Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

Report No: 2404-03

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Subject to Renewal: October 1, 2027

Attachment of Defend-R CI Ply, Defend-R CI Ply (Class A), and Defend-R CI NB to Wood, Steel, Concrete, and Masonry

Trade Secret Report Holder:

Drexel Metals, Inc.

Phone: 888-321-9630 Website: www.drexmet.com

CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

Section: 06 12 00 - Structural Panels

Section: 06 12 19 - Shear Wall Panels

Section: 06 16 00 - Sheathing

1 Innovative Products Evaluated[1]

1.1 Defend-R Wall Products:

1.1.1 Defend-R Panels:

1.1.1.1 Defend-R CI Ply

1.1.1.2 Defend-R CI Ply (Class A)

1.1.1.3 Defend-R CI NB

1.1.2 Defend-R Foam:

1.1.2.1 Defend-R CI Foil

1.1.2.2 Defend-R CI Foil (Class A)

1.1.2.3 Defend-R CI Coated Glass

1.1.2.4 Defend-R CI Coated Glass (Class A)

2 Product Description and Materials

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

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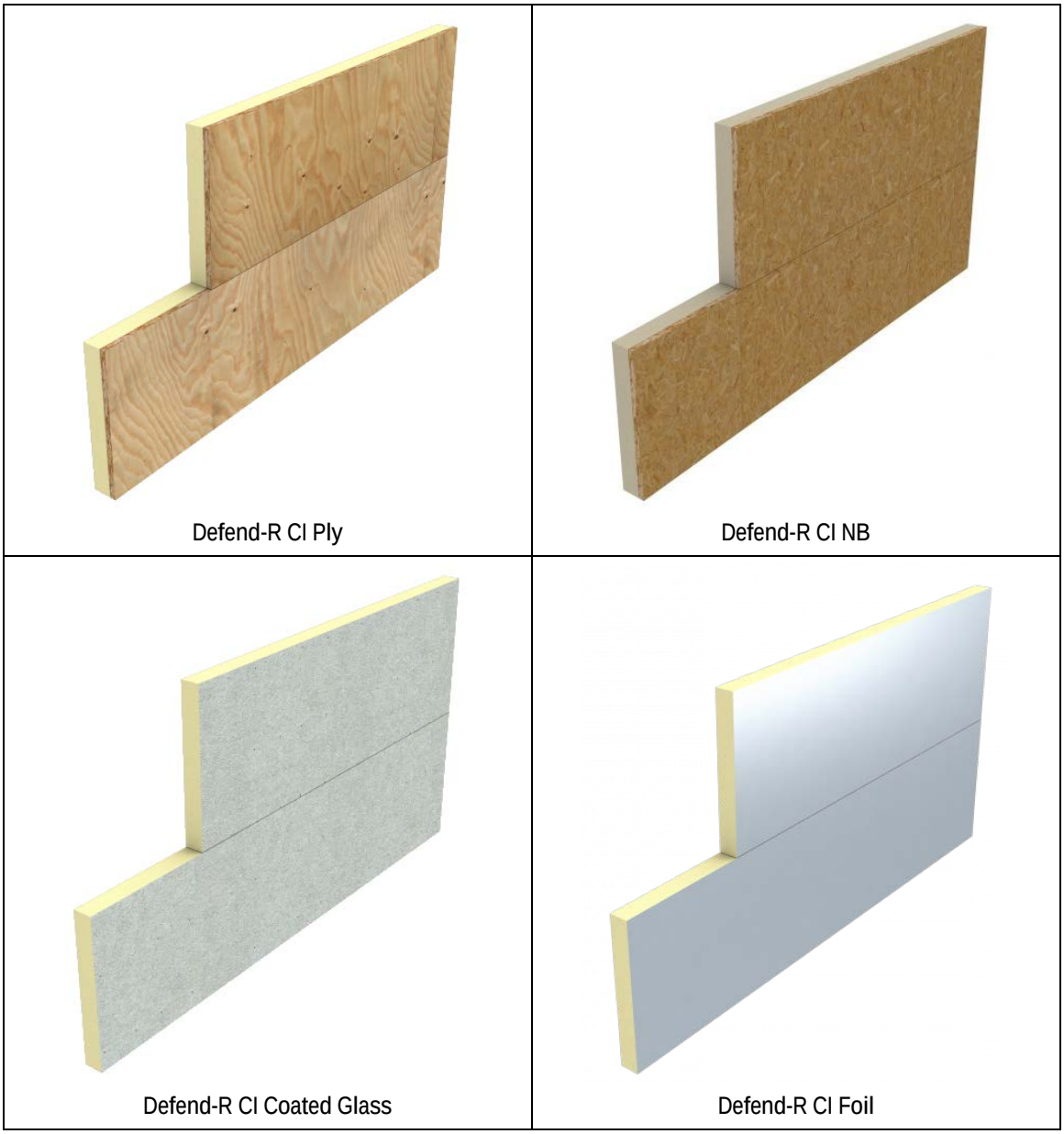


Figure 1. Defend-R Wall Products

2.2 Defend-R CI Ply and Defend-R CI Ply (Class A) panels are ASTM C1289, Type V, 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 on the other. Both are designed for use in Types I-IV commercial wall applications to provide continuous insulation within the building envelope.

2.3 Defend-R CI NB is an ASTM C1289 Type V, high thermal rigid insulation panel composed of a Type II, Class 2, closed cell polyisocyanurate foam core bonded to a premium performance coated glass facer on one side and $^{7}/_{16}$" or $^{5}/_{8}$" OSB or plywood on the other. It is designed for use in Type V commercial wall applications to provide continuous insulation within the building envelope.

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2.4 Defend-R CI Coated Glass, Defend-R CI Coated Glass (Class A), Defend-R CI Foil and Defend-R CI Foil (Class A) are proprietary Foam Plastic Insulating Sheathing (FPIS) products.

2.4.1 Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A) are polyisocyanurate insulation boards adhered to coated glass facers. Insulation boards are available as ASTM C1289 Type II, Class 2, Grade 2 or Grade 3 compliant.

2.4.2 Defend-R CI Foil and Defend-R CI Foil (Class A) are composite boards consisting of a 25-psi, closed-cell polyisocyanurate insulation foam core, coated on both sides with a glass-backed aluminum foil facer. Insulation boards are available as ASTM C1289 Type I, Class 1 and Class 2, Grade 2 or Grade 3 compliant.

2.5 *Material Availability*

2.5.1 *Thickness:*

2.5.1.1 *Defend-R CI Ply and Defend-R CI Ply (Class A):*

2.5.1.1.1 1.6" (41 mm) through 4.7" (119 mm)

2.5.1.2 *Defend-R CI Ply NB:*

2.5.1.2.1 1.5" (38 mm) through 4.6" (117 mm)

2.5.1.3 *Defend-R CI Coated Glass and Defend-R CI Coated Glass (Class A):*

2.5.1.3.1 1" (25 mm) through 4" (102 mm)

2.5.1.4 *Defend-R CI Foil and Defend-R CI Foil (Class A):*

2.5.1.4.1 1" (25 mm) through 4" (102 mm)

2.5.2 *Standard Product Width:*

2.5.2.1 48" (1,219 mm)

2.5.3 *Standard Length:*

2.5.3.1 96" (2,438 mm)

2.6 Throughout this report:

2.6.1 The term, *"Defend-R Panels"*, refers to Defend-R CI Ply, Defend-R CI Ply (Class A), and Defend-R NB.

2.6.2 The term, *"Defend-R Foam"*, refers to Defend-R CI Foil and Defend-R CI Foil (Class A), Defend-R CI Coated Glass, and Defend-R CI Coated Glass (Class A) products.

2.7 *Fasteners*

2.7.1 Defend-R Panels shall be fastened with one of the proprietary fasteners described in this report, and in accordance with the provisions of this report.

2.7.1.1 Proprietary fastener properties shall be per published manufacturer data.

2.7.1.2 Hunter SIP/WD fasteners (TRUFAST® SIPTP 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.

2.7.1.3 Hunter SIP/SD fasteners (TRUFAST® SIPLD 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.

2.7.1.4 Hunter SIP/HD (TRUFAST® SIPHD fasteners) 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.

2.7.1.5 1/4" Tapcon® Screw Anchors are 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.

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2.7.2 When referred to in this report, Hunter SIP/WD, SIP/SD, and SIP/HD fasteners are equivalent to TRUFAST SIPTP, SIPLD and SIPHD fasteners, respectively.

2.8 *Framing/Substrate Materials*

2.8.1 *Wood:*

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

2.8.2 *Steel:*

2.8.2.1 Cold-formed steel (CFS) framing members must comply with one of the material standards provided in AISI S100, Section A3.1.

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

2.8.3 *Concrete:*

2.8.3.1 Concrete shall be normal-weight structural concrete with a specified compressive strength of 2,500-psi minimum, and shall comply with IBC Section 1901.2.

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

2.8.4 *Masonry:*

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

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

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

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.

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

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 *ACI 318: Building Code Requirements for Structural Concrete*

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

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

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

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

4.3.6 *ASTM D1761: Standard Test Methods for Mechanical Fasteners in Wood*

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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 *Defend-R Panel Attachment to Wood Framing*

6.1.1 Defend-R Panels shall be fastened along each stud.

6.1.2 Defend-R Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) may be permitted for use in accordance with **Table 1** and **Table 2**, when 1x wood furring strips (0.75" thick) are installed vertically over the Defend-R Foam and parallel to the studs (furring is in between insulation and the underside of fastener head).

6.1.2.1 The wood furring species, grade, actual dimensions, orientation, continuity, span, and resistance between fasteners shall be established by the approved construction documents or designed by an RDP. The tables address the fastener connection only unless the table notes expressly state otherwise.

6.1.2.2 **Table 1** lists the largest vertical spacing for the specified fastener(s), while **Table 2** lists maximum wind pressure and the 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**, or

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" Defend-R CI 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).

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

6.1.3.1 Fasteners are required to attach Defend-R 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 2** for a typical installation detail of Defend-R Panels attached to wood studs.

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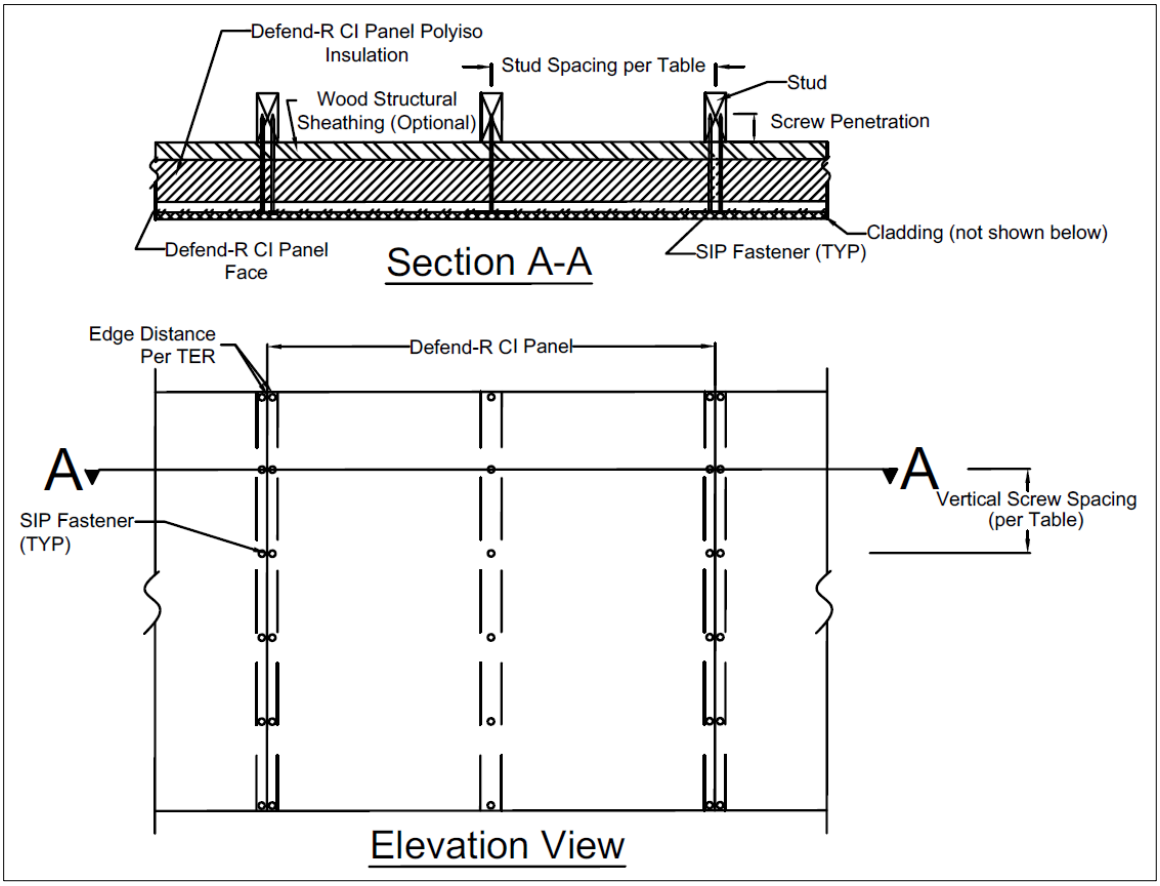


Figure 2. Typical Installation Detail

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Table 1. Maximum Fastener Spacing for Defend-R Panels Attached to Wood Framing[5]

Framing Member[4]	Stud Spacing (in) o.c.	Fastener[1,2]	Maximum Nominal Thickness of the Polyiso Portion of Defend-R Panels (in)	Maximum Fastener Vertical Spacing (in)					
				Specified Cladding Weight[3] (psf)					
				5	10	15	20	25	30
Wood Framing	16"	Hunter SIP/SD	≤ 2 1/2	24	24	24	24	24	24
			3	24	24	24	24	20	16
			3 1/2	24	24	24	16	12	12
			4	24	16	12	8	8	6
		Hunter SIP/WD	≤ 2	24	24	24	24	24	24
			2 1/2	24	24	24	24	24	20
			3	24	24	24	24	20	16
			3 1/2	24	24	24	16	12	12
			4	24	16	12	8	8	6
	24"	Hunter SIP/SD	1	24	24	24	24	24	24
			1 1/2	24	24	24	24	24	20
			2	24	24	24	24	20	16
			2 1/2	24	24	24	20	16	16
			3	24	24	20	16	12	12
			3 1/2	24	20	16	12	8	8
			4	20	12	8	6	4	4
		Hunter SIP/WD	< 1 1/2	24	24	24	24	20	16
			2	24	24	24	20	16	16
			2 1/2	24	24	24	20	16	12
			3	24	24	20	16	12	12
			3 1/2	24	20	16	12	8	8
			4	20	12	8	6	4	4

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

1. Minimum fastener penetration into stud for Hunter SIP/WD is 1 1/2". Minimum fastener penetration into the stud for Hunter SIP/SD is 2" for use with Defend-R Panels 4.2" thick or less, and 1.5" for use with Defend-R Panels 4.6" thick. 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 Defend-R Panels and achieves the minimum required fastener penetration into stud.
3. The weight of Defend-R Panels is included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials.
4. Wood studs shall be a minimum of 2 x 4 and have a minimum specific gravity of 0.42.
5. Defend-R Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) may be permitted for use in accordance with Table 1 when used with 1x wood furring strips (0.75" thick) that are installed vertically over the Defend-R Foam and parallel to the studs (furring is in between insulation and underside of the fastener head).

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

6.1.4.1 Defend-R Panels shall be fastened along each stud with Hunter SIP/WD or Hunter SIP/SD.

6.1.4.2 See **Figure 2** for a typical installation detail of Defend-R Panels attached to wood studs.

Table 2. Allowable Wind Pressures for Defend-R CI Ply and Defend-R CI Ply NB Attached to Wood Framing With SIP/WD and SIP/SD[1,2,3,6]

Stud Spacing (in) o.c.	Vertical Fastener Spacing (in) o.c.	Allowable Wind Pressure[4] (psf)	Maximum Wind Speed (mph) Based on Wind Exposure[4,5]		
			B	C	D
16"	24	54	165	145	135
	16	81	200	180	165
	12	108	200	200	195
	≤ 8	120	200	200	200
24"	24	36	135	115	110
	16	54	165	145	135
	12	72	195	170	155
	≤ 8	95	200	200	185

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

1. Minimum fastener penetration into stud is 1.5". 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 to such that the fastener fully penetrates the Defend-R 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 60-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, Chapter 30 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.

6.2 *Defend-R Panel Attachment to CFS Framing*

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

6.2.2 Defend-R Panels shall be fastened along each stud. Defend-R Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) may be permitted 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 Defend-R 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).

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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**, or

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

6.2.6 *Defend-R Panel Attachment to CFS Framing to Support Cladding Weight:*

6.2.6.1 Fasteners are required to attach Defend-R 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 Defend-R CI 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 Defend-R 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"	Hunter SIP/SD	1	24	24	24	24	24	24
			1 1/2	24	24	24	24	24	20
			2	24	24	24	24	20	16
			2 1/2 to 4	24	24	24	20	16	12
		Hunter SIP/HD	1	24	24	24	24	24	20
			1 1/2	24	24	24	24	20	16
			2	24	24	24	20	16	12
			2 1/2	24	24	20	16	12	8
			3	24	24	16	12	8	8
			3 1/2	24	20	12	8	8	6
			4	24	16	12	8	6	6
	24"	Hunter SIP/SD	1	24	24	24	24	20	16
			1 1/2	24	24	24	20	16	12
			2	24	24	20	16	12	12
			2 1/2 to 3	24	24	16	12	12	8
			3 1/2 to 4	24	24	16	12	8	8
		Hunter SIP/HD	1	24	24	24	20	16	12
			1 1/2	24	24	20	16	12	12
			2	24	24	16	12	8	8
			2 1/2 to 3	24	20	12	8	8	6
			3 1/2	20	12	8	6	6	4
			4	16	8	8	6	4	4

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

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 Defend-R Panel to achieve minimum fastener penetration into framing.
2. The weight of Defend-R Panels is 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. Defend-R Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) may be permitted for use in accordance to Table 3, Table 4, and Table 5, when light-gauge furring channels or hat channels are installed vertically over the Defend-R 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).

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Table 4. Maximum Fastener Spacing for Defend-R CI 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 Defend-R 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"	Hunter SIP/SD	≤ 4	24	24	24	24	24	24
		Hunter SIP/HD	≤ 2	24	24	24	24	24	24
			2 1/2	24	24	24	24	20	16
			3	24	24	24	16	16	12
			3 1/2	24	24	20	16	12	8
			4	24	24	16	12	8	8
	24"	Hunter SIP/SD	≤ 1 1/2	24	24	24	24	24	24
			2	24	24	24	24	24	20
			2 1/2	24	24	24	24	20	16
			3 to 4	24	24	24	20	16	16
		Hunter SIP/HD	1	24	24	24	24	24	24
			1 1/2	24	24	24	24	24	20
			2	24	24	24	24	20	16
			2 1/2	24	24	20	16	12	12
			3	24	20	16	12	8	8
			3 1/2	24	20	12	8	8	6
			4	24	16	12	8	6	6

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 Defend-R CI Ply panel to achieve minimum fastener penetration into framing.
2. The weight of Defend-R CI Ply panels is 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. Defend-R Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) may be permitted for use in accordance to Table 3, Table 4, and Table 5, when light-gauge furring channels or hat channels are installed vertically over the Defend-R Foam parallel to the studs (furring is in between insulation and underside of the 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).

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Table 5. Maximum Fastener Spacing for Defend-R Panels 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 Defend-R Panels (in)	Maximum Fastener Vertical Spacing (in)					
				Specified Cladding Weight[2] (psf)					
				5	10	15	20	25	30
12-gauge CFS Framing[6,7]	16"	Hunter SIP/SD	≤ 4	24	24	24	24	24	24
		Hunter SIP/HD	≤ 2 1/2	24	24	24	24	24	24
			3	24	24	24	24	20	16
			3 1/2	24	24	24	16	12	12
			4	24	20	12	8	8	8
	24"	Hunter SIP/SD	≤ 1 1/2	24	24	24	24	24	24
			2	24	24	24	24	24	20
			2 1/2	24	24	24	24	20	16
			3 to 4	24	24	24	24	16	16
		Hunter SIP/HD	1	24	24	24	24	24	24
			1 1/2	24	24	24	24	24	20
			2	24	24	24	24	20	16
			2 1/2	24	24	20	16	12	12
			3	24	20	16	12	8	8
			3 1/2	24	20	12	8	8	6
			4	24	16	12	8	6	6

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 Defend-R Panel to achieve minimum fastener penetration into framing.
2. The weight of Defend-R Panels is 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. Defend-R Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) may be permitted for use in accordance to Table 3, Table 4, and Table 5, when light-gauge furring channels or hat channels are installed vertically over the Defend-R 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).

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

6.2.7.1 Defend-R Panels shall be fastened along each stud with Hunter SIP/SD.

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Table 6. Allowable Wind Pressures for Defend-R CI Ply and Defend-R CI Ply NB Attached to Steel Framing with SIP/SD[1,2,5]

Steel Design Thickness (in)	Stud Spacing (in) o.c.	Vertical Fastener Spacing (in) o.c.	Allowable Wind Pressure[3] (psf)	Maximum Wind Speed (mph) Based on Wind Exposure[3,4]		
				B	C	D
0.0346" (20-gauge)	16"	24	43	155	135	125
		20	52	170	150	135
		16	65	190	165	155
		12	86	200	190	175
		≤ 8	120	200	200	200
	24"	24	29	130	110	100
		20	35	140	120	110
		16	43	155	135	125
		12	58	180	155	145
		≤ 8	86	200	190	175
0.0451" (18-gauge)	16"	24	68	195	170	155
		20	81	200	185	170
		16	101	200	200	190
		≤ 12	120	200	200	200
	24"	24	45	160	140	130
		20	54	175	150	140
		16	68	195	170	155
		12	90	200	195	180
		≤ 8	95	200	200	185
0.0552" (16-gauge)	16"	24	102	200	200	190
		≤ 20	120	200	200	200
	24"	24	68	195	170	155
		20	81	200	185	170
		≤ 16	95	200	200	185
0.0979" (12-gauge)	16"	≤ 24	120	200	200	200
	24"	24	81	200	185	170
		≤ 20	95	200	200	185

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

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 Defend-R Panel to achieve minimum fastener penetration into framing.
2. CFS framing shall be a minimum of 33 mils thick and have a minimum tensile strength of 45-ksi.
3. Three-second-gust wind speed; based on a building height of 60-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 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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6.3 *Defend-R Panel Attachment to Concrete Substrates*

6.3.1 *Defend-R Panel Attachment to Concrete Substrates to Support Cladding Weight:*

6.3.1.1 Fasteners are required to attach Defend-R 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 Defend-R 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 Defend-R 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 Defend-R 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 Defend-R 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"	Hunter SIP/SD	≤ 1 1/2	24	24	24	24	24	24
			2	24	24	24	24	24	20
			2 1/2	24	24	24	24	20	16
			3 to 4	24	24	24	20	16	12
		Hunter SIP/WD	≤ 3	24	24	24	24	24	24
			3 1/2	24	24	24	24	24	20
			4	24	24	24	24	20	16
Concrete (f_c' ≥ 2,500-psi)	16"	1/4" Tapcon	≤ 2	24	24	24	24	24	24
			2 1/2	24	24	24	24	24	20
			3 to 4	24	24	24	24	20	16
Concrete (f_c' ≥ 2,500-psi)	24"	Hunter SIP/SD	1	24	24	24	24	24	20
			1 1/2	24	24	24	24	20	16
			2	24	24	24	20	16	12
			2 1/2 to 3	24	24	20	16	12	8
			3 1/2 to 4	24	24	16	12	8	8
		Hunter SIP/WD	≤ 1 1/2	24	24	24	24	24	24
			2 to 2 1/2	24	24	24	24	24	20
			3	24	24	24	24	20	16
			3 1/2	24	24	24	20	16	12
			4	24	24	20	16	12	8
		1/4" Tapcon	≤1 1/2	24	24	24	24	24	24
			2	24	24	24	24	20	16
			2 1/2	24	24	24	20	16	12
			3 to 4	24	24	20	16	12	12

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Table 7. Maximum Fastener Spacing for Defend-R 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 Defend-R 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 Hunter SIP/SD and SIP/WD. Minimum fastener embedment into the substrate for Tapcon is 2" for use with Defend-R Panels 4.2" thick or less, and 1.4" for use with Defend-R Panels 4.6" thick or thicker. Required fastener length shall be chosen to fully penetrate the Defend-R 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 Defend-R Panels is 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. Defend-R Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) may be permitted for use in accordance with this table when used with 1x wood furring strips (0.75" thick) that are installed vertically over the Defend-R Foam and parallel to the studs (furring is in between insulation and underside of the fastener head)

6.4 *Defend-R Panel Attachment to CMU Substrates*

6.4.1 Defend-R Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) is permitted for use in accordance with **Table 8** when used with 1x wood furring strips (0.75" thick), and are installed vertically over the Defend-R Foam and parallel to the studs (furring is in between insulation and underside of fastener head)

6.4.2 *Defend-R Panel Attachment to Masonry Substrates to Support Cladding Weight:*

6.4.2.1 Fasteners are required to attach Defend-R Panels to masonry substrates to support the attached cladding weight. See **Table 8** for maximum vertical fastener spacing to support specified cladding weights.

6.4.2.2 **Table 9** 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 8**, or

6.4.2.3.2 Wind pressure/wind speed per **Table 9**.

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Table 8. Maximum Fastener Spacing for Defend-R 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 Defend-R Panels (in)	Maximum Fastener Vertical Spacing[6] (in)					
				Specified Cladding Weight[3] (psf)					
				5	10	15	20	25	30
CMU	16"	Hunter SIP/SD	≤ 3 1/2	24	24	24	24	24	24
			4	24	24	24	24	20	16
		Hunter SIP/WD	≤ 4	24	24	24	24	24	24
		1/4" Tapcon	≤ 2	24	24	24	24	24	24
			2 1/2 to 4	24	24	24	24	20	16
	24"	Hunter SIP/SD	≤ 3	24	24	24	24	24	24
			3 1/2	24	24	24	24	24	20
			4	24	24	20	16	12	12
		Hunter SIP/WD	≤ 2 1/2	24	24	24	24	24	24
			3 to 4	24	24	24	24	24	20
		1/4" Tapcon	≤ 1 1/2	24	24	24	24	24	24
			2	24	24	24	24	20	16
			2 1/2 to 4	24	24	20	16	12	12

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

1. Masonry to have a minimum specified compressive strength of 2,500-psi. Screw shall have sufficient length and be installed so that it fully penetrates the shell thickness of the CMU with a minimum 3 threads extending passed the interior side of the shell. CMU shall have a minimum face shell thickness of 1 1/4".
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 1/2".
3. The weight of Defend-R Panels is 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. Defend-R Foam (without the FRT plywood or OSB facer adhered to the polyiso insulation) may be permitted for use in accordance with this table when used with 1x wood furring strips (0.75" thick) that are installed vertically over the Defend-R Foam and parallel to the studs (furring is in between insulation and underside of the fastener head).

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

6.4.3.1 Defend-R Panels shall be fastened with Hunter SIP/SD.

Table 9. Allowable Wind Pressures for Defend-R CI Ply and Defend-R CI Ply NB Attached to Masonry Substrates with SIP/SD[1,2]

Horizontal Fastener Spacing (in) o.c.	Vertical Fastener Spacing (in) o.c.	Allowable Wind Pressure[3] (psf)	Maximum Wind Speed (mph) Based on Wind Exposure[4,5]		
			B	C	D
16"	24	34	130	115	105
	16	50	160	140	130
	12	67	190	165	150
	8	101	200	200	185
	≤ 6	120	200	200	200
24"	24	23	105	90	85
	16	34	130	115	105
	12	45	150	130	125
	8	67	190	165	150
	≤ 6	90	200	190	175

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

1. Masonry to have a minimum specified compressive strength of 2,500-psi. Screw shall have sufficient length and be installed so that it fully penetrates the shell thickness of the CMU with a minimum 3 threads extending passed the interior side of the shell. CMU shall have a minimum face shell thickness of 1¼".
2. Proprietary fastener properties are per published data or testing.
3. Allowable pressure does not consider masonry strength in holding the fastener as a post-installed embedment in accordance with ACI 318, Appendix D.
4. Three-second gust wind speed; based on a building height of 60-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 and IRC Section R301.2.1. Pressure Equalization Factor, PEF=1.0.
5. Interpolation between table values is permitted.

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 Defend-R Wall Products comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 *Defend-R Panels:*

8.1.1.1 Connection of Defend-R Panels was evaluated for use in supporting attached cladding weight.

8.1.1.2 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.

8.1.1.3 Connection of Defend-R CI Ply and Defend-R CI Ply NB panels were evaluated to determine the allowable out-of-plane wind pressure and maximum wind speeds.

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

8.1.2 *Defend-R Foam:*

8.1.2.1 Defend-R Foam Products were evaluated for use beneath continuous furring.

8.1.2.2 The report evaluates only the furring-to-substrate connection through the foam.

8.1.2.3 Furred connection through Defend-R Foam Products were evaluated to determine the allowable out-of-plane wind pressure and maximum wind speeds.

8.2 Allowable out-of-plane wind pressures for concrete substrates is outside the scope of this report.

8.3 Attachment of the cladding to the Defend-R 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 Defend-R 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 Defend-R Panel.

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

9.3.4 Fastener head shall be installed in contact with the face of the Defend-R 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.

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9.3.7 Fasteners installed in concrete and CMU shall have pre-drilled holes in accordance with manufacturer installation instructions.

9.3.8 When Defend-R 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 masonry (CMU) 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 Defend-R Wall Products on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, Defend-R Wall Products 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, Defend-R Wall Products shall be approved for the following applications:

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

11.3 Unless exempt by state statute, when Defend-R Wall Products 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 Drexel Metals, Inc.

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, Defend-R Wall Products shall be used:

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

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 Defend-R Wall Products (Defend-R CI Ply, Defend-R CI Ply (Class A), Defend-R CI NB, Defend-R CI Foil, Defend-R CI Foil (Class A), Defend-R CI Coated Glass (Class A) and Defend-R CI Coated Glass), 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.drexmet.com/products/insulation/defend-r-ci-wall-insulation.

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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