



Listing and Technical Evaluation Report™

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TRUFAST® Structural Insulated Panel (SIP) Fasteners

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CSI Designations:

DIVISION: 03 00 00 - CONCRETE

DIVISION: 05 00 00 - METALS

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 03 15 00 - Concrete Accessories

Section: 05 05 23 - Metal Fastenings

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

DIVISION: 04 00 00 - MASONRY

Section: 04 05 23 - Masonry Accessories

1 Innovative Products Evaluatedⁱ

1.1 SIPTP, SIPLD and SIPHD

2 Product Description and Materials

2.1 Fasteners

2.1.1 SIPTP (Thread Point) fasteners are size No. 14 fasteners with a pancake head and a T-30 drive. The point is a threaded drill point. The SIPTP fastener is shown in **Figure 1**.

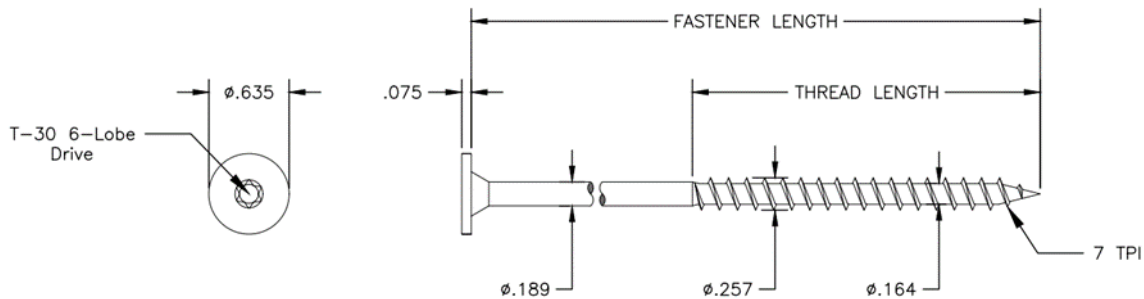


Figure 1. SIPTP Fastener

2.1.2 SIPLD (Light-Duty) fasteners are size No. 14 fasteners with a pancake head and a T-30 drive. The point is a two-flute formed drill tip. The SIPLD fastener is shown in **Figure 2**.

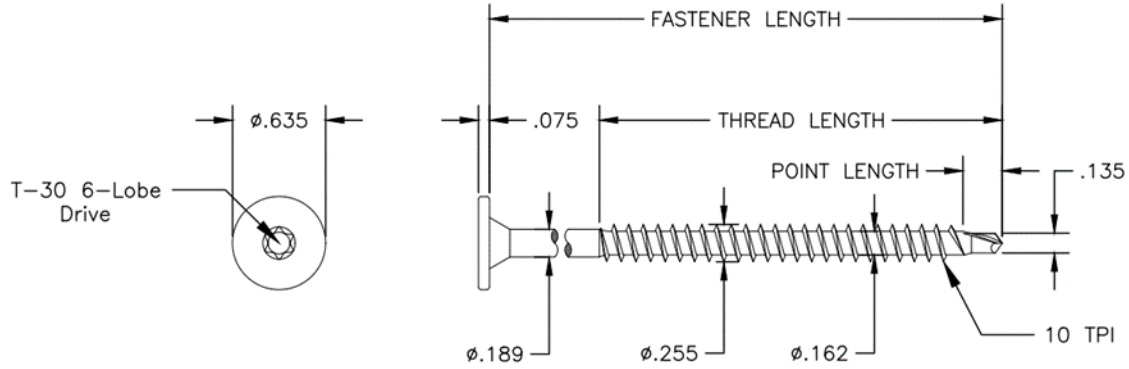


Figure 2. SIPLD Fastener

2.1.3 SIPHD (Heavy-Duty) fasteners are size No. 14 fasteners with a pancake head and a T-30 drive. The point is a two-flute formed drill tip. The SIPHD fastener is shown in **Figure 3**.

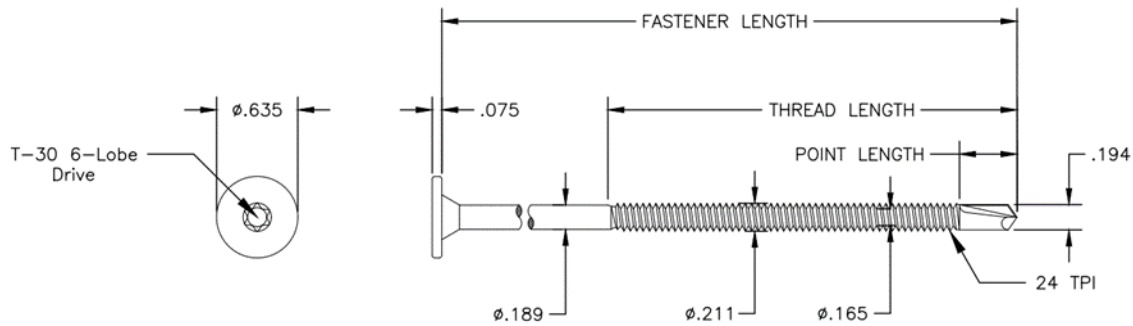


Figure 3. SIPHD Fastener

2.1.4 SIP fasteners are coated with TRUFAST® Tru-Kote™ coating.

2.1.4.1 SIP fasteners coated with TRUFAST® Tru-Kote™ were tested in accordance with ASTM D6294 with less than fifteen percent (15%) red rust after 15 cycles, which met the conditions of acceptance specified in Section 4.7.1 of FM 4470.

2.1.5 The fasteners evaluated in this report are set forth in **Table 1**, **Table 2** and **Table 3**.

Table 1. SIPTP Fastener Specifications

Fastener Name	Fastener Part Number	Head (in)		Nominal Length ¹ (in)	Thread Length ¹ (in)	Shank Diameter ² (in)	Thread Diameter (in)		Nominal Bending Yield, ³ F _{yb} (psi)	Allowable Fastener Strength (lb)		
		Diameter	Drive Type				Minor	Major		Tensile	Shear at Shank Diameter	Shear at Minor Diameter
SIPTP	SIPTP-2000	0.635	T-30	2.00	1.75	0.189	0.164	0.257	185,000	1,185	975	860
	SIPTP-2500			2.50								



Table 1. SIPTP Fastener Specifications

Fastener Name	Fastener Part Number	Head (in)		Nominal Length ¹ (in)	Thread Length ¹ (in)	Shank Diameter ² (in)	Thread Diameter (in)		Nominal Bending Yield, ³ F _{yb} (psi)	Allowable Fastener Strength (lb)		
		Diameter	Drive Type				Minor	Major		Tensile	Shear at Shank Diameter	Shear at Minor Diameter
	SIPTP-3000			3.00	2.00							
	SIPTP-3500			3.50								
	SIPTP-4000			4.00	2.75							
	SIPTP-4500			4.50								
	SIPTP-5000			5.00								
	SIPTP-5500			5.50								
	SIPTP-6000			6.00								
	SIPTP-6500			6.50								
	SIPTP-7000			7.00								
	SIPTP-7500			7.50								
	SIPTP-8000			8.00								
	SIPTP-8500			8.50								
	SIPTP-9000			9.00								
	SIPTP-10000			10.00								
	SIPTP-11000			11.00								
	SIPTP-12000			12.00								
	SIPTP-13000			13.00								
	SIPTP-14000			14.00								
	SIPTP-15000			15.00								
	SIPTP-16000			16.00								
	SIPTP-18000			18.00								

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 (see **Figure 1**).
2. Shank diameter based on manufactured thickness. Finished dimensions are larger due to the proprietary coatings added.
3. Nominal bending yield, F_{yb}, is measured along the threaded portion of the fastener. For the nominal bending yield of the fastener along the shank, take a ten percent (10%) reduction.



Table 2. SIPLD Fastener Specifications

Fastener Name	Fastener Part Number	Head (in)		Nominal Length ¹ (in)	Thread Length ¹ (in)	Point Length (in)	Shank Diameter ² (in)	Thread Diameter (in)		Nominal Bending Yield, ³ F _{yb} (psi)	Allowable Fastener Strength (lb)		
		Diameter	Drive Type					Minor	Major		Tensile	Shear at Shank Diameter	Shear at Minor Diameter
SIPLD	SIPLD-2250	0.635	T-30	2.25	1.00	0.125	0.189	0.162	0.255	185,000	1,130	945	830
	SIPLD-3000			3.00	2.75	0.275							
	SIPLD-3250			3.25	1.50	0.125							
	SIPLD-3500			3.50	2.75	0.275							
	SIPLD-4000			4.00									
	SIPLD-4250			4.25	2.00	0.125							
	SIPLD-4500			4.50	2.75	0.275							
	SIPLD-5000			5.00									
	SIPLD-5250			5.25	2.50	0.125							
	SIPLD-5500			5.50	2.75	0.275							
	SIPLD-6000			6.00									
	SIPLD-6500			6.50									
	SIPLD-7000			7.00									
	SIPLD-7500			7.50									
	SIPLD-8000			8.00									
	SIPLD-8500			8.50									
	SIPLD-9000			9.00									
	SIPLD-9500			9.50									
	SIPLD-10000			10.00									
	SIPLD-11000			11.00									
SIPLD-12000	12.00												
SIPLD-13000	13.00												
SIPLD-14000	14.00												
SIPLD-15000	15.00												



Table 2. SIPLD Fastener Specifications

Fastener Name	Fastener Part Number	Head (in)		Nominal Length ¹ (in)	Thread Length ¹ (in)	Point Length (in)	Shank Diameter ² (in)	Thread Diameter (in)		Nominal Bending Yield, ³ F _{yb} (psi)	Allowable Fastener Strength (lb)		
		Diameter	Drive Type					Minor	Major		Tensile	Shear at Shank Diameter	Shear at Minor Diameter
	SIPLD-16000			16.00									
	SIPLD-18000			18.00									

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

- Fastener length is measured from the underside of the head to the tip. Thread length includes tapered tip (see Figure 2).
- Shank diameter based on manufactured thickness. Finished dimensions are larger due to the proprietary coatings added.
- Nominal bending yield, F_{yb}, is measured along the threaded portion of the fastener. For the nominal bending yield of the fastener along the shank, take a ten percent (10%) reduction.

Table 3. SIPHD Fastener Specifications

Fastener Name	Fastener Part Number	Head (in)		Nominal Length ¹ (in)	Thread Length ¹ (in)	Point Length (in)	Shank Diameter ² (in)	Thread Diameter (in)		Nominal Bending Yield, ³ F _{yb} (psi)	Allowable Fastener Strength (lb)		
		Diameter	Drive Type					Minor	Major		Tensile	Shear at Shank Diameter	Shear at Minor Diameter
SIPHD	SIPHD-2250	0.635	T-30	2.25	1.00	0.125	0.189	0.165	0.211	185,000	1,285	1,015	875
	SIPHD-3250			3.25	1.50								
	SIPHD-4250			4.25	2.00								
	SIPHD-4500			4.50	3.19	0.450							
	SIPHD-5250			5.25	2.50	0.125							
	SIPHD-6000			6.00	3.88	0.450							
	SIPHD-8000			8.00									
	SIPHD-9000			9.00									
	SIPHD-9750			9.75									
	SIPHD-11750			11.75									
	SIPHD-13750			13.75									

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

- Fastener length is measured from the underside of the head to the tip. Thread length includes tapered tip (see Figure 3).
- Shank diameter based on manufactured thickness. Finished dimensions are larger, due to the proprietary coatings added.
- Nominal bending yield, F_{yb}, is measured along the threaded portion of the fastener. For the nominal bending yield of the fastener along the shank, take a ten percent (10%) reduction.



2.2 Substrate Materials

2.2.1 Wood:

- 2.2.1.1 Solid sawn wood members connected with SIP fasteners shall consist of lumber species or species combinations having a Specific Gravity (SG) of at least 0.42.
- 2.2.1.2 Wood structural panels, plywood, and Oriented Strand Board (OSB) connected with SIP fasteners shall have an SG of at least 0.50. Wood structural panels shall comply with DOC PS 1 or DOC PS 2 in accordance with [IBC Section 2303.1.5](#), [IRC Section R503.2.1](#), [IRC Section R604.1](#) and [IRC Section R803.2.1](#).
- 2.2.1.3 Structural composite lumber (i.e., LVL, LSL, PSL) connected with SIP fasteners shall have an equivalent specific gravity of at least 0.50.

2.2.2 Steel:

- 2.2.2.1 Cold-Formed Steel (CFS) shall comply with [IBC Section 2210](#) and [IBC Section 2211](#), and one of the material standards provided in Section A3.1 of AISI S100.
- 2.2.2.2 Fasteners are approved for use with steel decking designed and constructed in accordance with ANSI/SDI-RD.

2.2.3 Concrete:

- 2.2.3.1 Normal weight and lightweight structural concrete shall comply with [IBC Section 1901.2](#).
- 2.2.3.2 Concrete shall be uncracked for the service life of the fastener.

2.2.4 Masonry:

- 2.2.4.1 Load-bearing Concrete Masonry Units (CMUs) shall comply with [IBC Section 2114.3](#) and [IRC Section R606.2.1](#).
- 2.2.4.2 CMUs shall be normal weight and conform to ASTM C90.

2.3 As needed, review material properties for design in Section 6 and to regulatory evaluation in Section 8.

3 Definitions

- 3.1 [New Materials](#)ⁱⁱ 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.ⁱⁱⁱ The [design strengths](#) and permissible stresses shall be established by tests^{iv} and/or engineering analysis.^v
- 3.2 [Duly Authenticated Reports](#)^{vi} and [Research Reports](#)^{vii} are test reports and related engineering evaluations, which are written by an [approved agency](#)^{viii} and/or an [approved source](#).^{ix}
 - 3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the [Defend Trade Secrets Act](#) (DTSA).^x
- 3.3 An [approved agency](#) is “approved” when it is [ANAB ISO/IEC 17065 accredited](#). DrJ Engineering, LLC (DrJ) is listed in the [ANAB directory](#).
- 3.4 An [approved source](#) is “approved” when a professional engineer (i.e., [Registered Design Professional](#)) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the [state legislature](#) via its professional engineering regulations.^{xi}
- 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 [Registered Design Professional](#) (RDP).
 - 3.5.1 The [Center for Building Innovation](#) (CBI) is [ANAB](#)^{xii} [ISO/IEC 17025](#) and [ISO/IEC 17020](#) accredited.
- 3.6 The regulatory authority shall [enforce](#)^{xiii} 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](#)^{xiv} 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.^{xv}
- 3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope, shall be approved.^{xvi} Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.^{xvii}
- 3.9 Approval equity is a fundamental commercial and legal principle.^{xviii}

4 **Applicable Standards for the Listing; Regulations for the Regulatory Evaluation**^{xix}

4.1 *Standards*

- 4.1.1 *ACI 318: Building Code Requirements for Structural Concrete*
- 4.1.2 *AISI S100: North American Specification for the Design of Cold-formed Steel Structural Members*
- 4.1.3 *AISI S904: Standard Test Methods for Determining the Tensile and Shear Strength of Screws*
- 4.1.4 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*
- 4.1.5 *ANSI/SDI-RD: Standard for Steel Roof Deck*
- 4.1.6 *ASTM C90: Standard Specification for Loadbearing Concrete Masonry Units*
- 4.1.7 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood*
- 4.1.8 *ASTM D6294: Standard Test Method for Corrosion Resistance of Ferrous Metal Fastener Assemblies Used in Roofing and Waterproofing*
- 4.1.9 *ASTM F1575: Standard Test Method for Determining Bending Yield Moment of Nails*
- 4.1.10 *DOC PS 1: Structural Plywood*
- 4.1.11 *DOC PS 2: Performance Standard for Wood-based Structural-use Panels*
- 4.1.12 *FM 4470: Approval Standard for Single-Ply Polymer-Modified Bitumen Sheet, Built-Up Roof (BUR), and Liquid Applied Roof Assemblies for Use in Class 1 and Noncombustible Roof Deck Construction*
- 4.1.13 *TMS 402: Building Code for Masonry Structures*

4.2 *Regulations*

- 4.2.1 *IBC – 15, 18, 21: International Building Code®*
- 4.2.2 *IRC – 15, 18, 21: International Residential Code®*
- 4.2.3 *IECC – 15, 18, 21: International Energy Conservation Code®*

5 **Listed**^{xx}

- 5.1 A nationally recognized testing laboratory such as CBI, states that the materials, designs, methods of construction, and/or equipment have met nationally recognized standards and/or have been tested and found suitable for use in a specified manner.



6 Tabulated Properties Generated from Nationally Recognized Standards

- 6.1 SIPTP fasteners are used for attaching Structural Insulated Panels (SIPs) and Composite Insulation Board (nail base) to wood framing, concrete, and masonry block.
- 6.2 SIPLD fasteners are used for attaching SIPs and Composite Insulation Board (nail base) to wood framing, light gauge steel framing, concrete and masonry block.
- 6.3 SIPHD fasteners are used for attaching SIPs and Composite Insulation Board (nail base) to Cold-Formed Steel (CFS) framing.
- 6.4 *Design*
 - 6.4.1 *Connections in Wood:*
 - 6.4.1.1 Design of SIPTP and SIPLD fasteners in wood connections is governed by the applicable code and the provisions for dowel-type fasteners in NDS. Unless otherwise noted, adjustment of the design stresses for the duration of load shall be in accordance with the applicable code.
 - 6.4.1.1.1 Head pull-through design values are provided in **Table 4**.
 - 6.4.1.1.2 Withdrawal design values are provided in **Table 5**, **Table 6**, **Table 9** and **Table 10**.
 - 6.4.1.2 Fasteners in wood shall follow in the minimum spacing, end distance and edge distance requirements provided in **Table 15**.
 - 6.4.2 *Connections in Steel:*
 - 6.4.2.1 Design of SIPLD and SIPHD fasteners in steel connections is governed by [IBC Section 2210](#), [IBC Section 2211](#) and the provisions for screw-type fasteners in Section J4 of AISI S100.
 - 6.4.2.1.1 Allowable Strength Design (ASD) pullout values are provided in **Table 13** and **Table 14**.
 - 6.4.2.1.2 Instructions for calculating Load Resistance Factored Design (LRFD) pullout values are provided in the footnotes of **Table 13** and **Table 14**.
 - 6.4.2.2 Fasteners in steel shall follow the minimum edge distance, end distance and spacing requirements provided in **Table 16**.
 - 6.4.3 *Connections in Concrete:*
 - 6.4.3.1 Design of SIPTP and SIPLD fasteners in concrete connections is governed by [IBC Section 1901.3](#) and the provisions for anchoring to concrete in ACI 318-19 Chapter 17.
 - 6.4.3.1.1 Allowable pullout values for resisting static tension loads are provided in **Table 7** and **Table 11**.
 - 6.4.3.1.2 The concrete shall remain uncracked for its service life and have a 28-day compressive strength as specified in **Table 7** and **Table 11**.
 - 6.4.3.2 For use in lightweight structural concrete, adjustments shall be made per ACI 318-19 Section 17.2.4.
 - 6.4.3.3 Fasteners in concrete shall follow the installation requirements of **Table 17**.
 - 6.4.4 *Connections in Masonry (CMU Block):*
 - 6.4.4.1 Design of SIPTP and SIPLD fasteners in masonry connections is governed by [IBC Section 2107](#) and the provisions for anchoring to masonry in TMS 402.
 - 6.4.4.1.1 Allowable design values for resisting static tension loads are provided in **Table 8** and **Table 12**.
 - 6.4.4.1.2 Allowable tension loads apply when fastener is installed in grouted or ungrouted CMU block.
 - 6.4.4.2 Fasteners in CMU block shall follow the installation requirements of **Table 18**.



6.5 SIP Fastener Reference Head Pull-Through Design Values

6.5.1 Reference design values for head pull-through for SIPTP and SIPLD fasteners are provided in **Table 4**.

Table 4. SIP Fastener Head Pull-Through Design Values

Main Member Type (Specific Gravity)	Main Member Description	Head Pull-Through Design Value ¹ (lb)
OSB ⁵ (0.50)	²³ / ₃₂ " thick	345
	¹⁹ / ₃₂ " thick	145
	¹ / ₂ " thick	100
	⁷ / ₁₆ " thick	85
Plywood ⁵ (0.50)	²³ / ₃₂ " thick	380
	¹⁹ / ₃₂ " thick	265
	¹⁵ / ₃₂ " thick	175
SPF ² (0.42)	Dry Service Condition ^{3,4}	380
	Wet Service Condition ^{3,4}	265
DF-L ² (0.50)	Dry Service Condition ^{3,4}	555
	Wet Service Condition ^{3,4}	390

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

- Tabulated pull-through values shall be adjusted by all applicable adjustment factors per NDS, Table 11.3.1, for ASD only.
- For wood species with a specific gravity between 0.42 and 0.50, use the tabulated values for specific gravity of 0.42. For wood species with an SG greater than 0.50, use the tabulated values for specific gravity of 0.50.
- Minimum 1.5" thickness.
- The dry service condition is defined as lumber with an in-service moisture content of less than or equal to nineteen percent (19%). The wet service condition is defined as lumber with an in-service moisture content of greater than nineteen percent (19%).
- Plywood and OSB shall comply with DOC PS 1 or DOC PS 2, respectively (i.e., APA Rated).



6.6 SIPTP Fastener Withdrawal and Pullout Values

6.6.1 Withdrawal design values for SIPTP fasteners in OSB and plywood are provided in **Table 5**.

Table 5. SIPTP Withdrawal Values in OSB and Plywood

Main Member Type (Specific Gravity)	Main Member Nominal Thickness ¹ (in)	Withdrawal Value ² (lb)
OSB ³ (0.50)	23/32	110
	19/32	60
	1/2	40
	7/16	45
Plywood ³ (0.50)	23/32	155
	19/32	130
	15/32	85

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

- Fastener penetrates through the full thickness of the board.
- Tabulated withdrawal values shall be adjusted by all applicable adjustment factors per NDS, Table 11.3.1, ASD only.
- Plywood and OSB shall comply with DOC PS 1 or DOC PS 2, respectively (i.e., APA Rated).



6.6.2 Reference withdrawal values for SIPTP fasteners in dimensional lumber and engineered wood are provided in **Table 6**.

Table 6. SIPTP Reference Withdrawal Values in Lumber and Engineered Wood (lb/in)

Main Member Type (Specific Gravity)	Main Member Service Condition ²	Fastener Installed in Face or Edge Grain	Penetration into Main Member ³ (in)	Reference Withdrawal Value ^{4,5} (lb/in)
SPF ¹ (0.42)	Dry	Face	1	175
			2	190
	Wet	Face	1	120
			1	120
DF-L ¹ (0.50)	Dry	Face	1	195
			1	140
	Wet	Face	1	135
LVL (0.50)	Dry	Face	1	140
		Edge		125
LSL (0.50)	Dry	Face	1	135

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

- For wood species with an SG between 0.42 and 0.50, use the tabulated values for SG of 0.42. For wood species with an SG greater than 0.50, use the tabulated values for SG of 0.50.
- The dry service condition is defined as lumber with an in-service moisture content of less than or equal to nineteen percent (19%). The wet service condition is defined as lumber with an in-service moisture content of greater than nineteen percent (19%).
- Fastener penetration is the threaded length embedded in the main member, including the tip.
- Where applicable, the full design withdrawal value (W) is equal to: $W = w_1 + (LT - 1) \times (w_2 - w_1)$; where:
 w_1 = reference withdrawal corresponding to 1" penetration,
 LT = embedded thread length (minimum 1"), and
 w_2 = reference withdrawal corresponding to 2" penetration.
- Tabulated withdrawal values shall be adjusted by all applicable adjustment factors per NDS, Table 11.3.1, ASD only.



6.6.3 Allowable pullout loads for SIPTP fasteners in concrete and concrete masonry units are provided in **Table 7** and **Table 8**, respectively.

Table 7. SIPTP Allowable Pullout Loads in Concrete (lb)

Main Member	Minimum 28 Day Concrete Compressive Strength (psi)	Effective Embedment Depth ⁵ (in)	Allowable Pullout Load ^{6,7} (lb)
Concrete ^{1,2,3,4}	2,500	1	100
	4,000		165

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

- Concrete remains uncracked for service life of fastener.
- For use in lightweight structural concrete, adjustments shall be made per ACI 318-19 Section 17.2.4.
- Critical edge distance is 3".
- Concrete thickness shall be a minimum of 1.5 times the embedment.
- Fastener embedment is the threaded length embedded in the main member, including the tip.
- Single fastener with static tension load only.
- Allowable pullout is determined by dividing the strength design value by a conversion factor (α) of 1.48. The conversion factor is based on the load combination: $1.2D + 1.6L$, where:
Dead Load (D) = 30% and
Live Load (L) = 70%.
Adjustments shall be made where other load combinations control.

Table 8. SIPTP Allowable Tension Load CMU Block (lb)

Main Member	Embedment Depth ¹ (in)	Allowable Tension Load ^{2,3,4} (lb)
CMU Block ⁴	1	175

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

- Fastener embedment is the threaded length embedded in the CMU block wall or web, including the tip.
- Minimum edge distance is 2.5".
- Allowable unit tension is determined by dividing the strength design value by a conversion factor (α) of 1.48. The conversion factor is based on the load combination: $1.2D + 1.6L$, where:
Dead Load (D) = 30% and
Live Load (L) = 70%.
Adjustments shall be made where other load combinations control.
- Standard concrete masonry unit block conforming to ASTM C90.



6.7 *SIPLD Fastener Withdrawal and Pullout Values*

6.7.1 Withdrawal design values for SIPLD fasteners in OSB and plywood are provided in **Table 9**.

Table 9. SIPLD Withdrawal Values in OSB & Plywood (lb)

Main Member Type (Specific Gravity)	Main Member Nominal Thickness ¹ (in)	Withdrawal Value ² (lb)
OSB ³ (0.50)	23/32	155
	19/32	70
	1/2	45
	7/16	50
Plywood ³ (0.50)	23/32	180
	19/32	120
	15/32	80

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

- Fastener penetrates through the full thickness of the board.
- Tabulated withdrawal values shall be adjusted by all applicable adjustment factors per NDS, Table 11.3.1, ASD only.
- Plywood and OSB shall comply with DOC PS 1 or DOC PS 2, respectively (i.e., APA Rated).



6.7.2 Reference withdrawal values for SIPLD fasteners in dimensional lumber and engineered wood are provided in **Table 10**.

Table 10. SIPLD Reference Withdrawal Values in Lumber and Engineered Wood (lb/in)

Main Member Type (Specific Gravity)	Main Member Service Condition ²	Fastener Installed in Face or Edge Grain	Penetration into Main Member ³ (in)	Reference Withdrawal Value ^{4,5} (lb/in)
SPF ¹ (0.42)	Dry	Face	1	140
			2	180
	Wet	Edge	1	100
			2	125
		Face	1	100
			2	125
DF-L ¹ (0.50)	Dry	Face	1	150
			2	205
	Wet	Edge	1	155
			2	145
		Face	1	105
			2	145
LVL (0.50)	Dry	Face	1	135
		Edge		115
LSL (0.50)	Dry	Face	1	140

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

- For wood species with an SG between 0.42 and 0.50, use the tabulated values for SG of 0.42. For wood species with an SG greater than 0.50, use the tabulated values for specific gravity of 0.50.
- The dry service condition is defined as lumber with an in-service moisture content of less than or equal to nineteen percent (19%). The wet service condition is defined as lumber with an in-service moisture content of greater than nineteen percent (19%).
- Fastener penetration is the threaded length embedded in the main member, including the tip.
- Where applicable, the full design withdrawal value (W) is equal to: $W = w1 + (LT - 1) \times (w2 - w1)$; where:
w1 = reference withdrawal corresponding to 1" penetration,
LT = embedded thread length (minimum 1"), and
w2 = reference withdrawal corresponding to 2" penetration.
- Tabulated withdrawal values shall be adjusted by all applicable adjustment factors per NDS, Table 11.3.1, ASD only.



6.7.3 Allowable pullout loads for SIPLD fasteners in concrete and concrete masonry units are provided in **Table 11** and **Table 12**, respectively.

Table 11. SIPLD Allowable Pullout Loads in Concrete (lb)

Main Member	Minimum 28 Day Concrete Compressive Strength (psi)	Effective Embedment Depth ⁵ (in)	Allowable Pullout Load ^{6,7} (lb)
Concrete ^{1,2,3,4}	2,500	1	70
	4,000		155
	5,000		160

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

- Concrete remains uncracked for service life of fastener.
- For use in lightweight structural concrete, adjustments shall be made per ACI 318-19 Section 17.2.4.
- Critical edge distance is 3".
- Concrete thickness shall be a minimum of 1.5 times the embedment.
- Fastener embedment is the threaded length embedded in the main member, including the tip.
- Single fastener with static tension load only.
- Allowable pullout is determined by dividing the strength design value by a conversion factor (α) of 1.48. The conversion factor is based on the load combination: $1.2D + 1.6L$, where:
Dead Load (D) = 30% and
Live Load (L) = 70%.
Adjustments shall be made where other load combinations control.

Table 12. SIPLD Allowable Tension Loads CMU Block (lb)

Main Member	Embedment Depth ¹ (in)	Allowable Tension Load ^{2,3} (lb)
CMU Block ⁴	1	80

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

- Fastener embedment is the threaded length embedded in the CMU block wall or web, including the tip.
- Minimum edge distance is 2.5".
- Allowable tension is determined by dividing the strength design value by a conversion factor (α) of 1.48. The conversion factor is based on the load combination: $1.2D + 1.6L$, where:
Dead Load (D) = 30% and
Live Load (L) = 70%.
Adjustments shall be made where other load combinations control.
- Standard concrete masonry unit block conforming to ASTM C90



6.7.4 Allowable pullout strength values for SIPLD fasteners in steel are provided in **Table 13**.

Table 13. SIPLD Allowable Pullout Strength Design Values (lb)

Minimum Tensile Strength of Steel ¹	Steel Designation ⁴	Design Steel Thickness ^{2,3}				
		0.024" (24-gauge)	0.030" (22-gauge)	0.036" (20-gauge)	0.048" (18-gauge)	0.060" (16-gauge)
42 ksi	ASTM A1008 Gr. 25	60	90	110	170	215
45 ksi	ASTM A653 Gr. 33, ASTM A1063 Gr. 33, ASTM A1008 Gr. 30	65	95	115	180	230
52 ksi	ASTM A653 Gr. 37, ASTM A1063 Gr. 37	75	115	135	210	270
55 ksi	ASTM A653 Gr. 40, ASTM A1063 Gr. 40	80	120	140	220	285
58 ksi	ASTM A36	85	125	150	230	300
65 ksi	ASTM A653 Gr. 50 Class 1, ASTM A1063 Gr. 50, ASTM A992	90	130	160	240	315
70 ksi	ASTM A653 Gr. 50 Class 3, ASTM A653 Gr. 55, ASTM A653 Gr. 60, ASTM A588	95	135	165	250	330
80 ksi	ASTM A653 Gr. 70, ASTM A1063 Gr. 70	105	140	180	270	350
90 ksi	ASTM A1063 Gr. 80	115	145	190	285	375
110 ksi	ASTM A1063 Gr. 100	140	175	225	320	415

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

1. Steel shall comply with AISI S100.
2. To calculate LRFD values, multiply the tabulated allowable values by 1.5.
3. Linear interpolation or extrapolation between steel tensile strengths or design steel thicknesses is permitted.
4. The steel designation is provided as an aid to designers and specifiers and is not necessarily inclusive of all possible steel types. The tabulated pullout strength design values are applicable for any steel with the given minimum tensile strengths in the leftmost column.



6.8 SIPHD Fastener Pullout Strength Design Values

6.8.1 Allowable pullout strength values for SIPHD fasteners in steel are provided in **Table 14**.

Table 14. SIPHD Allowable Pullout Strength Design Values (lb)

Minimum Tensile Strength of Steel ¹	Steel Designation ⁴	Design Steel Thickness ^{2,3}					
		0.060" (16-gauge)	0.075" (14-gauge)	0.100" (12-gauge)	0.125"	0.188"	0.250"
42 ksi	ASTM A1008 Gr. 25	135	185	270	350	560	765
45 ksi	ASTM A653 Gr. 33, ASTM A1063 Gr. 33, ASTM A1008 Gr. 30	145	200	290	375	610	820
52 ksi	ASTM A653 Gr. 37, ASTM A1063 Gr. 37	165	230	335	435	735	945
55 ksi	ASTM A653 Gr. 40, ASTM A1063 Gr. 40	175	245	355	460	785	1000
58 ksi	ASTM A36	185	255	375	485	840	1055
65 ksi	ASTM A653 Gr. 50 Class 1, ASTM A1063 Gr. 50, ASTM A992	210	290	420	545	960	1180
70 ksi	ASTM A653 Gr. 50 Class 3, ASTM A653 Gr. 55, ASTM A653 Gr. 60, ASTM A588	225	310	450	585	1030	1270
80 ksi	ASTM A653 Gr. 70, ASTM A1063 Gr. 70	255	355	515	670	1140	1455
90 ksi	ASTM A1063 Gr. 80	290	395	575	755	1245	1635
110 ksi	ASTM A1063 Gr. 100	355	485	700	920	1460	2000

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

1. Steel shall comply with AISI S100.
2. To calculate LRFD values, multiply the tabulated allowable values by 1.5.
3. Linear interpolation or extrapolation between steel tensile strengths or design steel thicknesses is permitted.
4. The steel designation is provided as an aid to designers and specifiers and is not necessarily inclusive of all possible steel types. The tabulated pull-out strength design values are applicable for any steel with the given minimum tensile strengths in the leftmost column.

6.9 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^{xxi}

- 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.^{xxii}
- 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.^{xxiii}

8 Regulatory Evaluation and Accepted Engineering Practice

- 8.1 SIPTP, SIPLD and SIPHD comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:
 - 8.1.1 TRUFAST® SIP Fasteners were tested and evaluated to determine their structural resistance properties, which were used to develop reference design values for Allowable Stress Design (ASD). The following properties were evaluated:
 - 8.1.1.1 Bending yield in accordance with ASTM F1575
 - 8.1.1.2 Tensile strength in accordance with AISI S904
 - 8.1.1.3 Shear strength in accordance with AISI S904
 - 8.1.1.4 Head pull-through in accordance with ASTM D1761
 - 8.1.1.5 Withdrawal strength in accordance with ASTM D1761
 - 8.1.1.6 Corrosion resistance of fasteners used in roof assemblies in accordance with ASTM D6294
 - 8.1.2 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this report.
 - 8.1.3 Use of fasteners in cracked concrete is outside the scope of this report.
- 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 Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP/approved sources. DrJ is qualified^{xxiv} to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.
- 8.3 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which are 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, the more restrictive shall govern.
- 9.3 Fasteners shall be installed with the appropriate rotating powered driver, per the manufacturer instructions.
- 9.4 Fasteners shall not be struck with a hammer during installation.
- 9.5 *Installation in Wood*
 - 9.5.1 Minimum penetration is 1", unless otherwise stated in this report.
 - 9.5.2 Lead holes are not required.



- 9.5.3 The underside of the fastener head shall be installed flush to the surface of the wood member being connected. Fasteners shall not be overdriven.
- 9.5.4 Minimum requirements for fastener spacing, edge distance and end distance shall be in accordance with **Table 15**.

Table 15. SIPTP and SIPLD Minimum Fastener Distance Requirements in Wood (in)

Connection Geometry ^{1,2}	SIPTP and SIPLD
Edge Distance – Load in any direction	5/8
End Distance – Load parallel to grain, towards end	3 7/8
End Distance – Load parallel to grain, away from end	2 5/8
End Distance – Load perpendicular to grain	2 5/8
Spacing between Fasteners in a Row – Parallel to grain	3 7/8
Spacing between Fasteners in a Row – Perpendicular to grain	2 5/8
Spacing between Rows of Fasteners – In-line	1 1/4
Spacing between Rows of Fasteners – Staggered	5/8
SI: 1 in = 25.4 mm 1. Edge distances, end distances and spacing of fasteners shall be sufficient to prevent splitting of the wood or as shown in this table, whichever is more restrictive. 2. Values for "Spacing between Rows of Fasteners-Staggered" apply where the fasteners in adjacent rows are offset by one-half of the "Spacing between Fasteners in a Row."	

9.6 Installation in Cold-Formed Steel

- 9.6.1 For installation of SIPHD fasteners in steel over 3/8" thickness, predrill with a #8 bit (0.199").
- 9.6.2 Install using a maximum 2,000-rpm screw gun.
- 9.6.3 Minimum requirements for fastener spacing, edge distance and end distance shall be in accordance with **Table 16**.
- 9.6.4 The fastener shall penetrate a minimum of three threads past the backside of the steel.

Table 16. SIPLD and SIPHD Minimum Fastener Spacing Requirements in CFS (in)

Connection Geometry	SIPLD & SIPHD
Spacing Between Fastener	5/8
Edge Distance	3/8
End Distance	5/8
SI: 1 in = 25.4 mm	

9.7 Installation in Concrete and Masonry (CMU Block)

- 9.7.1 For SIPTP fasteners, predrill with a 3/16" masonry bit. Install using a low rpm/high torque screw gun.
- 9.7.2 For SIPLD fasteners, predrill with a 3/16" masonry bit. Install using a maximum 2,500-rpm screw gun.



- 9.7.3 SIPTP and SIPLD shall be installed in the web of the CMU block.
- 9.7.4 Installation requirements for SIPTP and SIPLD fasteners in concrete and masonry are provided in **Table 17** and **Table 18**.

Table 17. SIPTP & SIPLD Installation Requirements in Concrete (in)

Connection Geometry ¹	SIPTP & SIPLD
Minimum Spacing Between Fasteners	3
Critical Edge Distances (C_{ac})	3
Minimum Edge Distance (C_{min})	2½
Effective Embedment (h_e)	1
Minimum Concrete Thickness	1½

SI: 1 in = 25.4 mm
 1. This information shall be used in conjunction with the requirements of Chapter 17 of ACI 318-19.

Table 18. SIPTP & SIPLD Installation Requirements in CMU Block (in)

Connection Geometry	SIPTP & SIPLD
Embedment Depth	1
Minimum Spacing	3
Minimum Edge Distance	2½

SI: 1 in = 25.4 mm

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 Bending yield in accordance with ASTM F1575
 - 10.1.2 Tensile strength in accordance with AISI S904
 - 10.1.3 Shear strength in accordance with AISI S904
 - 10.1.4 Head pull-through strength in accordance with ASTM D1761
 - 10.1.5 Withdrawal strength in accordance with ASTM D1761
 - 10.1.6 Corrosion resistance of fasteners used in roof assemblies in accordance with ASTM D6294
- 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 RDPs. Accuracy of external test data and resulting analysis is relied upon.
- 10.3 Where pertinent, 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.
- 10.5 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.^{xxv}
- 10.6 Where additional condition of use and/or regulatory compliance information is required, please search for SIPTP, SIPLD and SIPHD on the DrJ Certification website.

11 Findings

- 11.1 As outlined in Section 6, SIPTP, SIPLD and SIPHD have performance characteristics that were tested and/or meet applicable regulations and 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, SIPTP, SIPLD and SIPHD shall be approved for the following applications:
 - 11.2.1 Use as fasteners as laid out in this report.
- 11.3 Unless exempt by state statute, when SIPTP, SIPLD and SIPHD 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 Altenloh, Brinck & Company U.S., Inc.
- 11.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10^{xxvi} are similar) in pertinent part states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.
- 11.6 **Approved:**^{xxvii} Building regulations require that the building official shall accept Duly Authenticated Reports.^{xxviii}
 - 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 Agreements (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.^{xxix}



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 For SIPTP and SIPLD fasteners installed in dry lumber, the wood member shall have a moisture content of equal to or less than nineteen percent (19%).
- 12.4 Use of fasteners in locations exposed to saltwater or saltwater spray is outside the scope of this evaluation report.
- 12.5 SIPTP and SIPLD fasteners installed in concrete are limited to use in uncracked normal weight and lightweight structural concrete having a minimum specified 28-day compressive strength of 2,500-psi.
- 12.6 SIPTP and SIPLD fasteners installed in concrete or masonry are permitted to resist static tension forces.
- 12.7 SIPTP and SIPLD fasteners installed in concrete or masonry are limited to dry use applications.
- 12.8 Periodic special inspections shall be performed in accordance with IBC Section 1705.1.1.
- 12.9 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:
 - 12.9.1 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.
 - 12.9.2 This report and the installation instructions shall be submitted at the time of permit application.
 - 12.9.3 These innovative products have an internal quality control program and a third-party quality assurance program.
 - 12.9.4 At a minimum, these innovative products shall be installed per Section 9 of this report.
 - 12.9.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.
 - 12.9.6 These innovative products have an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4, and IRC Section R109.2.
 - 12.9.7 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.
- 12.10 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, "the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new material or assemblies as provided for in Section 104.11," all of IBC Section 104, and IBC Section 105.4.
- 12.11 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).
- 12.12 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 The innovative products 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 www.trufast.com.

14 Review Schedule

- 14.1 This report is subject to periodic review and revision. For the latest version, visit drjcertification.org.
- 14.2 For information on the status of this report, please contact [DrJ Certification](#).

15 Approved for Use Pursuant to U.S. and International Legislation Defined in Appendix A

- 15.1 SIPTP, SIPLD and SIPHD are included in this report published by an approved agency that is concerned with evaluation of products or services, maintains periodic inspection of the production of listed materials or periodic evaluation of services. This report states either that the material, product, or service meets recognized standards or has been tested and found suitable for a specified purpose. This report meets the legislative intent and definition of being acceptable to the AHJ.



Appendix A

1 Legislation that Authorizes AHJ Approval

- 1.1 **Fair Competition:** State legislatures have adopted Federal regulations for the examination and approval of building code 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 **Adopted Legislation:** The following local, state, and federal regulations affirmatively authorize these innovative products to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:
 - 1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies, and/or methods of construction. The goal is to “*protect economic freedom and opportunity by promoting free and fair competition in the marketplace.*”
 - 1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies, and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
 - 1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),^{xxx} where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years^{xxxi} and/or a \$5,000,000 fine or 3 times the value of^{xxxii} the Intellectual Property (IP) and Trade Secrets (TS).
 - 1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of Listings, certified reports, Technical Evaluation Reports, duly authenticated reports, and/or research reports prepared by approved agencies and/or approved sources.
 - 1.2.4 For new materials^{xxxiii} that are not specifically provided for in any regulation, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.
 - 1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.^{xxxiv}
 - 1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence provided in writing, that specific legislation have been violated by an individual registered PE.
 - 1.2.7 The AHJ 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 IBC Section 104.11.^{xxxv}



- 1.3 **Approved^{xxxvi} by Los Angeles:** The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards that apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.^{xxxvii} The Superintendent of Building Approved Testing Agency Roster is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a DrJ Listing are LAMC approved. In addition, the Superintendent of Building 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 the California Building Code (CBC) Section 1707.1.^{xxxviii}
- 1.4 **Approved by Chicago:** The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly, and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).
- 1.5 **Approved by New York City:** The 2022 NYC Building Code (NYCBC) states in part that an approved agency shall be deemed^{xxxix} an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement^{xl} (i.e., ANAB, International Accreditation Forum [IAF], etc.).
- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation by:
- 1.6.1 A certification mark or listing of an approved certification agency,
 - 1.6.2 A test report from an approved testing laboratory,
 - 1.6.3 A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, or
 - 1.6.4 A product evaluation report based upon testing, comparative or rational analysis, or a combination thereof, developed, signed and sealed by a professional engineer or architect, licensed in Florida.
 - 1.6.5 For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods:
 - 1.6.5.1 A certification mark, listing or label from a commission-approved certification agency indicating that the product complies with the code,
 - 1.6.5.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,
 - 1.6.5.3 A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code,



- 1.6.5.4 A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code, or
- 1.6.5.5 A statewide product approval issued by the Florida Building Commission.
- 1.6.6 The [Florida Department of Business and Professional Regulation \(DBPR\)](#) website provides a listing of companies certified as a [Product Evaluation Agency](#) (i.e., EVLMiami 13692), a [Product Certification Agency](#) (i.e., CER10642), and as a [Florida Registered Engineer](#) (i.e., ANE13741).
- 1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA]):** A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation [553.842](#) and [553.8425](#).
- 1.8 **Approved by New Jersey:** Pursuant to the 2018 Building Code of New Jersey in [IBC Section 1707.1 General](#),^{xli} it states: “*In the absence of approved rules or other approved standards, 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 the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)*”.^{xlii} Furthermore N.J.A.C 5:23-3.7 states: “*Municipal approvals of alternative materials, equipment, or methods of construction.*”
- 1.8.1 **Approvals:** Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability, and safety of those conforming with the requirements of the regulations.
- 1.8.1.1 A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of the above.
- 1.8.1.2 Reports of engineering findings issued by nationally recognized evaluation service programs such as but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of the above.
- 1.8.2 The [New Jersey Department of Community Affairs](#) has confirmed that technical evaluation reports, from any accredited entity listed by [ANAB](#), meets the requirements of item the previous paragraph, given that the listed entities are no longer in existence and/or do not provide “*reports of engineering findings.*”
- 1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, [Part 3282.14](#)^{xliii} and [Part 3280](#),^{xliiv} the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform to the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow:
- 1.9.1 “*All construction methods shall be in conformance with accepted engineering practices.*”
- 1.9.2 “*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.*”
- 1.9.3 “*The design stresses of all materials shall conform to accepted engineering practice.*”



- 1.10 **Approval by US, Local and State Jurisdictions in General:** In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:
- 1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.^{xlv}
 - 1.10.2 For innovative alternatives and/or methods of construction, the building official shall accept Duly Authenticated Reports from approved agencies with respect to the quality and manner of use of new materials or assemblies.^{xlvi}
 - 1.10.2.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is in the ANAB directory.
 - 1.10.2.2 An approved source is “approved” when an RDP is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.^{xlvii}
 - 1.10.3 The design strengths and permissible stresses of any structural material...shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.^{xlviii}
- 1.11 **Approval by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, designs, services, and/or methods of construction through the Agreement on Technical Barriers to Trade and the IAF Multilateral Recognition Arrangement (MLA), where these agreements:
- 1.11.1 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.
 - 1.11.2 **Approved:** The purpose of the MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA and subsequently, acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, designs, services, and/or methods of construction.
 - 1.11.3 ANAB is an IAF-MLA signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope, shall be approved.^{xlix}
 - 1.11.4 Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.^l
- 1.12 Approval equity is a fundamental commercial and legal principle.^{li}



Notes

- i For more information, visit drjcertification.org or call us at 608-310-6748.
- ii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1702>
- iii 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/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>
- iv <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706>:-:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests%20as
- v 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/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706>:-:text=shall%20conform%20to%20the%20specifications%20and%20methods%20of%20design%20of%20accepted%20engineering%20practice
- vi <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:-:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies
- vii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>
- viii https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_agency
- ix https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_source
- x <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](#).
- xi <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/>
- xii <https://www.cbiteest.com/accreditation/>
- xiii <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104>:-:text=to%20enforce%20the%20provisions%20of%20this%20code
- xiv <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>:-:text=Where%20the%20alternative%20material%20design%20or%20method%20of%20construction%20is%20not%20approved%20the%20building%20official%20shall%20respond%20in%20writing%20stating%20the%20reasons%20why%20the%20alternative%20was%20not%20approved AND <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#105.3.1>:-:text=If%20the%20application%20or%20the%20construction%20documents%20do%20not%20conform%20to%20the%20requirements%20of%20pertinent%20laws%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%20stating%20the%20reasons%20therefore
- xv <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:-:text=the%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%20104.11
- xvi <https://iaf.nu/en/about-iaf-mia/#>:-:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%20with%20the%20appropriate%20scope
- xvii True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- xviii <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>
- xix Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.
- xx <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2>(Listed%20or%20certified); <https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#listed> AND <https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#abeled>
- xxi <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1703.4>
- xxii <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%20livable%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades
- xxiii <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
- xxiv 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](#).
- xxv See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.
- xxvi [2018 IFC Section 104.9](#)
- xxvii 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](#) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.
- xxviii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>
- xxix Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.



- xxx <http://www.drjengineering.org/AppendixC> AND <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>
- xxxi <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years>
- xxxii <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided>
- xxxiii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>
- xxxiv [IBC 2021, Section 1706.1 Conformance to Standards](#)
- xxxv [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General](#)
- xxxvi **See Section 11 for the distilled building code definition of **Approved****
- xxxvii [Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES](#)
- xxxviii <https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>
- xxxix [New York City, The Rules of the City of New York, § 101-07 Approved Agencies](#)
- xl [New York City, The Rules of the City of New York, § 101-07 Approved Agencies](#)
- xli <https://up.codes/viewer/new-jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1>
- xlii <https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>
- xliii <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>
- xliv <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>
- xlv [IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.](#)
- xlvi [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.](#)
- xlvii <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/>
- xlviii [IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards](#) Adopted law pursuant to IBC model code language 1706.1.
- xlix <https://iaf.nu/en/about-iaf-mla/#:~:text=it%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>
- i **True for all ANAB accredited product evaluation agencies and all International Trade Agreements.**
- ii <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>