Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

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Attachment of EnergyShield® Ply Pro and EnergyShield® Ply to Wood, Steel, and Concrete

Trade Secret Report Holder:

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CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES
Section: 06 00 90 - Wood and Plastic Fastenings
Section: 06 05 23 - Wood, Plastic, and Composite Fastenings
Section: 06 12 00 - Structural Panels
Section: 06 12 19 - Shear Wall Panels
Section: 06 16 00 - Sheathing
Section: 06 16 13 - Insulated Sheathing
Section: 06 16 36 - Wood Panel Product Sheathing

1 Innovative Products Evaluated[1]

1.1 EnergyShield Ply Pro and EnergyShield Ply

2 Product Description and Materials

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

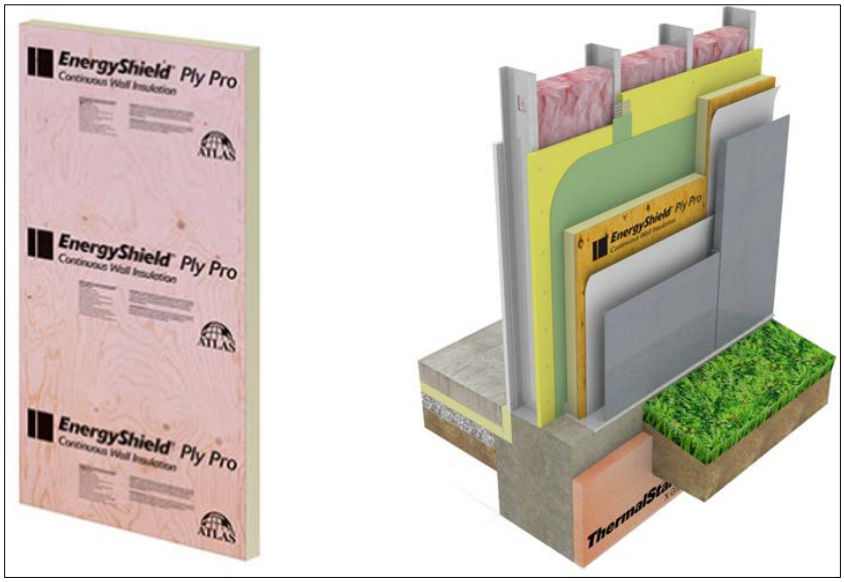


Figure 1. EnergyShield Ply Pro

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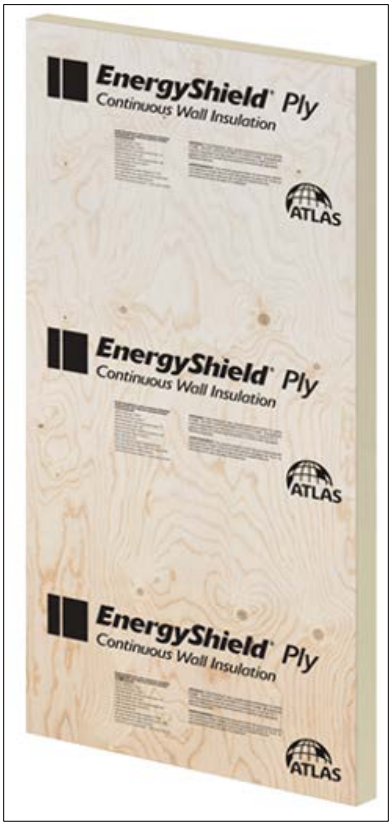


Figure 2. EnergyShield Ply

2.2 EnergyShield Ply Pro and EnergyShield Ply are ASTM C1289 Type V compliant, high thermal rigid insulation panels composed of a Type II Class 2 closed cell polyisocyanurate foam core bonded to a premium performance coated glass facer on one side and $^{5}/_{8}$" or $^{3}/_{4}$" Fire-Retardant Treated (FRT) plywood (EnergyShield Ply Pro) or $^{5}/_{8}$" or $^{3}/_{4}$" normal plywood (EnergyShield Ply) on the other.

2.3 EnergyShield Ply Pro is designed for use in Types I-IV commercial wall applications to provide continuous insulation within the building envelope.

2.4 EnergyShield Ply is designed for use in Type V and residential wall applications to provide continuous insulation within the building envelope.

2.4.1 Nominal density of the polyiso foam core is 2.0-pcf.

2.4.2 Foam core for EnergyShield Ply Pro and EnergyShield Ply is Class A, NFPA 285 compliant.

2.4.3 EnergyShield Ply is not approved for NFPA 285 assemblies.

2.5 *Material Availability*

2.5.1 *Total Available Thicknesses:*

2.5.1.1 $1^{5}/_{8}$" through $4^{3}/_{4}$"

2.5.1.1.1 *Polyiso Foam Core Insulation Available Thicknesses:*

2.5.1.1.1.1 1"

2.5.1.1.1.2 1.5"

2.5.1.1.1.3 2"

2.5.1.1.1.4 2.5"

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2.5.1.1.1.5 3"

2.5.1.1.1.6 3.5"

2.5.1.1.1.7 4"

2.5.1.1.2 *FRT Plywood/Standard Plywood Available Thicknesses:*

2.5.1.1.2.1 $^{5}/_{8}$"

2.5.1.1.2.2 $^{3}/_{4}$"

2.5.1.1.3 *Standard Product Width:*

2.5.1.1.3.1 48"

2.5.1.1.4 *Standard Product Length:*

2.5.1.1.4.1 96"

2.5.1.1.4.2 108"

2.6 *Fasteners*

2.6.1 EnergyShield Ply Pro and EnergyShield Ply panels shall be fastened with one of the proprietary fasteners described in this section and in accordance with the provisions of this report.

2.6.1.1 Proprietary fastener properties shall be in accordance with the published design values listed in manufacturer evaluation reports.

2.6.1.2 TRUFAST® SIP TP fasteners are size No. 14 (shank diameter 0.189") fasteners with a 0.635" diameter pancake head and a T-30 drive. The point is a threaded drill point.

2.6.1.3 TRUFAST® SIP LD fasteners are size No. 14 (shank diameter 0.189") fasteners with a 0.635" diameter pancake head and a T-30 drive. The point is a two-flute formed drill tip.

2.6.1.4 TRUFAST® SIP HD fasteners are size No. 14 (shank diameter 0.189") fasteners with a 0.635" diameter pancake head and a T-30 drive. The point is a two-flute formed drill tip.

2.6.1.5 $^{1}/_{4}$" Tapcon® Screw Anchors are a 0.192" shank diameter carbon steel concrete anchors with a 0.475" diameter flat head and star drive. They have an alternating high-low thread form and a pointed tip.

2.7 *Framing/Substrate Materials*

2.7.1 *Wood:*

2.7.1.1 Solid sawn wood framing members shall consist of lumber species having a specific gravity of at least 0.42.

2.7.2 *Steel:*

2.7.2.1 Steel framing members must comply with one of the material standards provided in AISI S100, Section A3.1.

2.7.2.2 At a minimum, steel framing members must comply with the requirements set forth in this report.

2.7.3 *Concrete:*

2.7.3.1 Normal weight structural concrete must comply with IBC Section 1901.2.

2.7.3.2 Concrete shall remain uncracked for the service life of the fastener.

2.7.4 *Masonry:*

2.7.4.1 Load-bearing Concrete Masonry Units (CMU) shall comply with IBC Section 2114.3 and IRC Section R606.2.1.

2.7.4.2 CMU shall be normal-weight and conform to ASTM C90.

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

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3 Definitions[2]

3.1 New Materials[3] 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.[4] The design strength and permissible stresses shall be established by tests[5] and/or engineering analysis.[6]

3.2 Duly authenticated reports[7] and research reports[8] are test reports and related engineering evaluations that are written by an approved agency[9] and/or an approved source.[10]

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

3.2.1.1 This report protects confidential Intellectual Property and trade secrets under the regulation, 18.US.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).[11]

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

3.4 An approved source is *"approved"* when a professional engineer (i.e., Registered Design Professional, hereinafter RDP) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[12]

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

3.5.1 The Center for Building Innovation (CBI) is ANAB[13] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[14] 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[15] 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.[16]

3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory. Therefore, recognition of certificates and validation statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope shall be approved.[17] Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,[18] and can be used in any country that is an MLA signatory found at this link: https://iaf.nu/en/recognised-abs/

3.9 Approval equity is a fundamental commercial and legal principle.[19]

4 Applicable Local, State, and Federal Approvals; Standards; Regulations[20]

4.1 *Local, State, and Federal*

4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured local jurisdictions: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, St. Louis County, Texas Department of Insurance, and Wichita.[21]

4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured states: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.[22]

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4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[23] and Part 3280[24] pursuant to the use of ISO/IEC 17065 duly authenticated reports.

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

4.2 *Regulations*

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

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

4.2.3 *IECC – 18, 21, 24: International Energy Conservation Code®*

4.3 *Standards*

4.3.1 *AISI S100: North American Specification for the Design of Cold-formed Steel Structural Members*

4.3.2 *ASCE/SEI 7: Minimum Design Loads for Buildings and Other Structures*

4.3.3 *ASTM A653: Specification for Steel Sheet, Zinc-coated Galvanized or Zinc-iron Alloy-coated Galvannealed by the Hot-dip Process*

4.3.4 *ASTM C90: Standard Specification for Loadbearing Concrete Masonry Units*

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

5 Listed[25]

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

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 *EnergyShield Panel Attachment to Wood Framing*

6.1.1 EnergyShield Ply Pro and EnergyShield Ply panels shall be fastened along each stud.

6.1.2 EnergyShield foam products (without the FRT plywood or OSB facer adhered to the polyiso insulation) is permitted for use in accordance with **Table 1** and **Table 2**, when nominal 1x wood furring strips ($^3/_4$" thick) are installed vertically over the EnergyShield foam products and parallel to the studs (furring is in between insulation and underside of fastener head).

6.1.2.1 The design of the furring is outside the scope of this report and must be checked for the applied loads.

6.1.2.2 **Table 1** lists the largest vertical spacing for the specified fastener(s), while **Table 2** lists the maximum wind pressure and corresponding maximum wind speed for each Exposure Category.

6.1.2.3 The fastener spacing to be used shall be governed by the stricter of:

6.1.2.3.1 Cladding weight per **Table 1**

6.1.2.3.2 Wind pressure/wind speed per **Table 2**

6.1.2.3.3 *Example:* If the cladding weighing 15-psf is installed through a 1.6" EnergyShield Ply panel into wood framing spaced 24" o.c., in a region with wind speeds that can reach up to 150 mph (Exposure Category C), the vertical fastener shall be installed 12" o.c. (value taken directly from **Table 2** as an example; per note #5 in **Table 2**, interpolation is permitted).

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6.1.3 *Connections to Wood Framing to Support Cladding Weight:*

6.1.3.1 Fasteners are required to attach EnergyShield Ply Pro and EnergyShield Ply panels to wood framing to support the attached cladding weight. See **Table 1** for the maximum vertical fastener spacing (along the height of the stud) to support specified cladding weights.

6.1.3.2 See **Figure 3** for a typical installation detail of EnergyShield Ply Pro and EnergyShield Ply panels attached to wood studs.

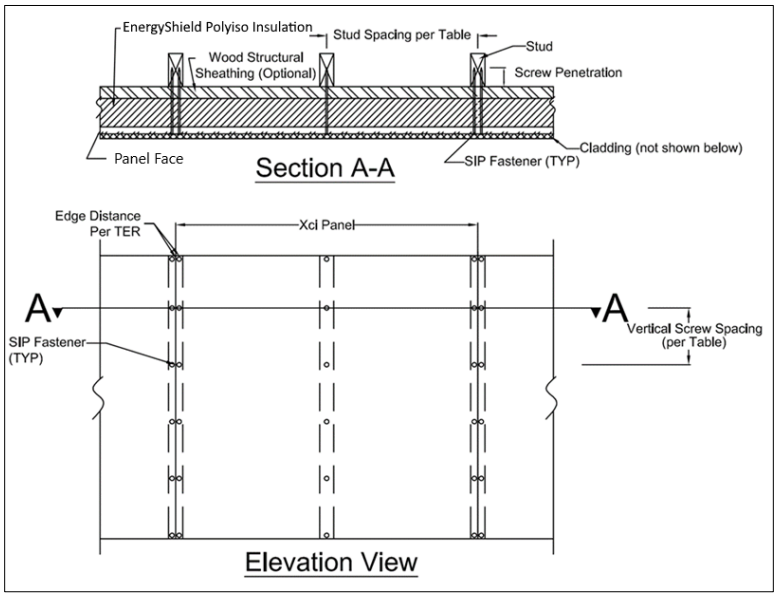


Figure 3. Typical Installation Detail

Table 1. Maximum Fastener Spacing for EnergyShield Ply Pro and EnergyShield Ply Attached to Wood Framing[6]

Framing Member[5]	Stud Spacing (in) o.c.	Fastener[1,2,3]	Maximum Nominal Thickness of the Polyiso Portion of EnergyShield Ply Pro (in)	Maximum Fastener Vertical Spacing (in)					
				Specified Cladding Weight[4] (psf)					
				5	10	15	20	25	30
Wood Framing	16"	SIP LD	≤ 4	24	24	24	24	24	24
		SIP TP	≤ 4	24	24	24	24	24	24
	24"	SIP LD	≤ 4	24	24	24	24	24	24
		SIP TP	≤ 4	24	24	24	24	24	24

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m^2

1. Minimum fastener penetration into stud is 1$^3/_8$". Fastener penetration length is equal to the threaded portion of the screw in the main member, including the tip.
2. Proprietary fastener properties are per published data or testing. Fastener length shall be chosen so that the fastener fully penetrates the EnergyShield Ply Pro and EnergyShield Ply panels and achieves the minimum required fastener penetration into stud.
3. SIP LD = Light-duty drill point for corrugated steel deck, wood, and concrete/CMU applications. SIP TP = Thread point for wood, timber, and concrete/CMU applications.
4. The weight of EnergyShield Ply Pro and EnergyShield Ply panels are included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials.
5. Wood studs shall be a minimum of 2 x 4 and have a minimum specific gravity of 0.42.
6. EnergyShield Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is allowable for use in accordance with Table 1, when used with 1x wood furring strips ($^3/_4$" thick) with a minimum specific gravity of 0.50 are installed vertically over the EnergyShield Foam and parallel to the studs (furring is in between insulation and underside of fastener head).

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6.1.4 *Connections to Wood Framing to Resist Out-of-Plane Wind Loading:*

6.1.4.1 EnergyShield Ply Pro and EnergyShield Ply panels shall be fastened along each stud with TRUFAST SIP Fasteners (SIP LD or SIP TP).

6.1.4.2 See **Figure 3** for a typical installation detail of EnergyShield Ply Pro and EnergyShield Ply panels attached to wood studs.

Table 2. Allowable Wind Pressures for EnergyShield Ply Pro and EnergyShield Ply Attached to Wood Framing[1,2,3,4,5,6]

Main Substrate	Fastener	Stud Spacing (in o.c.)	Vertical Fastener Spacing (in o.c.)	Allowable Wind Pressure (psf)	Maximum Basic Wind Speed (mph)			Allowable Wind Speed (mph)		
					B	C	D	B	C	D
SPF Stud	SIP LD	16	24	51.6	190	160	146	148	124	113
		16	20	61.9	200	175	160	155	135	124
		16	16	77.3	200	196	179	155	151	139
		16	12	103.1	200	200	200	155	155	155
		16	8	154.7	200	200	200	155	155	155
		24	24	34.4	155	130	119	120	101	93
		24	20	41.3	170	143	131	132	111	101
		24	16	51.6	190	160	146	148	124	113
		24	12	68.8	200	184	169	155	143	131
		24	8	103.1	200	200	200	155	155	155
	SIP TP	16	24	61.9	200	175	160	155	135	124
		16	20	74.3	200	192	176	155	148	136
		16	16	92.8	200	200	196	155	155	152
		16	12	123.8	200	200	200	155	155	155
		16	8	185.6	200	200	200	155	155	155
		24	24	41.3	170	143	131	132	111	101
		24	20	49.5	187	156	143	145	121	111
		24	16	61.9	200	175	160	155	135	124
		24	12	82.5	200	200	185	155	155	143
		24	8	123.8	200	200	200	155	155	155

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m^2

1. Minimum fastener penetration into stud is 1$^3/_8$". Fastener penetration length is equal to the threaded portion of the screw in the main member, including the tip.
2. Proprietary fastener properties are per published data or testing. Fastener length shall be chosen so that the fastener fully penetrates the EnergyShield Ply Pro and EnergyShield Ply panels and achieves the minimum required fastener penetration into stud.
3. Wood studs shall be a minimum of 2 x 4 and have a minimum specific gravity of 0.42.
4. Three-second-gust wind speed; based on a building height of 66-feet, Zone 5, Importance Factor, I_w=1.0 and Topographic Factor, K_{zt}=1.0, Internal Pressure Coefficient, GC_{pi}=+/-0.18 in accordance with ASCE 7, Section 30.4.2 and IRC Section R301.2.1. Pressure Equalization Factor, PEF=1.0.
5. Interpolation between table values is permitted.
6. Where furring strips are used over foam, their adequacy to span between fasteners shall be checked separately. The design of furring strips is not taken into account in this table.

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6.2 *EnergyShield Panel Attachment to CFS Framing*

6.2.1 Minimum penetration into CFS framing is the steel framing thickness plus three threads and the tip of the fastener, unless noted otherwise in this report.

6.2.1.1 TRUFAST SIP LD fasteners are permitted for use with 16-gauge through 18-gauge CFS framing.

6.2.1.2 TRUFAST SIP HD fasteners are permitted for use with 12-gauge through 16-gauge CFS framing.

6.2.1.3 Either SIP LD or SIP HD fasteners are permitted for use with 16-gauge CFS framing.

6.2.2 EnergyShield Ply Pro and EnergyShield Ply panels shall be fastened along each stud. EnergyShield Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is allowable for use in accordance with **Table 3**, **Table 4**, **Table 5**, and **Table 6**, when light-gauge furring channels or hat channels are installed vertically over the EnergyShield Foam parallel to the studs (furring is in between insulation and underside of fastener head).

6.2.3 Furring or hat channel thickness must be equal to or greater than CFS framing thickness.

6.2.4 The design of the furring and hat channels is outside the scope of this report and should be checked for the applied loads.

6.2.4.1 Furring or hat channels shall be oriented so that the raised portion of the furring or channel is snug against the polyiso insulation (i.e., inverted orientation).

6.2.5 **Table 3** through **Table 5** list the largest vertical spacing for the specified fastener(s) and CFS framing member thickness, while **Table 6** lists maximum wind pressure and the corresponding maximum wind speed for each Exposure Category.

6.2.5.1 The fastener spacing to be used shall be governed by the stricter of:

6.2.5.1.1 Cladding weight per **Table 3** through **Table 5**

6.2.5.1.2 Wind pressure/wind speed per **Table 6**

6.2.6 *EnergyShield Panel Attachment to CFS Framing to Support Cladding Weight:*

6.2.6.1 Fasteners are required to attach EnergyShield Ply Pro and EnergyShield Ply panels to CFS framing to support the attached cladding weight.

6.2.6.1.1 See **Table 3** for maximum vertical fastener spacing (along the height of the stud) for 18-gauge CFS framing to support specified cladding weights.

6.2.6.1.2 See **Table 4** for maximum vertical fastener spacing (along the height of the stud) for 16-gauge CFS framing to support specified cladding weights.

6.2.6.1.3 See **Table 5** for maximum vertical fastener spacing (along the height of the stud) for 12-gauge CFS framing to support specified cladding weights.

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Table 3. Maximum Fastener Spacing for EnergyShield Ply Pro and EnergyShield Ply Attached to 18-Gauge CFS Framing[5]

Framing Member[4]	Stud Spacing (in) o.c.	Fastener[1,3]	Maximum Nominal Thickness of the Polyiso Portion of EnergyShield Ply Pro Panels (in)	Maximum Fastener Vertical Spacing (in) Specified Cladding Weight[2] (psf)					
				5	10	15	20	25	30
18-gauge CFS Framing[6,7]	16"	SIP LD	≤ 4	24	24	24	24	24	24
	24"		≤ 2	24	24	24	24	24	24
			2 1/2	24	24	24	24	24	20
			3	24	24	24	24	24	20
			3 1/2	24	24	24	24	20	16
			4	24	24	24	24	20	16

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

1. Minimum fastener penetration into stud is the steel thickness plus three threads and the tip of the fastener. Required fastener length shall be chosen to fully penetrate EnergyShield Ply Pro and EnergyShield Ply Panel to achieve minimum fastener penetration into framing.
2. The weight of EnergyShield Ply Pro and EnergyShield Ply panels are included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials.
3. Proprietary fastener properties are per published data or testing.
4. CFS framing shall be a minimum of 45 mils thick and have a minimum ultimate tensile strength of 45-ksi (i.e., ASTM A653, SS Grade 33).
5. EnergyShield Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is allowable for use in accordance with Table 3, Table 4, and Table 5, when light-gauge furring channels or hat channels are installed vertically over the EnergyShield Foam parallel to the studs (furring is in between insulation and underside of fastener head).
6. Furring or hat channel thickness must be equal to or greater than CFS framing thickness.
7. Furring or hat channels shall be oriented so that the raised portion of the furring or channel is snug against the polyiso insulation (i.e., inverted orientation).

Table 4. Maximum Fastener Spacing for EnergyShield Ply Pro and EnergyShield Ply Attached to 16-Gauge CFS Framing[5]

Framing Member[4]	Stud Spacing (in) o.c.	Fastener[1,3]	Maximum Nominal Thickness of the Polyiso Portion of EnergyShield Ply Pro Panels (in)	Maximum Fastener Vertical Spacing (in) Specified Cladding Weight[2] (psf)					
				5	10	15	20	25	30
16-gauge CFS Framing[6,7]	16"	SIP LD	≤ 4	24	24	24	24	24	24
		SIP HD	≤ 4	24	24	24	24	24	24
	24"	SIP LD	≤ 4	24	24	24	24	24	24
		SIP HD	≤ 3	24	24	24	24	24	24
			3 1/2	24	24	24	24	20	20
			4	24	24	24	20	16	16

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

1. Minimum fastener penetration into stud is the steel thickness plus three threads and the tip of the fastener. Required fastener length shall be chosen to fully penetrate the EnergyShield Ply Pro and EnergyShield Ply panel to achieve minimum fastener penetration into framing.
2. The weight of EnergyShield Ply Pro and EnergyShield Ply panels are included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials.
3. Proprietary fastener properties are per published data or testing.
4. CFS framing shall be a minimum of 53 mils thick and have a minimum ultimate tensile strength of 65-ksi (i.e., ASTM A653, SS Grade 50).
5. EnergyShield Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is allowable for use in accordance with Table 3, Table 4, and Table 5, when light-gauge furring channels or hat channels are installed vertically over the EnergyShield Foam parallel to the studs (furring is in between insulation and underside of fastener head).
6. Furring or hat channel thickness must be equal to or greater than CFS framing thickness.
7. Furring or hat channels shall be oriented such that the raised portion of the furring or channel is snug against the polyiso insulation (i.e., inverted orientation).

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Table 5. Maximum Fastener Spacing for EnergyShield Ply Pro and EnergyShield Ply Attached to 12-Gauge CFS Framing[5]

Framing Member[4]	Stud Spacing (in) o.c.	Fastener[1,3]	Maximum Nominal Thickness of the Polyiso Portion of EnergyShield Ply Pro Panels (in)	Maximum Fastener Vertical Spacing (in) Specified Cladding Weight[2] (psf)					
				5	10	15	20	25	30
12-gauge CFS Framing[6]	16"	SIP HD	≤ 4	24	24	24	24	24	24
	24"		≤ 3	24	24	24	24	24	24
			3 1/2	24	24	24	24	24	20
			4	24	24	24	24	20	16

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

1. Minimum fastener penetration into stud is the steel thickness plus three threads and the tip of the fastener. Required fastener length shall be chosen to fully penetrate the EnergyShield Ply Pro to achieve minimum fastener penetration into framing.
2. The weight of EnergyShield Ply Pro panels are included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials.
3. Proprietary fastener properties are per published data or testing.
4. CFS framing shall be a minimum of 99 mils thick and have a minimum ultimate tensile strength of 65-ksi (i.e., ASTM A653, SS Grade 50).
5. EnergyShield Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is allowable for use in accordance with Table 3, Table 4, and Table 5, when light-gauge furring channels or hat channels are installed vertically over the EnergyShield Foam parallel to the studs (furring is in between insulation and underside of fastener head).
6. Furring or hat channels shall be oriented such that the raised portion of the furring or channel is snug against the polyiso insulation (i.e., inverted orientation).

6.2.7 *EnergyShield Panel Connections to CFS Framing to Resist Out-of-Plane Wind Loading:*

6.2.7.1 EnergyShield Ply Pro and EnergyShield Ply panels shall be fastened along each stud with SIP LD or SIP HD, as applicable in accordance with **Section 6.2.1**.

Table 6. Allowable Wind Pressures for EnergyShield Ply Pro and EnergyShield Ply Attached to Steel Framing[1,3,4,5]

Main Substrate	Fastener	Stud Spacing (in o.c.)	Vertical Fastener Spacing (in o.c.)	Allowable Wind Pressure (psf)	Maximum Basic Wind Speed (mph)			Allowable Wind Speed (mph)		
					B	C	D	B	C	D
18-gauge CFS[2]	SIP LD	16	24	67.5	200	183	167	155	142	130
		16	20	81.0	200	200	183	155	155	142
		16	16	101.3	200	200	200	155	155	155
		16	12	135.0	200	200	200	155	155	155
		16	8	202.5	200	200	200	155	155	155
		24	24	45.0	178	149	137	138	116	106
		24	20	54.0	195	163	150	151	127	116
		24	16	67.5	200	183	167	155	142	130
		24	12	90.0	200	200	193	155	155	150
		24	8	135.0	200	200	200	155	155	155

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Table 6. Allowable Wind Pressures for EnergyShield Ply Pro and EnergyShield Ply Attached to Steel Framing[1,3,4,5]

Main Substrate	Fastener	Stud Spacing (in o.c.)	Vertical Fastener Spacing (in o.c.)	Allowable Wind Pressure (psf)	Maximum Basic Wind Speed (mph)			Allowable Wind Speed (mph)		
					B	C	D	B	C	D
16-gauge CFS	SIP LD	16	24	99.4	200	200	200	155	155	155
		16	20	119.3	200	200	200	155	155	155
		16	16	149.1	200	200	200	155	155	155
		16	12	198.8	200	200	200	155	155	155
		16	8	298.1	200	200	200	155	155	155
		24	24	66.3	200	181	166	155	140	128
		24	20	79.5	200	198	182	155	154	141
		24	16	99.4	200	200	200	155	155	155
		24	12	132.5	200	200	200	155	155	155
		24	8	198.8	200	200	200	155	155	155
	SIP HD	16	24	78.8	200	197	181	155	153	140
		16	20	94.5	200	200	198	155	155	153
		16	16	118.1	200	200	200	155	155	155
		16	12	157.5	200	200	200	155	155	155
		16	8	236.3	200	200	200	155	155	155
		24	24	52.5	192	161	148	149	125	114
		24	20	63.0	200	176	162	155	137	125
		24	16	78.8	200	197	181	155	153	140
		24	12	105.0	200	200	200	155	155	155
		24	8	157.5	200	200	200	155	155	155
12-gauge CFS	SIP HD	16	24	99.4	200	200	200	155	155	155
		16	20	119.3	200	200	200	155	155	155
		16	16	149.1	200	200	200	155	155	155
		16	12	198.8	200	200	200	155	155	155
		16	8	298.1	200	200	200	155	155	155
		24	24	66.3	200	181	166	155	140	128
		24	20	79.5	200	198	182	155	154	141
		24	16	99.4	200	200	200	155	155	155
		24	12	132.5	200	200	200	155	155	155
		24	8	198.8	200	200	200	155	155	155

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Table 6. Allowable Wind Pressures for EnergyShield Ply Pro and EnergyShield Ply Attached to Steel Framing[1,3,4,5]

Main Substrate	Fastener	Stud Spacing (in o.c.)	Vertical Fastener Spacing (in o.c.)	Allowable Wind Pressure (psf)	Maximum Basic Wind Speed (mph)			Allowable Wind Speed (mph)		
					B	C	D	B	C	D

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

1. Minimum fastener penetration into stud is the steel thickness plus three threads and the tip of the fastener. Required fastener length shall be chosen to fully penetrate the EnergyShield Panel to achieve minimum fastener penetration into framing.
2. CFS framing shall be a minimum of 43 mils thick and have a minimum tensile strength of 45-ksi.
3. Three-second-gust wind speed, based on a building height of 66-feet, Zone 5, Importance Factor, I_w=1.0 and Topographic Factor, K_{zt}=1.0, Internal Pressure Coefficient, GC_{pi}=+/-0.18 in accordance with ASCE 7, Section 30.4.2 and IRC Section R301.2.1. Pressure Equalization Factor, PEF=1.0.
4. Interpolation between table values is permitted.
5. Where furring channels or hat channels are used over foam, their adequacy to span between fasteners shall be checked separately. The design of furring channels and hat channels is not taken into account in this table.

6.3 *EnergyShield Panel Attachment to Concrete Substrates*

6.3.1 *EnergyShield Panel Attachment to Concrete Substrates to Support Cladding Weight:*

6.3.1.1 Fasteners are required to attach EnergyShield Ply Pro and EnergyShield Ply panels to concrete to support the attached cladding weight. See **Table 7** for maximum vertical fastener spacing to support specified cladding weights.

6.3.1.2 EnergyShield Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is permitted for use in accordance with **Table 7** when used with 1x wood furring strips (0.75" thick), and are installed vertically over the EnergyShield Foam and parallel to the studs (furring is in between insulation and underside of fastener head). The design of the furring is outside the scope of this report, and should be checked for the applied loads.

Table 7. Maximum Fastener Spacing for EnergyShield Ply Pro and EnergyShield Ply Panels Attached to Concrete Substrates[7]

Substrate Material[5]	Maximum Horizontal Fastener Spacing (in)	Fastener[1,2,4]	Maximum Nominal Thickness of the Polyiso Portion of EnergyShield Ply Pro panels (in)	Maximum Fastener Vertical Spacing[6] (in)					
				Specified Cladding Weight[3] (psf)					
				5	10	15	20	25	30
Concrete (f_c' ≥ 2,500-psi)	16"	SIP LD	≤ 4	24	24	24	24	24	24
		SIP TP	≤ 4	24	24	24	24	24	24
		1/4" Tapcon	≤ 4	24	24	24	24	24	24
	24"	SIP LD	≤ 4	24	24	24	24	24	24
		SIP TP	≤ 4	24	24	24	24	24	24
		1/4" Tapcon	≤ 4	24	24	24	24	24	24

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Table 7. Maximum Fastener Spacing for EnergyShield Ply Pro and EnergyShield Ply Panels Attached to Concrete Substrates[7]

Substrate Material[5]	Maximum Horizontal Fastener Spacing (in)	Fastener[1,2,4]	Maximum Nominal Thickness of the Polyiso Portion of EnergyShield Ply Pro panels (in)	Maximum Fastener Vertical Spacing[6] (in)					
				Specified Cladding Weight[3] (psf)					
				5	10	15	20	25	30

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m^2

1. Minimum fastener embedment into substrate is 1.5" for the SIP TP and SIP LD. Minimum fastener embedment into the substrate for Tapcon is 2" for use with EnergyShield Ply Pro and EnergyShield Ply panels 4.6" thick or less, and 1.4" for use with EnergyShield Ply Pro panels 4.6" thick or thicker. Required fastener length shall be chosen to fully penetrate the EnergyShield Panel to achieve minimum fastener embedment into substrate. Fastener embedment is the threaded length embedded in the substrate, including the tip.
2. Fasteners shall be installed with a minimum end distance of 6" and a minimum edge distance of 2.5".
3. The weight of EnergyShield Ply Pro and EnergyShield Ply panels are included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials.
4. Proprietary fastener properties are per published data or testing.
5. Concrete shall have a minimum compressive strength of 2,500-psi after 28 days.
6. Maximum Fastener Vertical Spacing is based on allowable lateral shear values 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% of the total load, respectively. Adjustments shall be made where other load combinations control.
7. EnergyShield Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is allowable for use in accordance with this table when used with 1x wood furring strips (0.75" thick) are installed vertically over the EnergyShield Foam and parallel to the studs (furring is in between insulation and underside of fastener's head)

6.3.2 EnergyShield Ply Pro and EnergyShield Ply panels shall be fastened with SIP LD, SIP TP, or ¼" Tapcon.

Table 8. Allowable Wind Pressures for EnergyShield Ply Pro and EnergyShield Ply Attached to Concrete[2,5]

Main Substrate	Fastener	Stud Spacing (in o.c.)	Vertical Fastener Spacing (in o.c.)	Allowable Wind Pressure (psf)	Maximum Basic Wind Speed (mph)			Allowable Wind Speed (mph)		
					B	C	D	B	C	D
f_c' = 2500-psi	SIP LD	16	24	26.3	136	114	104	105	88	81
		16	20	31.5	149	125	114	115	97	89
		16	16	39.4	166	140	128	129	108	99
		16	12	52.5	192	161	148	149	125	114
		16	8	78.8	200	197	181	155	153	140
		24	24	17.5	111	93	85	86	72	66
		24	20	21.0	122	102	93	94	79	72
		24	16	26.3	136	114	104	105	88	81
		24	12	35.0	157	132	121	122	102	93
		24	8	52.5	192	161	148	149	125	114

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Table 8. Allowable Wind Pressures for EnergyShield Ply Pro and EnergyShield Ply Attached to Concrete[2,5]

Main Substrate	Fastener	Stud Spacing (in o.c.)	Vertical Fastener Spacing (in o.c.)	Allowable Wind Pressure (psf)	Maximum Basic Wind Speed (mph)			Allowable Wind Speed (mph)		
					B	C	D	B	C	D
f_c' = 2500-psi	SIP TP	16	24	37.5	162	136	125	126	105	97
		16	20	45.0	178	149	137	138	116	106
		16	16	56.3	199	167	153	154	129	118
		16	12	75.0	200	193	176	155	149	137
		16	8	112.5	200	200	200	155	155	155
		24	24	25.0	133	111	102	103	86	79
		24	20	30.0	145	122	112	113	94	86
		24	16	37.5	162	136	125	126	105	97
		24	12	50.0	188	157	144	145	122	112
		24	8	75.0	200	193	176	155	149	137
	1/4" Tapcon	16	24	46.9	182	152	140	141	118	108
		16	20	56.3	199	167	153	154	129	118
		16	16	70.3	200	186	171	155	144	132
		16	12	93.8	200	200	197	155	155	153
		16	8	140.6	200	200	200	155	155	155
		24	24	31.3	148	124	114	115	96	88
		24	20	37.5	162	136	125	126	105	97
		24	16	46.9	182	152	140	141	118	108
		24	12	62.5	200	176	161	155	136	125
		24	8	93.8	200	200	197	155	155	153

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m^2

1. Minimum fastener embedment into substrate is 1.5" for the SIP TP and SIP LD. Minimum fastener embedment into the substrate for Tapcon is 2" for use with EnergyShield Ply Pro and EnergyShield Ply panels 4.6" thick or less, and 1.4" for use with EnergyShield Ply Pro panels 4.6" thick or thicker. Required fastener length shall be chosen to fully penetrate the EnergyShield Panel to achieve minimum fastener embedment into substrate. Fastener embedment is the threaded length embedded in the substrate, including the tip.
2. Fasteners shall be installed with a minimum end distance of 6" and a minimum edge distance of 2.5".
3. Three-second-gust wind speed, based on a building height of 66-feet, Zone 5, Importance Factor, I_w=1.0 and Topographic Factor, K_{zt}=1.0, Internal Pressure Coefficient, GC_{pi}=+/-0.18 in accordance with ASCE 7, Section 30.4.2 and IRC Section R301.2.1. Pressure Equalization Factor, PEF=1.0.
4. Interpolation between table values is permitted.
5. Where furring channels or hat channels are used over foam, their adequacy to span between fasteners shall be checked separately. The design of furring channels and hat channels is not taken into account in this table.

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6.4 *EnergyShield Panel Attachment to CMU Substrates*

6.4.1 EnergyShield Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is permitted for use in accordance with **Table 9** when used with 1x wood furring strips (0.75" thick), and are installed vertically over the EnergyShield Foam and parallel to the studs (furring is in between insulation and underside of fastener head).

6.4.2 *EnergyShield Panel Attachment to Masonry Substrates to Support Cladding Weight:*

6.4.2.1 Fasteners are required to attach EnergyShield Ply Pro and EnergyShield Ply panels to masonry substrates to support the attached cladding weight. See **Table 9** for maximum vertical fastener spacing to support specified cladding weights.

6.4.2.2 **Table 10** lists maximum wind pressure and the corresponding maximum wind speed for each Exposure Category.

6.4.2.3 The fastener spacing to be used shall be governed by the stricter of:

6.4.2.3.1 Cladding weight per **Table 9**; or

6.4.2.3.2 Wind pressure/wind speed per **Table 10**.

Table 9. Maximum Fastener Spacing for EnergyShield Ply Pro and EnergyShield Ply Panels Attached to Masonry Substrates[7]

Substrate Material[5]	Maximum Horizontal Fastener Spacing (in)	Fastener[1,2,4]	Maximum Nominal Thickness of the Polyiso Portion of EnergyShield Ply Pro panels (in)	Maximum Fastener Vertical Spacing[6] (in)					
				Specified Cladding Weight[3] (psf)					
				5	10	15	20	25	30
CMU	16"	SIP LD	≤ 4	24	24	24	24	24	24
		SIP TP	≤ 4	24	24	24	24	24	24
		1/4" Tapcon	≤ 4	24	24	24	24	24	24
	24"	SIP LD	≤ 4	24	24	24	24	24	24
		SIP TP	≤ 4	24	24	24	24	24	24
		1/4" Tapcon	≤ 4	24	24	24	24	24	24

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

1. Minimum fastener embedment into substrate is 1 3/8" for the SIP LD and SIP TP. Minimum fastener embedment into the substrate for Tapcon is 1 3/8" for use with EnergyShield Ply Pro and EnergyShield Ply panels. Required fastener length shall be chosen to fully penetrate the EnergyShield Panel to achieve minimum fastener embedment into substrate. Fastener embedment is the threaded length embedded in the substrate, including the tip.
2. Fasteners shall be installed into the face of CMU block with a minimum end distance shall be 6" and a minimum edge distance shall be 2.5".
3. The weight of EnergyShield Ply Pro and EnergyShield Ply panels are included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials.
4. Proprietary fastener properties are per published data or testing.
5. Masonry shall be normal-weight CMU conforming to ASTM C90.
6. Maximum Fastener Vertical Spacing is based on allowable lateral shear values 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% of the total load, respectively. Adjustments shall be made where other load combinations control.
7. EnergyShield Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is allowable for use in accordance with this table when used with 1x wood furring strips (0.75" thick) are installed vertically over the EnergyShield Foam and parallel to the studs (furring is in between insulation and underside of fastener head).

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6.4.3 *EnergyShield Panel Attachment to Masonry Substrates to Resist Out-of-Plane Wind Loading:*

6.4.3.1 EnergyShield Ply Pro and EnergyShield Ply panels shall be fastened with SIP LD, SIP TP, or 1/4" Tapcon.

Table 10. Allowable Wind Pressures for EnergyShield Ply Pro and EnergyShield Ply Attached to Masonry Substrates[1,2,3,4,5,6]

Main Substrate	Fastener	Stud Spacing (in o.c.)	Vertical Fastener Spacing (in o.c.)	Allowable Wind Pressure (psf)	Maximum Basic Wind Speed (mph)			Allowable Wind Speed (mph)		
					B	C	D	B	C	D
ASTM C90 Standard Normal Weight	SIP LD	16	24	30.0	145	122	112	113	94	86
		16	20	36.0	159	133	122	123	103	95
		16	16	45.0	178	149	137	138	116	106
		16	12	60.0	200	172	158	155	133	122
		16	8	90.0	200	200	193	155	155	150
		24	24	20.0	119	99	91	92	77	71
		24	20	24.0	130	109	100	101	84	77
		24	16	30.0	145	122	112	113	94	86
		24	12	40.0	168	141	129	130	109	100
		24	8	60.0	200	172	158	155	133	122
	SIP TP	16	24	65.6	200	180	165	155	140	128
		16	20	78.8	200	197	181	155	153	140
		16	16	98.4	200	200	200	155	155	155
		16	12	131.3	200	200	200	155	155	155
		16	8	196.9	200	200	200	155	155	155
		24	24	43.8	175	147	135	136	114	104
		24	20	52.5	192	161	148	149	125	114
		24	16	65.6	200	180	165	155	140	128
		24	12	87.5	200	200	191	155	155	148
		24	8	131.3	200	200	200	155	155	155

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Table 10. Allowable Wind Pressures for EnergyShield Ply Pro and EnergyShield Ply Attached to Masonry Substrates[1,2,3,4,5,6]

Main Substrate	Fastener	Stud Spacing (in o.c.)	Vertical Fastener Spacing (in o.c.)	Allowable Wind Pressure (psf)	Maximum Basic Wind Speed (mph)			Allowable Wind Speed (mph)		
					B	C	D	B	C	D
ASTM C90 Standard Normal Weight continued	1/4" Tapcon	16	24	70.9	200	187	172	155	145	133
		16	20	85.1	200	200	188	155	155	146
		16	16	106.3	200	200	200	155	155	155
		16	12	141.8	200	200	200	155	155	155
		16	8	212.7	200	200	200	155	155	155
		24	24	47.3	182	153	140	141	118	109
		24	20	56.7	200	167	153	155	130	119
		24	16	70.9	200	187	172	155	145	133
		24	12	94.5	200	200	198	155	155	153
		24	8	141.8	200	200	200	155	155	155

SI: 1 in = 25.4 mm, 1-psf = 0.0479 kN/m^2

1. Masonry must have a minimum specified compressive strength of 2,500-psi. Screw shall have sufficient length and be installed so that it penetrates the masonry a minimum of 1".
2. Proprietary fastener properties are per published data or testing.
3. A building height of 30-feet, GC_p= -1.4 for Zone 5 and an Effective Wind Area of 10ft^2, Topographic Factor: K_{zt}=1.0, Ground Elevation Factor: K_e=1.0, Internal Pressure Coefficient, GC_{pi}=+/-0.18 for an enclosed building, K_d = 0.85 for Component and Cladding and IRC Section R301.2.1.
4. Interpolation between table values is permitted.
5. V_{ult} is limited to 200 mph.
6. Allowable stress design wind speed shall be determined in accordance with IBC Section 1609.3.1: $V_{asd} = V_{ult}\sqrt{0.6}$.

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

7 Certified Performance[26]

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.[27]

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.[28]

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8 Regulatory Evaluation and Accepted Engineering Practice

8.1 EnergyShield Ply Pro and EnergyShield Ply comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 Connection of EnergyShield Ply Pro and EnergyShield Ply Panels was evaluated for use in supporting attached cladding weight.

8.1.1.1 The scope of this report includes connection to light-frame wood construction framing, light-frame Cold Formed Steel (CFS) framing, concrete substrates and Concrete Masonry Units (CMU) to support cladding weight.

8.1.2 Connection of EnergyShield Ply Pro and EnergyShield Ply panels were evaluated to determine the allowable out-of-plane wind pressure and maximum wind speeds.

8.1.2.1 Allowable out-of-plane wind pressures are provided for wood construction framing, CFS framing and CMU.

8.2 Allowable out-of-plane wind pressures for the base concrete substrates (e.g., wall system, etc.) is outside the scope of this report.

8.3 Attachment of the cladding to the EnergyShield Ply Pro and EnergyShield Ply panels is outside the scope of this report.

8.4 Any building code, regulation and/or accepted engineering evaluations (e.g., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified[29] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[30] respectively.

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

9 Installation

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

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

9.3 *Installation Procedure*

9.3.1 All EnergyShield Ply Pro and EnergyShield Ply Panel edges shall be supported by framing or blocking.

9.3.2 Fasteners shall be installed with a minimum edge distance of $^{3}/_{8}$" on all sides of the EnergyShield Panel.

9.3.3 Fasteners shall be installed with the appropriate rotating drill oriented normal to the surface of the EnergyShield Panel.

9.3.4 Fastener head shall be installed in contact with the face of the EnergyShield Panel.

9.3.5 Fasteners shall be installed with the maximum on-center spacing indicated in **Table 1** through **Table 9**, as applicable.

9.3.6 Fasteners installed in masonry shall be in the face of normal-weight CMU block conforming to ASTM C90.

9.3.7 Fasteners installed in concrete and CMU shall have predrilled holes in accordance with the manufacturer installation instructions.

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9.3.8 When polyiso foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is noted allowable for use in accordance with **Table 1** through **Table 9**, 1x furring strips or inverted hat/furring channels shall be installed in accordance with the respective table and the sections listed below:

9.3.8.1 See **Section 6.1** for wood framing.

9.3.8.2 See **Section 6.2** for CFS framing.

9.3.8.3 See **Section 6.3** for concrete substrates.

9.3.8.4 See **Section 6.4** for CMU (masonry) substrates.

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 Lateral resistance testing in accordance with ASTM D1761

10.1.2 Fastener spacing, wind pressure, and wind speed calculations performed by DrJ Engineering, LLC

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

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

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

10.5 *Testing and Engineering Analysis*

10.5.1 The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.[31]

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

11 Findings

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

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

11.2.1 Use as a nail base for support of cladding material products.

11.3 Unless exempt by state statute, when EnergyShield Ply Pro and EnergyShield Ply 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.

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11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Atlas Roofing Corporation.

11.5 IBC Section 104.2.3[32] (IRC Section R104.2.2[33] and IFC Section 104.2.3[34] are similar) in pertinent part state:

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

11.6 **Approved:**[35] Building regulations require that the building official shall accept duly authenticated reports.[36]

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

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

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

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

11.8 Through the IAF Multilateral Arrangement (MLA), this duly authenticated report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 duly authenticated reports are equivalent.[37]

12 Conditions of Use

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

12.2 As listed herein, EnergyShield Ply Pro and EnergyShield Ply shall be used:

12.2.1 In dry lumber with a moisture content less than or equal to nineteen percent (19%).

12.2.2 Cladding attachment shall be in accordance with the cladding manufacturer installation instructions or an approved engineered design.

12.3 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:

12.3.1 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.

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

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

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

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

12.3.6 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.

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

12.5 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).

12.6 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 EnergyShield Ply Pro and EnergyShield Ply, as listed in **Section 1.1**, are identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.

13.2 Additional technical information can be found at www.atlasrwi.com/products/wall/commercial/energyshield-ply-pro and www.atlasrwi.com/products/wall/residential-light-commercial/energyshield-ply.

14 Review Schedule

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

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

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Notes

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

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

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

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

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

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

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

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

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

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

11 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.

12 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/

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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[29] 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.

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

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

[32] 2021 IBC Section 104.11

[33] 2021 IRC Section R104.11

[34] 2018: https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9 AND 2021: https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11

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

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

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

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