Technical Evaluation Report™

TER 2307-06

Power Pro® Structural Wood Screws in Multi-Ply Connections

The Hillman™ Group

Products:

Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws

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

1 Innovative Products Evaluated[1,2]

1.1 Power Pro® LumberTite® Structural Wood Screws

1.2 Power Pro® TimberTite® Structural Wood Screws

1.3 Power Pro® TrussTite® Structural Wood Screws

1.4 Power Pro® Structural Lag Screws

1.5 Power Pro® TimberWood Structural Screws

2 Applicable Codes and Standards[3,4]

2.1 Codes

2.1.1 *IBC—15, 18, 21: International Building Code®*

2.1.2 *IRC—15, 18, 21: International Residential Code®*

2.2 Standards and Referenced Documents

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

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

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

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

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

2 **Federal Regulation Definition.** 24 CFR 3280.2 "Listed or certified" means included in a list published by a nationally recognized testing laboratory, inspection agency, or other organization concerned with product evaluation that maintains periodic inspection 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. **International Building Code (IBC) Definition of Listed.** Equipment, materials, products or services included in a list published by an organization acceptable to the building official and concerned with evaluation of products or services that maintains periodic inspection of production of listed equipment or materials or periodic evaluation of services and whose Listing states either that the equipment, material, product or service meets identified standards or has been tested and found suitable for a specified purpose. **IBC Definition of Labeled**. Equipment, materials or products to which has been affixed a label, seal, symbol or other identifying mark of a nationally recognized testing laboratory, approved agency or other organization concerned with product evaluation that maintains periodic inspection of the production of the above-labeled items and whose labeling indicates either that the equipment, material or product meets identified standards or has been tested and found suitable for a specified purpose.

3 This Listing is a code defined research report, which is also known as a duly authenticated report, provided by an approved agency (see IBC Section 1703.1) and/or an approved source (see IBC Section 1703.4.2). An approved agency is "approved" when it is ANAB accredited. DrJ Engineering, LLC (DrJ) is listed in the ANAB directory). A professional engineer is "approved" as an approved source when that professional engineer is properly licensed to transact engineering commerce. Where sealed by a professional engineer, it is also a duly authenticated report certified by an approved source. (i.e., Registered Design Professional). DrJ is an ANAB accredited product certification body.

4 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.

3 Performance Evaluation

3.1 Tests, test reports, research reports, duly authenticated reports and related engineering evaluations are defined as intellectual property and/or trade secrets and protected by Defend Trade Secrets Act 2016 (DTSA).[5]

3.2 Testing and/or inspections conducted for this TER were performed an ISO/IEC 17025 accredited testing laboratory,[6] an ISO/IEC 17020 accredited inspection body,[7] which are internationally recognized accreditations through International Accreditation Forum (IAF), and/or a licensed Registered Design Professional (RDP).

3.3 *Structural Applications*

3.3.1 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws were evaluated for their ability to provide multi-ply attachment in trusses, sawn lumber and Structural Composite Lumber (SCL) applications in accordance with general engineering principles.

3.4 Any building code 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 RDPs / approved sources. DrJ is qualified[8] to practice product and code compliance services within its scope of accreditation and engineering expertise, respectively.

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

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

4 Product Description and Materials

4.1 The innovative products evaluated in this TER are shown in Figure 1 through Figure 5.

Figure 1. Power Pro® LumberTite® Structural Wood Screws

[5] https://www.law.cornell.edu/uscode/text/18/part-I/chapter-90. Given our professional duty to inform, please be aware that whoever, with intent to convert a trade secret (TS), that is related to a product or service used in or intended for use in interstate or foreign commerce, to the economic benefit of anyone other than the owner thereof, and intending or knowing that the offense will, injure any owner of that trade secret, knowingly without authorization copies, duplicates, sketches, draws, photographs, downloads, uploads, alters, destroys, photocopies, replicates, transmits, delivers, sends, mails, communicates, or conveys such information; shall be fined under this title or imprisoned not more than 10 years, or both. 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. As the National Society of Professional Engineers states, "Engineers shall not disclose, without consent, confidential information concerning the business affairs or technical processes of any present or former client or employer, or public body on which they serve." Therefore, to protect intellectual property (IP) and TS, and to achieve 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. For more information, please review this website: Intellectual Property and Trade Secrets.

[6] Internationally recognized accreditations are performed by members of the International Accreditation Forum (IAF). Accreditation Body and Regional Accreditation Group Members of IAF are admitted to the IAF MLA only after a stringent evaluation of their operations by a peer evaluation team, which is charged to ensure that the applicant complies fully with both international standards and IAF requirements. Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope.

[7] Ibid.

[8] 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.

Figure 2. Power Pro® TimberTite® Structural Wood Screws

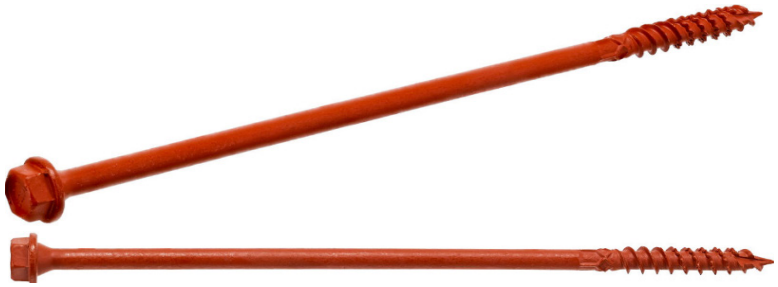

Figure 3. Power Pro® TrussTite® Structural Wood Screws

Figure 4. Power Pro® Structural Lag Screws

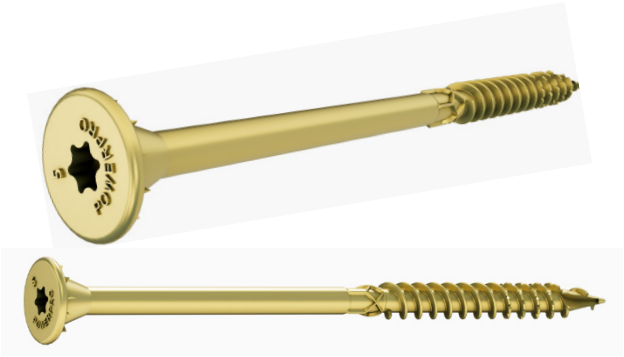

Figure 5. Power Pro® TimberWood Structural Screws

4.2 *General*

4.2.1 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws are partially threaded, self-drilling, dowel-type fasteners that are manufactured using standard cold-forming processes and are subsequently heat-treated and coated with a proprietary coating comprising of a zinc layer and an organic topcoat.

4.2.1.1 LumberTite® fasteners are Torx-driven screws with an integrated washer.

4.2.1.2 TimberTite® fasteners are $^{5}/_{16}$″ hex-driven screws with an integrated washer.

4.2.1.3 TrussTite® fasteners are $^{5}/_{16}$″ hex-driven screws with an integrated washer.

4.2.1.4 Structural Lag Screws are Torx-driven screws with a flattened truss head.

4.2.1.5 TimberWood Structural Screws are Torx-driven screws with a flat countersinking head.

4.3 *Fastener Material*

4.3.1 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws are made of hardened carbon steel.

4.4 *Corrosion Resistance*

4.4.1 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws may be used where screws are required to exhibit corrosion resistance when exposed to adverse environmental conditions, which are subject to the limitations of this report. Power Pro® screws have been evaluated for use in wood treated with ACQ-D preservatives with a retention of 0.40 pcf (6.4 kg/m^3) and may be used as an alternative to hot-dip galvanized fasteners in wood treated with preservatives or less corrosive effects meeting ASTM A153, Class D (IBC Section 2304.10.6 and IRC Section R317.3).

4.4.2 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws have a proprietary coating, which may be used as an alternative to the protection provided by code-approved hot-dipped galvanized coatings meeting ASTM A153, Class D (IBC Section 2304.10.6 and IRC Section R317.3).

4.5 Pressure-Preservative Treated (PPT) Wood Applications

4.5.1 Power Pro® Structural Lag Screw, and Power Pro® TimberWood Structural Screws having the proprietary coating are recognized for use in PPT lumber provided the conditions set forth by the PPT lumber manufacturer are met, including appropriate strength reductions.

4.6 Fire Retardant Treated (FRT) Wood Applications

4.6.1 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws having the proprietary coating are recognized for use in FRT lumber provided the conditions set forth by the FRT lumber manufacturer are met, including appropriate strength reductions.

4.7 *Wood Members*

4.7.1 Solid sawn wood members connected Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws shall consist of lumber species or species combinations having a specific gravity of 0.42 to 0.55.

4.7.2 Structural composite lumber (i.e., LVL, LSL, PSL, etc.) connected with Structural Lag Screws, or TimberWood Structural Screws shall be recognized in evaluation reports having published equivalent specific gravities for lateral and withdrawal resistance.

4.8 *Fastener Specifications*

4.8.1 Table 1 lists the dimensions and mechanical properties of Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws that are evaluated in this TER.

Table 1. Fastener Specifications

Fastener Name	Nominal Diameter (in)	Length[1] (in)	Thread Length[2] (in)	Head Diameter[3] (in)	Unthreaded Shank Diameter (in)	Thread Diameter (in)		Nominal Bending Yield[4] (psi)	Tensile Strength (lbf)	
						Minor	Major		ASD	LFRD
Power Pro® LumberTite® Screws	1/4	2 7/8	2.00	0.610	0.174	0.155	0.239	180,000	780	1,170
		4 1/2								
		6								
		7								
Power Pro® TimberTite® Screws	1/4	2 1/2	1.25	0.460	0.174	0.155	0.239	180,000	780	1,170
		4	2.00							
		6								
Power Pro® TrussTite® Screws	5/16	2 7/8	1.50	0.500	0.204	0.181	0.284	180,000	970	1,460
		3 3/8								
		4								
		4 1/2								
		5								
		6								
		6 3/4								
Power Pro® Structural Lag Screws	1/4	2 1/2	1.58	0.540	0.174	0.155	0.239	180,000	780	1,170
		3	1.80							
		3 1/2	1.96							
		4	2.38							
		5								
		6								

Table 1. Fastener Specifications

Fastener Name	Nominal Diameter (in)	Length[1] (in)	Thread Length[2] (in)	Head Diameter[3] (in)	Unthreaded Shank Diameter (in)	Thread Diameter (in)		Nominal Bending Yield[4] (psi)	Tensile Strength (lbf)	
						Minor	Major		ASD	LFRD
Power Pro® Structural Lag Screws	5/16	2 1/2	1.50	0.630	0.204	0.181	0.284	180,000	970	1,460
		3	2.10							
		3 1/2	2.20							
		4	2.60							
		5	3.50							
		6	4.00							
Power Pro® TimberWood Structural Screws	5/16	2 1/2	1.50	0.630	0.204	0.181	0.284	180,000	970	1,460
		3	2.10							
		4	2.60							
		5	3.50							
		6	4.00							

SI: 1 in = 25.4 mm, 1 psi = 0.00689 MPa, 1 lbf = 4.448 N

1. Measured from the underside of the head to the tip
2. Includes tip.
3. Nominal diameter of the washer head.

5 Applications

5.1 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws are used for attaching multi-ply wood members including trusses, sawn lumber, and SCL products.

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

5.3 Design

5.3.1 Design of Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws are governed by the applicable code and the provisions for dowel type fasteners in NDS.

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

5.4 *Multi-Ply Connection Design Values*

5.4.1 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws for Multi-ply Truss and Sawn Lumber Assemblies

5.4.1.1 Sawn lumber design values are provided for assemblies with two, three, or four plies in Table 2 through Table 6.

5.4.1.1.1 An example of two assemblies is presented in Figure 6.

5.4.1.1.2 Assembly conditions are detailed in Figure 7.

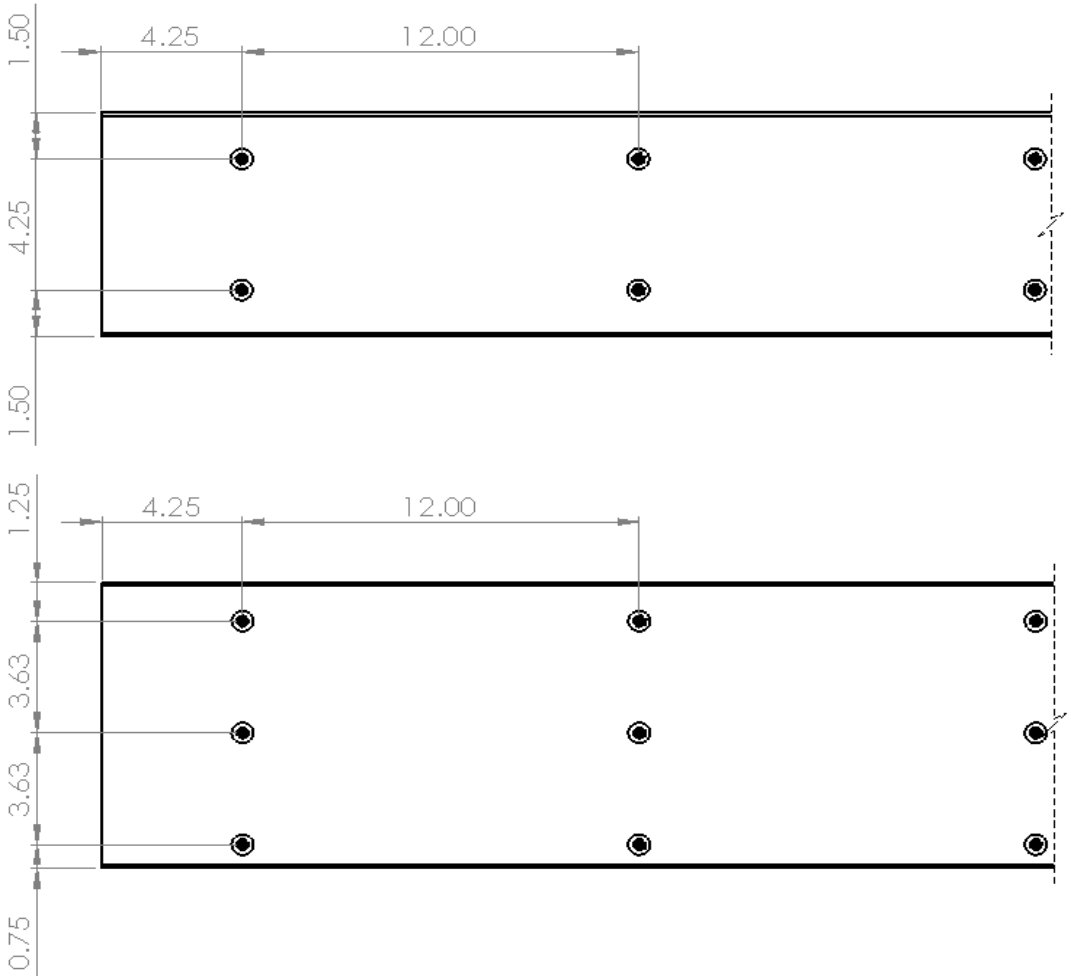

Figure 6. Fastener Spacing Diagram (Values are in Inches)

Table 2. Allowable Lateral Design Values (plf) for LumberTite® Fasteners in Multi-Ply Truss and Sawn Lumber Assemblies[2,3,4,5,6]

Fastener	Assembly	Members	Fastener Length[1] (in)	SPF/HF (0.42)						DF/SP (0.50)					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
				Number of Rows of Fasteners											
				2	3	2	3	2	3	2	3	2	3	2	3
LumberTite®	A	2-ply 1½"	2⅞	880	1,320	660	990	440	660	1,160	1,740	870	1,305	580	870
	B	3-ply 1½"	4½	660	990	495	745	330	495	870	1,305	655	985	435	655
	C	4-ply 1½"	6	585	880	440	660	295	445	775	1,165	585	880	390	585

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

1. Fastener length is measured from the underside of the head to the tip.
2. Wood framing shall be any species with Specific Gravity (SG) of 0.42 or greater. For wood species with an assigned specific gravity between 0.42 and 0.50, use the tabulated values for SG of 0.42. For wood species with an assigned SG greater than 0.50, use the tabulated values for SG of 0.50.
3. Allowable design values are based on a load duration factor C_D = 1.0 and shall be multiplied by all applicable adjustment factors per the NDS.
4. The tabulated allowable design loads may be applies to either side of the beam (head or point side of the fastener). Where loads are applied to both sides of the beam simultaneously, the total load applied to the beam shall not exceed the tabulated load.
5. For top-loaded members with even loading across the width of the entire assembly, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. (on-center) between fasteners in the same row.
6. Tabulated loads are for the connection strength. Beams and framing members shall be independently checked by a registered design professional.

Table 3. Allowable Lateral Design Values (plf) for TimberTite® Fasteners in Multi-Ply Truss and Sawn Lumber Assemblies[2,3,4,5,6]

Fastener	Assembly	Members	Fastener Length[1] (in)	SPF/HF (0.42)						DF/SP (0.50)					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
				Number of Rows of Fasteners											
				2	3	2	3	2	3	2	3	2	3	2	3
TimberTite®	A	2-ply 1½"	2½	580	870	435	655	290	435	820	1,230	615	925	410	615
	B	3-ply 1½"	4	435	655	325	490	220	330	615	925	460	690	310	465
	C	4-ply 1½"	6	385	580	290	435	195	295	545	820	410	615	275	415

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

1. Fastener length is measured from the underside of the head to the tip.
2. Wood framing shall be any species with SG of 0.42 or greater. For wood species with an assigned SG between 0.42 and 0.50, use the tabulated values for SG of 0.42. For wood species with an assigned SG greater than 0.50, use the tabulated values for SG of 0.50.
3. Allowable design values are based on a load duration factor C_D = 1.0 and shall be multiplied by all applicable adjustment factors per the NDS.
4. The tabulated allowable design loads may be applied to either side of the beam (head or point side of the fastener). Where loads are applied to both sides of the beam simultaneously, the total load applied to the beam shall not exceed the tabulated load.
5. For top-loaded members with even loading across the width of the entire assembly, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. between fasteners in the same row.
6. Tabulated loads are for the connection strength. Beams and framing members shall be independently checked by a registered design professional.

Table 4. Allowable Lateral Design Values (plf) for TrussTite® Fasteners in Multi-Ply Truss and Sawn Lumber Assemblies[2,3,4,5,6]

Fastener	Assembly	Members	Fastener Length[1] (in)	SPF/HF (0.42)						DF/SP (0.50)					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
				Number of Rows of Fasteners											
				2	3	2	3	2	3	2	3	2	3	2	3
TrussTite®	A	2-ply 1½"	2⅞	680	1,020	510	765	340	510	680	1,020	510	765	340	510
	B	3-ply 1½"	4	510	765	385	580	255	385	510	765	385	580	255	385
			4½	510	765	385	580	255	385	510	765	385	580	255	385
	C	4-ply 1½"	6	455	685	340	510	230	345	455	685	340	510	230	345

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

1. Fastener length is measured from the underside of the head to the tip.
2. Wood framing shall be any species with SG of 0.42 or greater. For wood species with an assigned SG between 0.42 and 0.50, use the tabulated values for SG of 0.42. For wood species with an assigned SG greater than 0.50, use the tabulated values for SG of 0.50.
3. Allowable design values are based on a load duration factor C_D = 1.0 and shall be multiplied by all applicable adjustment factors per the NDS.
4. The tabulated allowable design loads may be applied to either side of the beam (head or point side of the fastener). Where loads are applied to both sides of the beam simultaneously, the total load applied to the beam shall not exceed the tabulated load.
5. For top-loaded members with even loading across the width of the entire assembly, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. between fasteners in the same row.
6. Tabulated loads are for the connection strength. Beams and framing members shall be independently checked by a registered design professional.

Table 5. Allowable Lateral Design Values (plf) for ¼" Structural Lag Screws in Multi-Ply Truss and Sawn Lumber Assemblies[2,3,4,5,6]

Fastener	Assembly	Members	Fastener Length[1] (in)	SPF/HF (0.42)						DF/SP (0.50)					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
				Number of Rows of Fasteners											
				2	3	2	3	2	3	2	3	2	3	2	3
¼" Structural Lag Screw	A	2-ply 1½"	2½	680	1,020	510	765	340	510	900	1,350	675	1,015	450	675
			3	680	1,020	510	765	340	510	900	1,350	675	1,015	450	675
	B	3-ply 1½"	4	510	765	385	580	255	385	675	1,015	510	765	340	510
			5	510	765	385	580	255	385	675	1,015	510	765	340	510
	C	4-ply 1½"	6	455	685	340	510	230	345	600	900	450	675	300	450

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

1. Fastener length is measured from the underside of the head to the tip.
2. Wood framing shall be any species with an SG of 0.42 or greater. For wood species with an assigned SG between 0.42 and 0.50, use the tabulated values for SG of 0.42. For wood species with an assigned SG greater than 0.50, use the tabulated values for SG of 0.50.
3. Allowable design values are based on a load duration factor C_D = 1.0 and shall be multiplied by all applicable adjustment factors per the NDS.
4. The tabulated allowable design loads may be applied to either side of the beam (head or point side of the fastener). Where loads are applied to both sides of the beam simultaneously, the total load applied to the beam shall not exceed the tabulated load.
5. For top-loaded members with even loading across the width of the entire assembly, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. between fasteners in the same row.
6. Tabulated loads are for the connection strength. Beams and framing members shall be independently checked by a registered design professional.

Table 6. Allowable Lateral Design Values (plf) for 5/16″ Structural Lag Screws and 5/16″ TimberWood Structural Screws in Multi-Ply Truss and Sawn Lumber Assemblies[2,3,4,5,6]

Fastener	Assembly	Members	Fastener Length[1] (in)	SPF/HF (0.42)						DF/SP (0.50)					
				12" o.c.		16" o.c.		24" o.c.		12" o.c.		16" o.c.		24" o.c.	
				Number of Rows of Fasteners											
				2	3	2	3	2	3	2	3	2	3	2	3
5/16" Structural Lag Screw, and TimberWood Structural Screw	A	2-ply 1 1/2"	2 1/2	960	1,440	720	1,080	480	720	1,020	1,530	765	1,150	510	765
			3	960	1,440	720	1,080	480	720	1,020	1,530	765	1,150	510	765
	B	3-ply 1 1/2"	5	720	1,080	540	810	360	540	765	1,150	575	865	385	580
	C	4-ply 1 1/2"	6	640	960	480	720	320	480	680	1,020	510	765	340	510

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

1. Fastener length is measured from the underside of the head to the tip.
2. Wood framing shall be any species with an SG of 0.42 or greater. For wood species with an assigned SG between 0.42 and 0.50, use the tabulated values for SG of 0.42. For wood species with an assigned SG greater than 0.50, use the tabulated values for SG of 0.50.
3. Allowable design values are based on a load duration factor C_D = 1.0 and shall be multiplied by all applicable adjustment factors per the NDS.
4. The tabulated allowable design loads may be applied to either side of the beam (head or point side of the fastener). Where loads are applied to both sides of the beam simultaneously, the total load applied to the beam shall not exceed the tabulated load.
5. For top-loaded members with even loading across the width of the entire assembly, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. between fasteners in the same row.
6. Tabulated loads are for the connection strength. Beams and framing members shall be independently checked by a registered design professional.

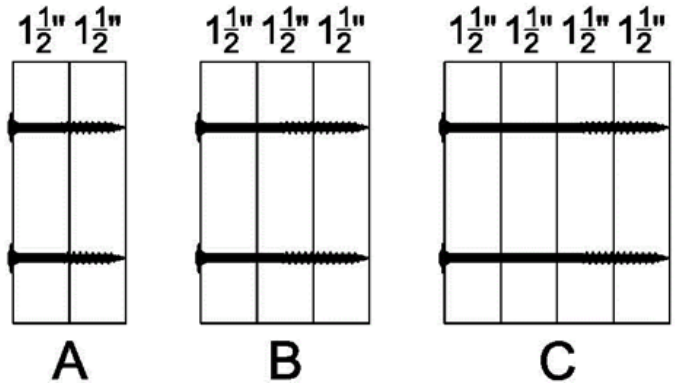

Figure 7. Truss and Sawn Lumber Assembly Configuration

5.4.2 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws for Multi-ply Structural Composite Lumber (SCL) Assemblies.

5.4.2.1 SCL is a family of engineered wood products, which includes but is not limited to, Laminated Veneer Lumber (LVL), Laminated Strand Lumber (LSL), Parallel Strand Lumber (PSL), and Oriented Strand Lumber (OSL).

5.4.2.2 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws SCL design values are provided for assemblies with two, three or four plies as shown in Table 7 through Table 11.

5.4.2.3 Assembly conditions are detailed in Figure 8.

Table 7. Allowable Lateral Design Values (plf) for LumberTite® Fasteners in Multi-Ply Truss and SCL Assemblies[2,3,4,5,6]

Fastener	Assembly	Members	Fastener Length[1] (in)	12" o.c.		16" o.c.		24" o.c.	
				Number of Rows of Fasteners					
				2	3	2	3	2	3
LumberTite®	A	2-ply 1¾"	2⅞	1,160	1,740	870	1,305	580	870
	B	3-ply 1¾"	4½	870	1,305	655	985	435	655
	C	4-ply 1¾"	7	775	1,165	585	880	390	585
	D	2-ply 1¾" & 3½"	4½	870	1,305	655	985	435	655
	E	3-ply,(2) 1¾"(1) & 3½"	7	775	1,165	585	880	390	585
	F	2-ply 3½"	6	1,160	1,740	870	1,305	580	870
			7						

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

1. Fastener length is measured from the underside of the head to the tip.
2. SCL shall have an SG of 0.50 or greater. Thicknesses listed in Figure 8 are a minimum.
3. Allowable design values are based on a load duration factor of C_D = 1.0 and shall be multiplied by all applicable adjustment factors per the NDS.
4. The tabulated allowable design loads may be applied to either side of the beam (head or point side of the fastener). Where loads are applied to both sides of the beam simultaneously, the total load applied to the beam shall not exceed the tabulated load.
5. For top-loaded members with even loading across the width of the entire assembly, and a depth of 18" or less, fasteners shall be installed in two (2) rows with a maximum distance of 24" o.c. between fasteners in the same row. Use three (3) rows for members deeper than 18".
6. Tabulated loads are for the connection strength. Beams and framing members shall be independently checked by a registered design professional.

Table 8. Allowable Lateral Design Values (plf) for TimberTite® Fasteners in Multi-Ply Truss and SCL Assemblies[2,3,4,5,6]

Fastener	Assembly	Members	Fastener Length[1] (in)	12" o.c.		16" o.c.		24" o.c.	
				Number of Rows of Fasteners					
				2	3	2	3	2	3
TimberTite®	D	2-ply 1¾" Side member & 3½" Main member	4	615	925	460	690	310	465
	F	2-ply 3½"	6	820	1230	615	925	410	615

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

1. Fastener length is measured from the underside of the head to the tip.
2. SCL shall have an SG of 0.50 or greater. Thicknesses listed in Figure 8 are a minimum.
3. Allowable design values are based on a load duration factor of C_D = 1.0 and shall be multiplied by all applicable adjustment factors per the NDS.
4. The tabulated allowable design loads may be applied to either side of the beam (head or point side of the fastener). Where loads are applied to both sides of the beam simultaneously, the total load applied to the beam shall not exceed the tabulated load.
5. For top-loaded members with even loading across the width of the entire assembly, and a depth of 18" or less, fasteners shall be installed in two (2) rows with a maximum distance of 32" o.c. between fasteners in the same row. Use three (3) rows for members deeper than 18".
6. Tabulated loads are for the connection strength. Beams and framing members shall be independently checked by a registered design professional.

Table 9. Allowable Lateral Design Values (plf) for TrussTite® Fasteners in Multi-Ply Truss and SCL Assemblies[2,3,4,5,6]

Fastener	Assembly	Members	Fastener Length[1] (in)	12" o.c.		16" o.c.		24" o.c.	
				Number of Rows of Fasteners					
				2	3	2	3	2	3
TrussTite®	A	2-ply 1¾"	2⅞	680	1,020	510	765	340	510
			3⅜						
	B	3-ply 1¾"	4½	510	765	385	580	255	385
			5						
	C	4-ply 1¾"	6¾	455	685	340	510	230	345
	D	2-ply 1¾" & 3½"	4½	510	765	385	580	255	385
	E	3-ply,(2) 1¾"(1) & 3½"	6	455	685	340	510	230	345
			6¾						
	F	2-ply 3½"	6	680	1,020	510	765	340	510
			6¾						

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

1. Fastener length is measured from the underside of the head to the tip.
2. SCL shall have an SG of 0.50 or greater. Thicknesses listed in Figure 8 are a minimum.
3. Allowable design values are based on a load duration factor of C_D = 1.0 and shall be multiplied by all applicable adjustment factors per the NDS.
4. The tabulated allowable design loads may be applied to either side of the beam (head or point side of the fastener). Where loads are applied to both sides of the beam simultaneously, the total load applied to the beam shall not exceed the tabulated load.
5. For top-loaded members with even loading across the width of the entire assembly, and a depth of 18" or less, fasteners shall be installed in two (2) rows with a maximum distance of 24" o.c. between fasteners in the same row. Use three (3) rows for members deeper than 18".
6. Tabulated loads are for the connection strength. Beams and framing members shall be independently checked by a registered design professional.

Table 10. Allowable Lateral Design Values (plf) for 1/4″ Structural Lag Screws in Multi-Ply Truss and SCL Assemblies[2,3,4,5,6]

Fastener	Assembly	Members	Fastener Length[1] (in)	12" o.c.		16" o.c.		24" o.c.	
				Number of Rows of Fasteners					
				2	3	2	3	2	3
1/4" Structural Lag Screw	A	2-ply 1¾"	3	900	1,350	675	1,015	450	675
			3½						
	B	3-ply 1¾"	5	675	1,015	510	765	340	510
	D	2-ply 1¾" Side member & 3½"Main Member	4	675	1,015	510	765	340	510
			5						
	F	2-ply 3½"	6	900	1,350	675	1,015	450	675

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

1. Fastener length is measured from the underside of the head to the tip.
2. SCL shall have an SG of 0.50 or greater. Thicknesses listed in Figure 8 are a minimum.
3. Allowable design values are based on a load duration factor of C_D = 1.0 and shall be multiplied by all applicable adjustment factors per the NDS.
4. The tabulated allowable design loads may be applies to either side of the beam (head or point side of the fastener). Where loads are applied to both sides of the beam simultaneously, the total load applied to the beam shall not exceed the tabulated load.
5. For top-loaded members with even loading across the width of the entire assembly, and a depth of 18" or less, fasteners shall be installed in two (2) rows with a maximum distance of 24" o.c. between fasteners in the same row. Use three (3) rows for members deeper than 18".
6. Tabulated loads are for the connection strength. Beams and framing members shall be independently checked by a registered design professional.

Table 11. Allowable Lateral Design Values (plf) for 5/16″ Structural Lag Screws and 5/16″ TimberWood Structural Screws in Multi-Ply Truss and SCL Assemblies[2,3,4,5,6]

Fastener	Assembly	Members	Fastener Length[1] (in)	12" o.c.		16" o.c.		24" o.c.	
				Number of Rows of Fasteners					
				2	3	2	3	2	3
5/16" Structural Lag Screw, and TimberWood Structural Screw	A	2-ply 1¾"	3	1,020	1,530	765	1,150	510	765
			3½						
	B	3-ply 1¾"	5	765	1,150	575	865	385	580
	D	2-ply 1¾" Side Member & 3½" Main Member	4	765	1,150	575	865	385	580
			5						
	F	2-ply 3½"	6	1,020	1,530	765	1,150	510	765

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

1. Fastener length is measured from the underside of the head to the tip.
2. SCL shall have a specific gravity, SG, of 0.50 or greater. Thicknesses listed in Figure 8 are a minimum.
3. Allowable design values are based on a load duration factor of C_D = 1.0 and shall be multiplied by all applicable adjustment factors per the NDS.
4. The tabulated allowable design loads may be applied to either side of the beam (head or point side of the fastener). Where loads are applied to both sides of the beam simultaneously, the total load applied to the beam shall not exceed the tabulated load.
5. For top-loaded members with even loading across the width of the entire assembly, and a depth of 18" or less, fasteners shall be installed in two (2) rows with a maximum distance of 24" o.c. between fasteners in the same row. Use three (3) rows for members deeper than 18".
6. Tabulated loads are for the connection strength. Beams and framing members shall be independently checked by a registered design professional.

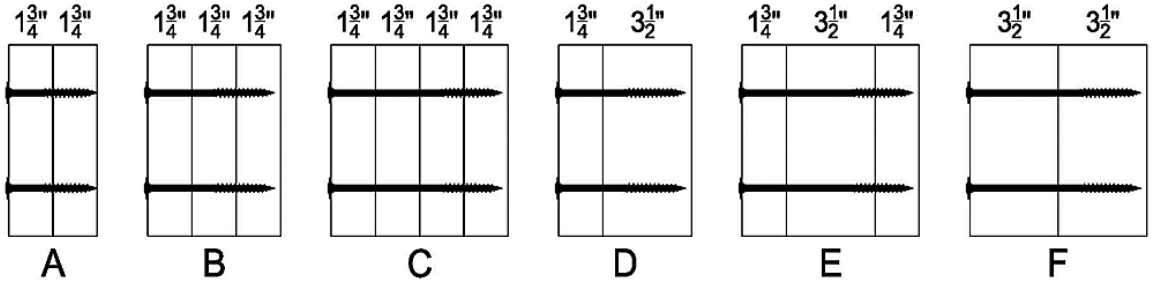

Figure 8. SCL Assembly Configurations

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

6 Installation

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

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

6.3 General Installation Procedure

6.3.1 Fasteners shall be installed with a 1/2" (12.7 mm), low rpm/high torque electric drill (450 rpm).

6.3.2 Fasteners shall be installed with the topside of the head flush to the surface of the wood member. Fasteners shall not be overdriven.

6.3.3 Fasteners shall not be struck with a hammer during installation.

6.3.4 Lead holes are not required but may be used where lumber is prone to splitting using the provisions in the NDS.

6.4 *Spacing, Edge Distance and End Distance*

6.4.1 LumberTite®, TimberTite® and 1/4″ Structural Lag Screws spacing, edge distance, and end distances shall be as specified in Figure 9 and Table 12.

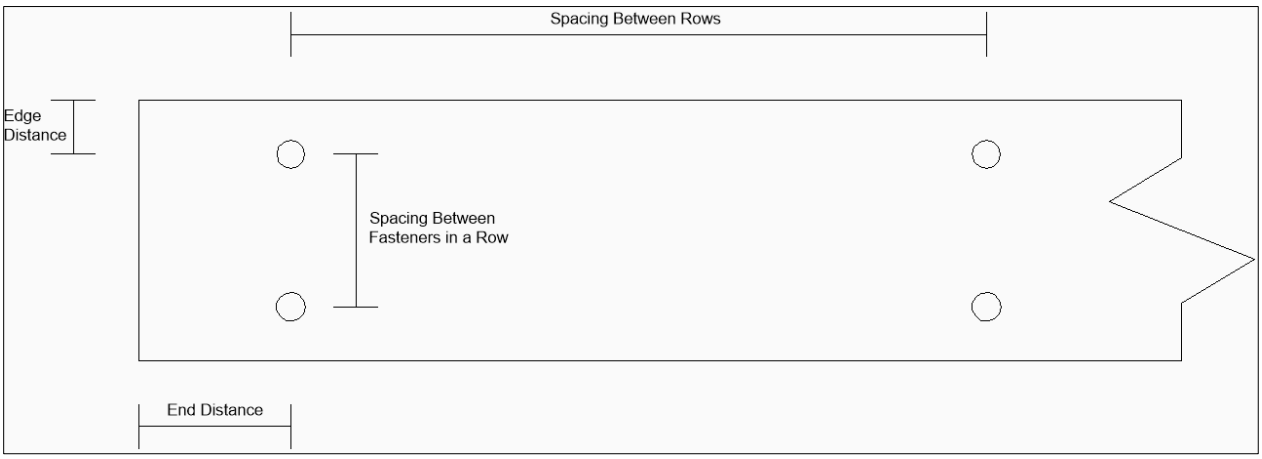

Figure 9. Minimum Screw Spacing Reference

Table 12. Screw Spacing, Edge Distance, and End Distance Requirements[1,2]

Connection Geometry	Minimum Spacing (in)
Edge Distance –Loaded edge	1 1/4
Edge Distance –Unloaded edge	3/4
End Distance – Load parallel to grain, towards end	3 5/8
End Distance – Load perpendicular to grain, away from end	2 3/8
End Distance – Load perpendicular to grain	2 3/8
Spacing between Fasteners in a Row – Parallel to grain	3 5/8
Spacing between Fasteners in a Row – Perpendicular to grain	2 3/8
Spacing between Rows of Fasteners – In-line	1 1/4
Spacing between Rows of Fasteners – Staggered[2]	3/4

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 the more restrictive.
2. Values for "Spacing between Rows or Fasteners-Staggered" apply where the screws in adjacent rows are offset by one-half of the "Spacing between Fasteners in a Row".

6.4.2 5/16″ Structural Lag and TrussTite® fastener spacing, edge distance, and end distances shall be as specified in Figure 9 and Table 13

Table 13. Screw Spacing, Edge Distance, and End Distance Requirements[1,2]

Connection Geometry	Minimum Spacing (in)
Edge Distance –Loaded edge	1 1/2
Edge Distance –Unloaded edge	3/4
End Distance – Load parallel to grain, towards end	4 1/4
End Distance – Load perpendicular to grain, away from end	2 7/8
End Distance – Load perpendicular to grain	2 7/8
Spacing between Fasteners in a Row – Parallel to grain	4 1/4
Spacing between Fasteners in a Row – Perpendicular to grain	2 7/8
Spacing between Rows of Fasteners – In-line	1 1/2
Spacing between Rows of Fasteners – Staggered[2]	3/4

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 the more restrictive.
2. Values for "Spacing between Rows or Fasteners-Staggered" apply where the screws in adjacent rows are offset by one-half of the "Spacing between Fasteners in a Row".

7 Substantiating Data

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

7.1.1 Connection design value calculations by DrJ Engineering, LLC in accordance with NDS and accepted engineering practice, and

7.1.2 Properties for Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws from approved sources.

7.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies (i.e., ANAB accredited agencies), approved sources (i.e., RDPs), and/or professional engineering regulations. Accuracy of external test data and resulting analysis is relied upon.

7.3 Where pertinent, testing and/or engineering analysis is based upon provisions that have been codified into law through state or local adoption of codes and standards. The developers of these codes and standards are responsible for the reliability of published content. DrJ's engineering practice may use a code-adopted provision as the control sample. A control sample versus a test sample establishes a product as being equivalent to the code-adopted provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

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

7.5 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.[9]

7.6 Where additional condition of use and/or code compliance information is required, please search for Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws on the DrJ Certification website.

8 Findings

8.1 As delineated in Section 3, Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws have performance characteristics that were tested and/or meet pertinent standards and are suitable for use pursuant to its specified purpose.

8.2 When used and installed in accordance with this TER and the manufacturer installation instructions, Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws shall be approved for the following applications:

8.2.1 To provide multi-ply attachment in trusses, sawn lumber, and SCL assemblies.

8.3 Unless exempt by state statute, when Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws are to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.

8.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from The Hillman™ Group.

[9] See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.

8.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10[10] 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.

8.6 **Approved**:[11] Building codes require that the building official shall accept duly authenticated reports[12] or research reports[13] from approved agencies and/or approved sources (i.e., licensed RDP) with respect to the quality and manner of use of new products, materials, designs, services, assemblies, or methods of construction.

8.6.1 Acceptance of an approved agency, by a building official, is performed by verifying that the agency is accredited by a recognized accreditation body of the International Accreditation Forum (IAF).

8.6.2 Acceptance of a licensed RDP, by a building official, is performed by verifying that the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.

8.6.3 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, as denial without written reason deprives a protected right to free and fair competition in the marketplace.

8.7 DrJ is an engineering company, employs RDPs and is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.

8.8 Through ANAB accreditation and the IAF Multilateral Agreements, this TER can be used to obtain product approval in any jurisdiction or country that has IAF MLA Members & Signatories to meet the Purpose of the MLA – "*certified once, accepted everywhere*." IAF specifically says, "*Once an accreditation body is a signatory of the IAF MLA, it is required to recognise certificates and validation and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope*."[14]

9 Conditions of Use

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

9.2 As defined in Section 3, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.

9.3 As listed herein, Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws can be used in:

9.3.1 Chemically (pressure preservatives and fire-retardants) treated wood with no limitations with respect to moisture content of the treated wood.

9.3.2 Untreated wood with no limitation with respect to moisture content of the untreated wood.

9.4 When installed in preservative-treated wood or fire-retardant-treated wood, connections shall be designed using the treatment manufacturer reductions for connections.

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[10] 2018 IFC Section 104.9

[11] 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.

[12] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1

[13] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2

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

9.5 For conditions not covered in this TER, connections shall be designed in accordance with generally accepted engineering practices. When the capacity of a connection is controlled by fastener strength rather than wood strength, the metal strength value shall be not increased by the adjustment factors specified in the NDS.

9.6 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:

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

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

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

9.6.4 At a minimum, these innovative products shall be installed per Section 6 of this TER.

9.6.5 The review of this TER, by the AHJ, shall be in compliance with IBC Section 104 and IBC Section 105.4.

9.6.6 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.

9.6.7 The application of these innovative products in the context of this TER are 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.

9.7 The approval of this TER by the AHJ shall comply with IBC Section 1707.1, where legislation states in pertinent part, "*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 104.11*", all of IBC Section 104, and IBC Section 105.4.

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

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

10 Identification

10.1 The innovative products listed in Section 1.1 through Section 1.5 are identified by a label on the board or packaging material bearing the manufacturer name, product name, TER number, and other information to confirm code compliance.

10.2 Additional technical information can be found at www.hillmangroup.com.

11 Review Schedule

11.1 This TER is subject to periodic review and revision. For the most recent version, visit drjcertification.org.

11.2 For information on the status of this TER, contact DrJ Certification.

12 Approved for Use Pursuant to US and International Legislation Defined in Appendix A

12.1 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws are included in this TER 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, and whose TER Listing states either that the material, product, or service meets identified standards or has been tested and found suitable for a specified purpose. This TER 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 Power Pro® LumberTite®, Power Pro® TimberTite®, Power Pro® TrussTite® Structural Wood Screws, Power Pro® Structural Lag Screws, and Power Pro® TimberWood Structural Screws 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),[15] where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than 10 years[16] and/or a $5,000,000 fine or 3 times the value of[17] 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[18] that are not specifically provided for in any building code, 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.[19]

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 has 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.[20]

[15] http://www.drjengineering.org/AppendixC and https://www.drjcertification.org/cornell-2016-protection-trade-secrets.

[16] https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years

[17] https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided

[18] https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2

[19] IBC 2021, Section 1706.1 Conformance to Standards

[20] IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General

1.3 **Approved**[21] **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, which 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.[22] The Superintendent of Building roster of approved testing agencies 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 CBI 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.[23]

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 NYC Building Code 2022 (NYCBC) states in pertinent part that an approved agency shall be deemed[24] 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[25] (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) A certification mark or listing of an approved certification agency, 2) A test report from an approved testing laboratory, 3) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity; 4) A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a professional engineer or architect, licensed in Florida. 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) A certification mark, listing, or label from a commission-approved certification agency indicating that the product complies with the code; 2) A test report from a commission-approved testing laboratory indicating that the product tested complies with the code; 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; 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; 5) A statewide product approval issued by the Florida Building Commission. 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).

[21] See Section 8 for the distilled building code definition of **Approved**

[22] Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES

[23] https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1

[24] New York City, The Rules of the City of New York, § 101-07 Approved Agencies

[25] New York City, The Rules of the City of New York, § 101-07 Approved Agencies

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 Building Code 2018 of New Jersey in IBC Section 1707.1 General,[26] 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)".[27] Furthermore N.J.A.C 5:23-3.7 states: Municipal approvals of alternative materials, equipment, or methods of construction. **(a) 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. 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 (a) above. 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 (a) above. 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 2 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[28] and Part 3280,[29] the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform with the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow: 1) "All construction methods shall be in conformance with accepted engineering practices"; 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."; and 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.[30]

1.10.2 For innovative alternative products, materials, designs, services and/or methods of construction, in the absence of approved rules or other approved standards…the building official shall accept duly authenticated reports (i.e., listing and/or research report) from approved agencies with respect to the quality and manner of use of new materials or assemblies.[31] A building official approved agency is deemed to be approved via certification from an accreditation body that is listed by the International Accreditation Forum[32] or equivalent.

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[26] https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1

[27] https://www.nj.gov/dca/divisions/codes/codreg/ucc.html

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

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

[30] IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.

[31] IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.

[32] Please see the ANAB directory for building official approved agencies.

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.[33] An approved source is defined as a PE subject to professional engineering laws, where a research and/or a technical evaluation report certified by a PE, shall be approved.

1.11 **Approval by International Jurisdictions**: The USMCA and GATT agreements provide for approval of innovative materials, products, designs, services, assemblies and/or methods of construction through the Technical Barriers to Trade agreements and the International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA), where these agreements:

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

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

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

1.11.4 **Approved**: The purpose of the IAF 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, products, designs, services, assemblies and/or methods of construction. Accreditations granted by IAF MLA signatories are recognised worldwide based on their equivalent accreditation programs, therefore reducing costs and adding value to businesses and consumers.

[33] IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.