Diameter (in)	Fastener Length (in)	Side Member Thickness (in)	Minimum Penetration into Main Member (in)	Lateral Design Values[1,2] (lbs)	
					Species (Specific Gravity)	
					LVL or LSL (0.50)	
					Z Para	Z Perp
Flange	1/4	2	1 1/4	3/4	135	105
		2 3/8		1 1/8	155	125
		2 3/4		1 1/2	165	135
		2 3/4	1 1/2	1 1/4	165	135
		4		2 1/2	175	140
		3 1/8	1 3/4	1 3/8	175	140
	5/16	2 3/4	1 1/4	1 1/2	215	170
		2 3/4	1 1/2	1 1/4	215	170
		4		2 1/2	245	195
		5 1/2		4	245	195
		3 1/8	1 3/4	1 3/8	235	190
		4 3/4		3	270	215
	3/8	4	1 1/2	2 1/2	280	220
		5 1/2		4	280	220
		4 3/4	1 3/4	3	300	240
Countersunk	1/4	2 3/8	1 1/4	1 1/8	155	125
		2 3/4		1 1/2	165	135
		2 3/4	1 1/2	1 1/4	165	135
		3 1/2		2	175	140
		4 3/8		2 7/8	175	140
		5 7/8		4 3/8	175	140
		3 1/8	1 3/4	1 3/8	175	140
		3 1/2		1 3/4	175	140
	5/16	3 1/8	1 1/4	1 7/8	225	180
		4	1 1/2	2 1/2	245	195
		5 1/2		4	245	195
		3 1/8	1 3/4	1 3/8	235	190
		3 1/2		1 3/4	270	215
		4 3/4		3	270	215

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Table 5. ConnexTite Fasteners Reference Lateral Design Values Using Engineered Lumber

Fastener Head Type	Nominal Fastener Diameter (in)	Fastener Length (in)	Side Member Thickness (in)	Minimum Penetration into Main Member (in)	Lateral Design Values[1,2] (lbs)	
					Species (Specific Gravity)	
					LVL or LSL (0.50)	
					Z Para	Z Perp
Countersunk continued	3/8	3 1/8	1 1/4	1 7/8	260	205
		4	1 1/2	2 1/2	280	220
		5 1/2		4	280	220
		3 1/2	1 3/4	1 3/4	280	225
		4 3/4		3	300	240

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

1. Reference lateral design values apply to two-member single shear connections where both members are of the same specific gravity and the fastener is oriented perpendicular to grain. Where the members are of different specific gravities, use the lower of the two.
2. Values shall be adjusted by all applicable adjustment factors per NDS Section 11.3 for wood screws.

6.6 *ConnexTite Fasteners Reference Lateral Design Values – Metal Side Plate*

6.6.1 The reference lateral design values for shear load perpendicular and parallel to grain with a metal side plate for ConnexTite Fasteners are specified in **Table 6**.

Table 6. ConnexTite Fasteners Reference Lateral Design Values Using Dimensional Lumber and Metal Side Plate

Side Member (Metal Plate) Thickness (in)	Nominal Fastener[2] Diameter (in)	Lateral Design Values[1,3] (lbs)	
		Species (Specific Gravity)	
		DF (0.50)	
		Z Para	Z Perp
0.105 (12-gauge)	5/16	565	595
0.134 (10-gauge)			
0.179 (7-gauge)			
0.239 (3-gauge)			
0.25			

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

1. Reference lateral design values apply to two-member single shear connections, where the main member is wood with a specific gravity greater than or equal to 0.50, the side member is a metal side plate (ASTM A36) and the fastener is oriented perpendicular to grain.
2. Minimum fastener length is 2 3/4".
3. Values shall be adjusted by all applicable factors per NDS Section 11.3 for wood screws.

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6.7 *ConnexTite Fasteners Spacing Requirements*

6.7.1 Minimum fastener spacing requirements for ConnexTite Fasteners are shown in **Table 7**.

Table 7. ConnexTite Fasteners Minimum Fastener Spacing Requirements[1,2,3]

Nominal Fastener Diameter (in)	Shank Diameter (in)	Minimum Edge Distance (in)		Minimum End Distance (in)			Minimum On-Center Spacing (in)			
		Load Parallel to Grain	Load Perpen-dicular To Grain	Between Fasteners in a Row		Load Perpen-dicular To Grain	Between Fasteners in a Row		Between Rows	
				Load Toward Fastener	Load Away From Fastener		Parallel to Grain	Perp. to Grain	Parallel to Grain	Perp. to Grain
1/4	0.173	3/8	1	1	1 3/4	1	1	NDS Table 12.5.1D	3/8	1 1/4
5/16	0.228	1/2	1 1/4	1 1/4	2 1/4	1 1/4	1 1/4		1/2	1 5/8
3/8	0.279	5/8	1 1/2	1 1/2	2 3/4	1 1/2	1 1/2		5/8	2

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

1. Fastener spacing follows requirements of NDS Section 12.5.
2. Heavy or medium concentrated loads shall not be suspended below the neutral axis of a single sawn lumber or structural glued laminated timber beam, except where mechanical or equivalent reinforcement is provided to resist tension stresses perpendicular to grain.
3. Always space fasteners to avoid splitting of wood.

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

7 Certified Performance[27]

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.[28]

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.[29]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 ConnexTite Fasteners comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 ConnexTite Carbon Steel Fasteners were tested and evaluated to determine their structural resistance properties, which are used to develop reference design values for Allowable Stress Design (ASD). The following properties were evaluated:

8.1.1.1 Withdrawal strength in accordance with ASTM D1761

8.1.1.2 Bending yield strength in accordance with ASTM F1575

8.1.1.3 Tensile strength in accordance with AISI S904

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8.1.1.4 Head pull-through in accordance with NDS

8.1.1.5 Lateral resistance in accordance with ASTM D1761

8.2 Any building code, regulation and/or accepted engineering evaluations (e.g., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified[30] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[31] respectively.

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

9 Installation

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

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

9.3 *Installation Procedure*

9.3.1 Install using a Torx® bit by turning. Pre-drilling of pilot holes is not required but may be used where lumber is prone to splitting.

9.3.2 Minimum penetration is 1", unless otherwise stated in this report.

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 Withdrawal testing in accordance with ASTM D1761

10.1.2 Bending yield testing in accordance with ASTM F1575

10.1.3 Tensile strength testing in accordance with AISI S904

10.1.4 Lateral strength testing in accordance with ASTM D1761

10.1.5 Shear strength calculations performed by DrJ Engineering, LLC in accordance with accepted engineering principles

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

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

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

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

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10.5 *Testing and Engineering Analysis*

10.5.1 The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.[32]

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

11 Findings

11.1 As outlined in **Section 6**, ConnexTite Fasteners 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, ConnexTite Fasteners shall be approved for the following applications:

11.2.1 Use as an alternative to those fasteners prescribed by the applicable code using the reference design value properties defined herein.

11.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from SFS Group USA, Inc.

11.4 IBC Section 104.2.3[33] (IRC Section R104.2.2[34] and IFC Section 104.2.3[35] 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.

11.5 **Approved:**[36] Building regulations require that the building official shall accept duly authenticated reports.[37]

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

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

11.5.3 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.

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

11.7 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.[38]

12 Conditions of Use

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

12.2 As listed herein, ConnexTite Fasteners shall be used:

12.2.1 For interior only. Dry use only if zinc-plated.

12.3 Design properties shall not exceed those described in **Section 6**.

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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 At a minimum, this innovative product shall be installed per **Section 9**.

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

12.4.5 This innovative product has 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.

12.4.6 The application of this innovative product 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 SFS Group USA, Inc. ConnexTite Fasteners, 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 us.sfs.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.

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Appendix A

Table 8. SFS Group USA, Inc. ConnexTite Fasteners Flange Head

Fastener Designation	Nominal Diameter	Head		Fastener Length (in)	Thread Length (in)	Shank Diameter (in)	Thread Diameter (in)	
		Diameter (in)	Thickness (in)				Minor	Major
ConnexTite Flange Head	1/4	0.552	0.094	1 1/2	1 1/4	0.173	0.155	0.244
				2	1 5/8			
				2 3/8	2			
				2 3/4	2 3/8			
				3 1/8	2 3/4			
				4				
				4 3/4				
				5 1/2				
				6 1/4				
				7 1/8				
				7 7/8				
				8 5/8				
				9 3/8				
				10 1/4				
				11				
				11 3/4				
	5/16	0.705	0.148	2 3/4	1 1/2	0.228	0.214	0.315
				3 1/8	2 3/4			
				4	2 3/4			
				4 3/8	4			
				5 1/2				
				6 1/4				
				7 1/8				
				7 7/8				
				8 5/8				
				9 3/8				
				10 1/4				
				11				
				11 3/4				
				12 5/8				
				13 3/8				
				14 1/8				
				15				
				15 3/4				

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Table 8. SFS Group USA, Inc. ConnexTite Fasteners Flange Head

Fastener Designation	Nominal Diameter	Head		Fastener Length (in)	Thread Length (in)	Shank Diameter (in)	Thread Diameter (in)	
		Diameter (in)	Thickness (in)				Minor	Major
ConnexTite Flange Head Continued	3/8	0.877	0.161	3 1/8	2 3/4	0.279	0.262	0.393
				4	3 1/2			
				4 3/4	4			
				5 1/2				
				6 1/4				
				7 1/8				
				7 7/8				
				8 5/8				
				9 3/8				
				10 1/4				
				11				
				11 3/4				
				12 5/8				
				13 3/8				
				14 1/8				
				15				
				15 3/4				

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Table 9. SFS Group USA, Inc. ConnexTite Fasteners Countersunk Head

Fastener Designation	Nominal Diameter	Head Diameter (in)	Fastener Length (in)	Thread Length	Shank Diameter (in)	Thread Diameter (in)	
						Minor	Major
ConnexTite Countersunk Head	1/4	0.457	2 3/8	1 3/8	0.173	0.155	0.244
			2 3/4	1 1/2			
			3 1/8	1 3/4			
			3 1/2	2 1/8			
			4	2 3/8			
			4 3/8				
			4 3/4				
			5 1/2				
			5 7/8				
			6 1/4				
			7 1/8				
			7 7/8				
			8 5/8				
			9 3/8				
			10 1/4				
			11				
			11 3/4				
	5/16	0.583	2 3/4	1 1/2	0.228	0.214	0.315
			3 1/8	2 3/8			
			3 1/2				
			4	2 3/4			
			4 3/4	2 3/4			
			5 1/2				
			6 1/4	4			
			7 1/8				
			7 7/8				
			8 5/8				
			9 3/8				
			10 1/4				
			11				
			11 3/4				
			12 5/8				
			13 3/8				
			14 1/8				
			15				
			15 3/4				

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Table 9. SFS Group USA, Inc. ConnexTite Fasteners Countersunk Head

Fastener Designation	Nominal Diameter	Head Diameter (in)	Fastener Length (in)	Thread Length	Shank Diameter (in)	Thread Diameter (in)	
						Minor	Major
ConnexTite Countersunk Head Continued	5/16 Continued	0.583 Continued	16 1/2	4 Continued	0.228 Continued	0.214 Continued	0.315 Continued
			18 1/8				
			19 3/4				
	3/8	0.728	3 1/8	2 3/8	0.279	0.262	0.393
			4	3 1/8			
			4 3/4				
			5 1/2				
			6 1/4	4			
			7 1/8				
			7 7/8				
			8 5/8				
			9 3/8				
			10 1/4				
			11				
			11 3/4				
			12 5/8				
			13 3/8				
			14 1/8				
			15				
			15 3/4				
			16 1/2				
			18 1/8				
			19 3/4				

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Table 10. SFS Group USA, Inc. ConnexTite Fasteners Countersunk Head, Fully Threaded

Fastener Designation	Nominal Diameter (in)	Head Diameter (in)	Fastener Length (in)	Thread Length (in)	Shank Diameter (in)	Thread Diameter (in)	
						Minor	Major
Countersunk Head Fully Threaded	1/4	0.457	1 1/2	1 1/4	0.173	0.155	0.244
			1 3/4	1 1/2			
			2	1 3/4			
			2 3/8	2 1/8			
			2 3/4	2 3/8			
	5/16	0.583	4 3/4	4 3/8	0.228	0.214	0.315
			6 1/4	6			
			7 1/8	6 3/4			
			7 7/8	7 1/2			
			8 5/8	8 3/8			
			9 3/8	9 1/8			
			10 1/4	9 7/8			
			11	10 3/4			
			11 3/4	11 1/2			
			13 3/8	13 1/8			
			15	14 5/8			
	3/8	0.728	4 3/4	4 3/8	0.279	0.262	0.393
			6 1/4	5 7/8			
			7 7/8	7 1/2			
			8 5/8	8 1/4			
			9 3/8	9			
			10 1/4	9 7/8			
			11	10 5/8			
			11 3/4	11 3/8			
			13 3/8	13			
			15	14 5/8			

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Notes

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

2 2021 IRC Section R317.3

3 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.

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

5 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

6 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

7 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

8 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.

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

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

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

12 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.

13 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/

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

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

16 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

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

18 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

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

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

21 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.

22 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

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

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

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

26 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

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

28 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

29 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

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[30] 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.

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

[32] 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

[33] 2021 IBC Section 104.11

[34] 2021 IRC Section R104.11

[35] 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

[36] 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.

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

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

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