



CERTIFICATION



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Technical Evaluation Report

TER 1811-02

Rmax ECOMAXci® FR Ply

Rmax

Product:

Rmax ECOMAXci® FR Ply

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DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION
SECTION: 07 20 00 - Thermal Protection
SECTION: 07 21 00 - Thermal Insulation
SECTION: 07 27 00 - Air Barriers

1 PRODUCT EVALUATED¹

1.1 Rmax ECOMAXci® FR Ply

2 APPLICABLE CODES AND STANDARDS^{2,3}

2.1 Codes

- 2.1.1 *IBC—12, 15, 18: International Building Code®*
- 2.1.2 *IRC—12, 15, 18: International Residential Code®*
- 2.1.3 *IECC—12, 15, 18: International Energy Conservation Code®*

2.2 Standards and Referenced Documents

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

¹ Building codes require data from valid [research reports](#) be obtained from [approved sources](#). Agencies who are accredited through ISO/IEC 17065 have met the [code requirements](#) for approval by the [building official](#). DrJ is an ISO/IEC 17065 [ANAB-Accredited Product Certification Body – Accreditation #1131](#).

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For more information on any of these topics or our mission, product evaluation policies, product approval process, and engineering law, visit drjcertification.org or call us at 608-310-6748.

² Unless otherwise noted, all references in this TER are from the 2018 version of the codes and the standards referenced therein (e.g., *ASCE 7, NDS, ASTM*). This material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein.

³ All terms defined in the applicable building codes are italicized.



- 2.2.2 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*
- 2.2.3 *ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*
- 2.2.4 *ASTM E1354: Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*
- 2.2.5 *ASTM E136: Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*
- 2.2.6 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*
- 2.2.7 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*
- 2.2.8 *AWC TR 12: General Dowel Equations for Calculating Lateral Connection Values*
- 2.2.9 *DOC PS 2: Performance Standard for Wood-based Structural-use Panels*
- 2.2.10 *NFPA 259: Standard Test Method for Potential Heat of Building Materials*
- 2.2.11 *NFPA 285: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components*
- 2.2.12 *UL 263: Standard for Fire Tests of Building Construction and Materials*

3 PERFORMANCE EVALUATION

- 3.1 Rmax ECOMAXci® FR Ply was evaluated to determine the following uses in Type I-IV construction:
 - 3.1.1 Connection to light-frame cold-formed steel framing to support cladding weight in accordance with [IBC Section 1609.1.1](#)
 - 3.1.2 Connection to light-frame fire-retardant treated wood construction framing to support cladding weight in accordance with [IBC Section 1604.2](#) and [IRC Section R301.1.3](#)
 - 3.1.3 Foam plastic insulation performance in accordance with [IBC Section 2603](#) and [IRC Section R316](#)
 - 3.1.4 Performance for use as an air barrier in accordance with [IECC Section C402.5.1](#)⁴
 - 3.1.5 Performance for use as a vapor retarder in accordance with [IBC Section 202](#) and [Section 1404.3](#)⁵ and [IRC Section R202](#) and [Section R702.7](#)
 - 3.1.6 Potential heat in accordance with [IBC Section 2603.5.3](#)
 - 3.1.7 Flame spread and smoke developed indices in accordance with [IBC Section 2603.5.4](#) and [IRC Section R316.3](#)
 - 3.1.8 Vertical and lateral fire propagation in accordance with [IBC Section 2603.5.5](#)
 - 3.1.9 Ignition characteristics in accordance with [IBC Section 2603.5.7](#)
 - 3.1.10 Special approval for use without a thermal barrier or ignition barrier in accordance with [IBC Section 2603.4](#) and [Section 2603.5.2](#) and [IRC Section R316.4](#)
 - 3.1.11 Performance for use in a fire resistance rated assembly in accordance with [IBC Section 2603.5.1](#)
- 3.2 ECOMAXci® FR Ply is not designed as a structural bracing material. Adequate building bracing shall be provided through other means and methods.
- 3.3 Design of cladding fastening to ECOMAXci® FR Ply is outside the scope of this TER.
- 3.4 ECOMAXci® FR Ply resistance to transverse wind loading is outside the scope of this TER.
- 3.5 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.

⁴ [2012 IECC Section C402.4.1](#)

⁵ [2015 IBC Section 1405.3](#)

- 3.6 Any engineering evaluation conducted for this TER was performed on the dates provided in this TER and within DrJ's professional scope of work.

4 PRODUCT DESCRIPTION AND MATERIALS

- 4.1 The product evaluated in this TER is shown in Figure 1.



FIGURE 1. ECOMAXci® FR PLY

- 4.2 ECOMAXci® FR Ply is a composite product whose core consists of Rmax rigid, closed-cell polyisocyanurate (Polyiso) foamed plastic insulation board bonded to glass fiber reinforced aluminum facers on each side. This insulation board is then bonded on one side to fire-retardant treated (FRT) plywood with liquid adhesive.
- 4.2.1 Rmax Polyiso foam insulation conforms to *ASTM C1289* in accordance with [IBC Section 2603](#).
- 4.2.2 The FRT plywood is manufactured in accordance with *DOC PS 2* and treated for compliance with [IBC Section 2303.2](#).
- 4.2.3 The Environmental Product Declarations (EPD) for the products listed in Section 1.1 is available at polyiso.org.
- 4.2.4 The rigid insulation portion of ECOMAXci® FR Ply is available with the following thicknesses: 0.75" (19 mm) through 4.5" (114 mm).
- 4.2.5 Application of the liquid adhesive shall be applied evenly across the board and shall not exceed 30% of the surface area of the board. The example in Figure 2 shows a pattern with 2" wide streams. Narrower streams and/or a reduced pattern is also acceptable.



FIGURE 2. ACCEPTABLE ADHESIVE APPLICATION PATTERN

- 4.2.6 The FRT plywood portion is available in $\frac{5}{8}$ " (16 mm) and $\frac{3}{4}$ " (19 mm) thicknesses.
- 4.2.7 Standard product width: 48" (1219 mm)
- 4.2.8 Standard product length: 96" (2438 mm)

5 APPLICATIONS

5.1 ECOMAXci® FR Ply is a composite insulation panel for use in the following applications:

- 5.1.1 Exterior walls of buildings of any height and of Type I-IV construction in accordance with IBC Section 2603.5
- 5.1.2 Continuous insulation on buildings constructed in accordance with the *IBC* for light-frame cold-formed steel construction, metal buildings, FRT wood framed buildings, or masonry buildings
- 5.1.3 Continuous insulation providing a nail base for cladding materials used in light-frame cold-formed steel construction, metal buildings, FRT wood framed buildings, or masonry buildings

5.2 Thermal Insulation

5.2.1 ECOMAXci® FR Ply is intended to be used as exterior continuous insulation under any type of permitted cladding.

5.3 Air Barrier

5.3.1 ECOMAXci® FR Ply meets the requirements of IECC Section C402 for use as a component of the air barrier, when installed in accordance with the manufacturer’s installation instructions and this TER, with all seams including the top and bottom edges of walls, taped, and all penetrations flashed and sealed in accordance with the flashing manufacturer’s installation instructions.

5.3.2 The air barrier properties of ECOMAXci® FR Ply are shown in Table 1.

TABLE 1. AIR BARRIER PROPERTIES

Test Method	Property
ASTM E2178	< 0.005 L/(s.m ²) ¹
1. Liter per second per square meter	

5.3.3 The air permeance of an air barrier material is defined by the *IECC* and the Air Barrier Association of America (ABAA) as being no greater than 0.02 L/(s.m²) at 75 Pa pressure difference when tested in accordance with ASTM E2178.

5.4 Fire Safety Performance

5.4.1 Surface Burn Characteristics

5.4.1.1 ECOMAXci® FR Ply has the flame spread and smoke developed ratings shown in Table 2 when tested in accordance with ASTM E84 per IBC Section 2603.5.4 and IRC Section R316.3.

TABLE 2. SURFACE BURN CHARACTERISTICS

Product	Flame Spread	Smoke Developed
ECOMAXci® FR Ply ¹	< 25	< 450
FRT Plywood	< 25	< 450
SI: 1 in = 25.4 mm 1. Foam plastic portion of ECOMAXci® FR Ply tested in accordance with <u>ASTM E84</u> . Flame spread and smoke developed numbers are shown for comparison purposes only and are not intended to represent the performance of ECOMAXci® FR Ply and related components under actual fire conditions.		

5.4.1 Thermal Barrier (*IBC and IRC Buildings*)

5.4.1.1 Except as provided in Section 5.4.1.2, ECOMAXci® FR Ply panels, up to 4.5" (114 mm) in foam thickness may be installed within the building envelope (including, but not limited to, attics, crawlspaces, and wall, roof, floor and ceiling assemblies) of all building types when separated from the interior with a thermal barrier consisting of a minimum ½" gypsum wallboard or an approved equivalent in accordance with IBC Section 2603.4 and IRC Section R316.4.

- 5.4.1.2 ECOMAXci® FR Ply is specifically approved for use without a thermal barrier or ignition barrier as prescribed by IBC Section 2603.4 through Section 2603.8 and IRC Section R316.4 through Section R316.5.13, based on large-scale testing conducted in accordance with UL 1715 per IBC Section 2603.9⁶ and IRC Section R316.6 as follows:
- 5.4.1.2.1 Panels may be installed in single or multiple layers.
 - 5.4.1.2.2 In a walls-only application, the panels are permitted to be used without a thermal barrier or ignition barrier in thicknesses not to exceed 4.5" (114 mm).
 - 5.4.1.2.3 In a ceiling-only application, the panels are permitted to be used without a thermal barrier or ignition barrier in thicknesses not to exceed 12" (305 mm).
 - 5.4.1.2.4 In an application where the panels are used on both the walls and ceilings, use of a thermal barrier or ignition barrier is required on either the wall or the ceiling. Panels may be installed in single or multiple layers in thicknesses up to 12" (305 mm) where covered by a thermal barrier or ignition barrier. The exposed wall or ceiling assembly must comply with Section 5.4.1.2.2 or Section 5.4.1.2.3, respectively.
 - 5.4.1.2.5 When the panels are covered, the covering shall comply with the interior finish requirements of IBC Chapter 8 and IRC Section R702.1, as applicable.

5.4.2 Potential Heat

- 5.4.2.1 ECOMAXci® FR Ply has been tested to assess its performance as shown in Table 3 with regard to potential heat in accordance with NFPA 259 and IBC Section 2603.5.3.

TABLE 3. POTENTIAL HEAT

Product	Potential Heat (Btu/lb)
ECOMAXci® FR Ply ¹	11,054
1. Foam plastic portion tested in accordance with <u>NFPA 259</u> .	

5.4.3 Ignition Properties

- 5.4.3.1 ECOMAXci® FR Ply was evaluated to assess performance with regard to ignition in accordance with IBC Section 2603.5.7.
- 5.4.3.1.1 The insulation boards comply with this section when the exterior side of the sheathing is protected with one of the following materials:
 - 5.4.3.1.1.1 A thermal barrier in accordance with IBC Section 2603.4.
 - 5.4.3.1.1.2 Masonry or concrete: minimum 1" (25.4 mm) thick.
 - 5.4.3.1.1.3 Glass-fiber-reinforced concrete panels: minimum 3/8" (9.5 mm) thick.
 - 5.4.3.1.1.4 Metal-faced panels having a minimum 0.019" (0.5 mm) thick aluminum or 0.016" (0.4 mm) thick corrosion-resistant steel outer facings.
 - 5.4.3.1.1.5 Stucco: minimum 7/8" (22.2 mm) thick complying with IBC Section 2510.

5.4.4 Vertical and Lateral Fire Propagation

- 5.4.4.1 ECOMAXci® FR Ply has been tested to assess its performance with regard to vertical and lateral fire propagation in accordance with NFPA 285 and IBC Section 2603.5.5.
- 5.4.4.2 Engineering analysis has also been conducted to assess substitution of other products within the approved wall assemblies.

⁶ 2012 IBC Section 2603.10

5.4.4.3 The wall assemblies listed in Table 4 are approved for use in Type I-IV, light-frame cold-formed steel construction metal buildings, FRT wood frame construction, or masonry construction with a maximum foam thickness of 4.5" (114 mm).

TABLE 4. VERTICAL & LATERAL FIRE PROPAGATION¹

Wall Component	Materials
<p>Base Wall System Use either 1, 2, 3, or 4</p> <p>Note: May use 4 optionally when FRTW framing is allowed by code.</p>	<ol style="list-style-type: none"> 1. Cast Concrete Walls 2. CMU Concrete Walls 3. Minimum 20 ga 3⁵/₈" (92 mm) steel studs spaced 24" (610 mm) o.c. (max.) <ol style="list-style-type: none"> a. Minimum 1/2" (12.7 mm) type X Special Fire Resistant Gypsum Wallboard Interior 4. Where allowed in Types I, II, III or IV construction, FRTW (Fire-retardant-treated wood) studs complying with <i>IBC</i> Section 2303.2, min. nominal 2x4 dimension, spaced 24" o.c. (610 mm) (max.) <ol style="list-style-type: none"> a. 5/8" (15.9 mm) type X Gypsum Wallboard Interior b. Bracing as required by code
<p>Fire-Stopping in Stud Cavity at Floor Lines As an option, use 2 with Fire Retardant Treated Wood (FRTW) framing.</p>	<ol style="list-style-type: none"> 1. 4 pcf mineral fiber insulation installed with z-clips 2. FRTW fire blocking at floor line in accordance with applicable code requirements
<p>Cavity Insulation Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, or 15</p> <p>Note: Items 5-15 are SPF Foam Type</p> <p>EZ FLO may be used inside the box headers and jamb studs for <i>NFPA 285</i> assemblies requiring SPF in stud cavities.</p>	<ol style="list-style-type: none"> 1. None 2. Any noncombustible insulation per <i>ASTM E136</i> 3. Any Mineral Fiber (Board type Class A <i>ASTM E84</i> faced or unfaced) 4. Any Fiberglass (Batt Type Class A <i>ASTM E84</i> faced or unfaced) 5. Maximum 5 1/2" (140 mm) Icynene® LD-C-50 spray foam in 6" deep studs (max.). Use with 5/8" (15.9 mm) exterior sheathing. 6. Maximum 5 1/2" (140 mm) Icynene® MD-C-200 2 pcf spray foam in 6" deep studs (max.) full fill without an air gap. Use with 5/8" exterior sheathing. 7. Maximum 5 1/2" (140 mm) Icynene® MD-R-210 2 pcf spray foam in maximum 6" (152 mm) deep studs full fill without an air gap. Use with 5/8" (15.9 mm) exterior sheathing. 8. SWD Urethane QS 112 2 pcf spray foam in maximum 6" (152 mm) deep studs partial fill with a maximum 2 1/2" (64 mm) air gap or full fill. Use with 5/8" (15.9 mm) exterior sheathing. 9. Gaco™ 183M, Maximum 3 1/2" (89 mm). Use with 5/8" (15.9 mm) exterior sheathing. 10. Gaco™ GacoOnePass™ F1850, maximum 3 1/2" (89 mm). Use with 5/8" (15.9 mm) exterior sheathing. 11. Demilec Sealection®, 500 maximum 3 5/8" (89 mm) max). Use with 5/8" (15.9 mm) exterior sheathing. 12. Demilec HeatLok Soy 200 Plus®, maximum 3.4" (86 mm). Use with 5/8" (15.9 mm) exterior sheathing. 13. Bayer Bayseal® maximum 3" (76 mm). Use with 5/8" (15.9 mm) exterior sheathing. 14. Lapolla FoamLok™ FL 2000, maximum 3" (76 mm). Use with 5/8" (15.9 mm) exterior sheathing. 15. BASF SprayTite® 81206 or WallTite® (US & US-N), maximum 3 5/8" (92 mm). Use with 5/8" (15.9 mm) exterior sheathing.
<p>Exterior Sheathing- Use either 1, 2, or 3</p> <p>Note – Exterior FRTW sheathing or gypsum board is optional for Base Walls 1 and 2. When SPF is used, 5/8" exterior gypsum sheathing must be used.</p>	<ol style="list-style-type: none"> 1. 1/2" (12.7 mm) or thicker exterior gypsum sheathing 2. Minimum 1/2" (12.7 mm) FRTW structural panels complying with <i>IBC Section 2303.2</i> and installed in accordance with code allowances for Types I, II, III, or IV construction 3. None (only when exterior insulation FRT plywood is on interior side attached direct to studs)

Wall Component	Materials
<p>Water-Resistive Barrier (WRB) Installed over Exterior Sheathing</p> <p>Use either option 1 or 2 installed per the manufacturer's installation instructions.</p> <p>Note 1: Sopraseal Xpress G may replace exterior sheathing, Item 1 above but WRB over Sopraseal Xpress G may not be used since it already incorporates a pre-installed WRB.</p> <p>NLA = No longer available. Replaced with Spraywrap MVP</p>	<ol style="list-style-type: none"> 1. None 2. Any WRB tested in accordance with <i>ASTM E1354</i> (at a minimum of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than the tested WRB. The following WRB products are allowed (Soprema Stick VP, Soprasolin HD or LM 204 VP based on <i>NFPA 285</i>): <ol style="list-style-type: none"> c. Carlisle (CCW) Fire Resist 705FR-A, Barritech NP™, or Barritech VP d. Dorken Systems Inc. Delta Stratus SA e. Dorken Systems Inc. Delta®-Maxx/Plus f. Dorken Systems Inc. Delta®-Fassade S g. Dorken Systems Inc. Delta®-Foxx Plus h. Dorken Systems Inc. Delta®-Vent S/Plus i. Dorken Systems Inc. Delta-Vent SA j. Dow Dowsil™ DefendAir 200 (or LT version) or DefenderAir 200C (Charcoal) k. Dryvit Backstop® NT™ l. DuPont™ Tyvek® (Various per ESR 2375) m. DuPont™ WeatherMate™ Housewrap or WeatherMate™ Plus Housewrap n. GCP PERM-A-BARRIER® Aluminum Wall Membrane o. GCP PERM-A-BARRIER® NPL 10 p. GCP PERM-A-BARRIER® VPL q. GCP PERM-A-BARRIER® VPL 50 Membrane r. GCP PERM-A-BARRIER® VPL Low Temperature s. GCP PERM-A-BARRIER® VPS t. Henry® Air-Bloc® (17, 21 FR, 31 MR, 32 MR, and 33 MR) u. Henry® Blueskin® SA, EnviroCap, FoilSkin, Blueskin® Metal Clad®, or Blueskin® VP160 v. Henry® Super Jumbo Tex 60 Minute® (Fortifiber) w. Henry® WeatherSmart® Drainable Housewrap (Fortifiber) x. Kingspan (Pactiv) GreenGuard® MAX™ Building Wrap y. MasterSeal® AWB 660 (Formerly BASF Enershield® HP) z. MasterSeal® AWB 660 I (Formerly BASF Enershield® I) aa. NatruaSeal Airseal NS-A-250HP™ or NS-A-250LP™ bb. Parex WeatherSeal Spray & Roll-On cc. Pecora XL-PermULTRA VP (10 mil DFT), or XL-PermULTRANP, or ProPerm VP dd. Prosoco R-Guard® (Cat 5™, MVP [NLA], Spray Wrap [NLA], or VB) ee. Prosoco R-Guard® Spray Wrap MVP ff. Siga Majvest® 500 SA gg. Sika Sikagard®-530 or Sikagard®-535 hh. Soprema Sopraseal® 1100T or Sopraseal Xpress G ii. Soprema Sopraseal® Stick VP, Soprasolin® HD or Sopraseal® LM 204 VP jj. Vaproshield Revealshield SA® kk. Vaproshield Wrapshield SA® ll. W.R. Meadows® Air-Shield™ (LMP Black, LMP Gray, LSR, SMP, or TMP)
<p>Exterior Insulation</p> <p>Installation may use FRT plywood on exterior side (installed over exterior sheathing) or interior side (applied direct to studs). This option (plywood on interior) negates use of exterior sheathing since the FRT ply acts as the sheathing.</p>	<ol style="list-style-type: none"> 1. ECOMAXci FR Ply – 4½" (max.) foam thickness, 5/8" (min.) FRT plywood thickness. <p>Note: FRT plywood may be applied in the field or factory applied. Adhesive must not be full coverage.</p>

Wall Component	Materials
<p>Water-Resistive Barrier (WRB) Installed over Exterior Insulation or FRTW</p> <p>Use any in item 1) or 2) depending on cladding used</p> <p>Note: Exterior WRB Items 1) b-d are not traditional WRB products, but are insulation panel joint tapes. The insulation panel joints shall be staggered.</p> <p>NLA = No longer available. Replaced with Spraywrap MVP</p>	<ol style="list-style-type: none"> 1. For use with all cladding options <ol style="list-style-type: none"> a. None b. 6" (max.) Venture Tape CW over insulation joints c. 6" (max.) Rmax R-SEAL 3000, R-SEAL 6000 or R-SEAL 2000 LF over insulation joints d. 6" (max.) asphalt or butyl based tape or liquid flashing over insulation joints e. Kingspan (Pactiv) GreenGuard® MAX™ Building Wrap f. DuPont™ Tyvek® (Various per ESR 2375) g. DuPont™ WeatherMate™ Housewrap or WeatherMate™ Plus Housewrap h. Henry® FoilSkin or Blueskin® Metal Clad® i. Prosoco R-Guard® Spray Wrap MVP j. Soprema Soprasolin® HD k. Carlisle (CCW) Fire Resist 705FR-A l. GCP PERM-A-BARRIER® Aluminum Wall Membrane 2. For use with cladding options 1 - 6 (Brick Equivalent) with non-open joint installation technique. <ol style="list-style-type: none"> a. Henry® Air-Bloc® 31MR b. Henry® Envirocap c. Henry® Air-Bloc® 33MR d. Henry® Air-Bloc® 21 FR e. Henry® Air-Bloc® 17 f. Henry® Blueskin® VP 160 g. Soprema Sopraseal® Stick VP h. Carlisle (CCW) Fire Resist Barritech NP™ i. Carlisle (CCW) Fire Resist Barritech VP j. Prosoco R-Guard® Spray Wrap (NLA) k. Prosoco R-Guard® MVP (NLA) l. Prosoco R-Guard® VB m. Prosoco R-Guard® Cat 5™ n. Vaproshield Revealshield SA® o. Vaproshield Wrapshield SA® p. Pecora XL-PermULTRA VP (10 mil DFT), XL-PermULTRA NP, or ProPerm VP q. GCP PERM-A-BARRIER® VPL r. GCP PERM-A-BARRIER® VPL Low Temperature s. GCP PERM-A-BARRIER® VPS t. Dryvit Backstop® NT™ u. W.R. Meadows® Air-Shield™ LMP (Gray) v. W.R. Meadows® Air-Shield™ LMP (Black) w. W.R. Meadows® Air-Shield™ TMP x. W.R. Meadows® Air-Shield™ LSR y. W.R. Meadows® Air-Shield™ SMP z. Siga Majvest® 500 SA aa. Sika Sikagard®-535 bb. Dow Dowsil™ DefendAir 200 (or LT version) or DefenderAir 200C (Charcoal) cc. Dorken Systems Inc. Delta®-Vent S/Plus dd. Dorken Systems Inc. Delta®-Fassade S ee. Dorken Systems Inc. Delta®-Foxy/Plus ff. Dorken Systems Inc. Delta®-Maxx/Plus gg. Fortifiber Weathersmart Drainable hh. Fortifiber Super Jumbo Tex 60 minute (only with Cladding #2 min. ¾" stucco) <p>2. Parex WeatherSeal Spray & Roll-On</p>
<p>Exterior Cladding</p> <p>Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, or 14</p>	<ol style="list-style-type: none"> 1. Brick – Nominal 4" (102 mm) clay brick or veneer with maximum 2½" (64 mm) ± ¼" (6.4 mm) air gap behind the brick. Brick Ties/Anchors 24" o.c. (610 mm) (max.)

Wall Component	Materials
	<ol style="list-style-type: none"> 2. Stucco – minimum ¾" (19.1 mm) thick exterior cement plaster and lath with an optional secondary water resistive barrier between the exterior insulation and lath. The secondary barrier shall not be full coverage asphalt or self-adhered butyl membrane. 3. Limestone – minimum 2" (51 mm) thick using any standard installation technique 4. Natural Stone Veneer – minimum 2" (51 mm) thick using any standard installation technique 5. Cast Artificial Stone, Precast Concrete Panels or CMU– minimum 1½" (38 mm) thick, using any standard installation technique. Cast stone complying with ICC-ES AC 51. 6. Terra Cotta Cladding – minimum 1¼" (32 mm) thick using any standard installation technique 7. Any MCM or ACM (aluminum, steel, copper, zinc) (w/ 2½" (64 mm) max. air gap) that has successfully passed <i>NFPA 285</i> using any standard installation technique 8. Uninsulated sheet metal building panels including aluminum, zinc, steel or copper using any standard installation technique 9. Uninsulated Fiber-cement siding using any standard installation technique 10. Stone/Aluminum honeycomb composite building panels that have passed <i>NFPA 285</i> or equivalent Stone Panels Inc. Stone Lite Panel system has been analyzed using manufacturer's standard installation technique. 11. Autoclaved-aerated-concrete (AAC) panels that have successfully passed <i>NFPA 285</i> using any standard installation technique 12. Thin Set Brick - Glen Gery Thin Tech Elite has been analyzed using manufacturer's standard installation technique or Tabs II Panel System with ½ inch bricks using Tabs Wall Adhesive 13. Natural Stone Veneer – minimum 1¼" (32 mm) (adhered with mortar or concrete/cement based adhesive). 14. FunderMax M.Look using the manufacturer's standard installation technique. The air gap between the cladding and insulation or WRB must not exceed 1½" (38 mm).
<p>SI: 1 in = 25.4 mm</p> <ol style="list-style-type: none"> 1. All WRBs shall be installed at recommended application rates and per the manufacturer's installation instructions. 2. Window Headers for all constructions shall incorporate minimum 0.08" (2 mm) aluminum flashing to cover air gaps between the exterior insulation and exterior façade. 3. Flashing of sheathing joints, window, door, and other exterior wall penetrations may be done with asphalt, acrylic, butyl based flashing tape or liquid flashing – max. 12" (305 mm) width, R-SEAL 6000 35 mil thick woven polyethylene tape – max. 12" (305 mm) width or R-SEAL 2000 LF liquid flashing – max 12" (305 mm) width. 	

5.4.5 Fire Resistance Ratings:

5.4.5.1 ECOMAXci® FR Ply has been tested and meet the requirements of *UL 263* in accordance with *IBC Section 2603.5.1* for use in the following assembly designs when installed in accordance with the manufacturer's installation instructions and this TER:

- 5.4.5.1.1 45 minutes: U424, U425, V321, V499, W456
- 5.4.5.1.2 1 hour: U026, U326, U330, U354, U355, U364, U424, U425, U460, V302, V303, V454, V499, W307, W417, W456
- 5.4.5.1.3 1.5 hour: U424, U425, V499, W456
- 5.4.5.1.4 2 hour: U349, U424, U425, U905, U906, V332, V499, W456
- 5.4.5.1.5 3 hour: U904, U907
- 5.4.5.1.6 4 hour: U902, U907

5.5 Fastener Attachments for ECOMAXci® FR Ply to Support Cladding Weight

- 5.5.1 Fasteners are required to attach the ECOMAXci® FR Ply sheathing to the wall framing to carry the cladding weight.
 - 5.5.1.1 See Table 5 and Table 6 for allowable cladding loads for various fastener types and sheathing thicknesses for light-frame cold-formed steel construction.
 - 5.5.1.1.1 Minimum allowable penetration into wall framing is the steel thickness plus three threads plus the tip.





- 5.5.1.2 See Table 7 through Table 8 for allowable cladding loads for various fastener types and sheathing thicknesses for wood stud framing.
 - 5.5.1.2.1 Minimum allowable penetration into FRT wood wall framing is 1¼"
- 5.5.2 The fasteners attaching the ECOMAXci® FR Ply sheathing to the wall framing shall have a minimum size and maximum spacing as shown in Table 5 through Table 8 and all panel edges shall be supported by framing or blocking.
- 5.5.3 For attaching to cold-form steel studs, fasteners with equal or greater design properties shall be permitted:
 - 5.5.3.1 #8 screw: 0.164" shank diameter, 0.3125" head diameter
 - 5.5.3.2 #10 screw: 0.190" shank diameter, 0.363" head diameter
 - 5.5.3.3 #12 screw: 0.216" shank diameter, 0.414" head diameter
 - 5.5.3.4 Rmax Nail Board Fastener SIPLD: 0.189" shank diameter, 0.625" head diameter
 - 5.5.3.5 Rmax Nail Board Fastener SIPHD: 0.189" shank diameter, 0.625" head diameter
 - 5.5.3.6 TruFast SIPLD: 0.189" shank diameter, 0.625" head diameter
 - 5.5.3.7 FastenMaster HeadLOK: 0.191" shank diameter, 0.625" head diameter
- 5.5.4 For attaching to FRT wood studs, fasteners with equal or greater design properties shall be permitted:
 - 5.5.4.1 Rmax Nail Board Fastener SIPTP: 0.189" shank diameter, 0.625" head diameter
 - 5.5.4.2 12d nail (0.148" x 3.25"): 0.312" head diameter
 - 5.5.4.3 Simpson Strong-Drive SDWS22: 0.22" shank diameter, 0.435" head diameter
 - 5.5.4.4 FastenMaster HeadLOK: 0.191" shank diameter, 0.625" head diameter
 - 5.5.4.5 TruFast SIPTP: 0.189" shank diameter, 0.625" head diameter
- 5.5.5 Fasteners in contact with FRT wood shall be coated to protect against corrosion per IBC Section 2304.10.5.
- 5.5.6 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

TABLE 5. ECOMAXCI® FR PLY WITH 5/8" OR 3/4" FIRE TREATED PLYWOOD – VERTICAL STEEL STUDS 16" O.C.^{3,4,5,6}

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® FR Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
20 ga. structural (33 mil)	Rmax Nail Board Fastener SIPLD	1.00	24	16	12	8	8	6
		1.50	24	16	8	8	6	4
		2.00	24	12	8	6	4	4
		2.50	16	8	6	4	4	-
		3.00	16	8	6	4	-	-
		3.50	12	6	4	-	-	-
		4.00	6	-	-	-	-	-
	HeadLOK	1.00	24	16	12	8	8	6
		1.50	24	16	8	8	6	4
		2.00	24	12	8	6	4	4
		2.50	24	12	8	6	4	4
		3.00	16	8	6	4	-	-
		3.50	12	6	4	-	-	-
		4.00	8	4	-	-	-	-
	#12 common	1.00	24	16	12	8	8	6
		1.50	24	16	12	8	6	6
		2.00	24	16	8	8	6	4
		2.50	24	12	8	6	4	4
		3.00	24	12	8	6	4	4
		3.50	16	8	6	4	-	-
	#10 common or TruFast SIPLD	1.00	24	16	12	8	8	6
		1.50	24	16	12	8	8	6
		2.00	24	16	8	8	6	4
		2.50	24	12	8	6	4	4
	TruFast SIPLD	3.00	16	8	6	4	4	-
		3.50	16	8	6	4	-	-
		4.00	12	6	4	-	-	-
	#8 common	0.75	24	16	12	8	6	6
1.00		24	16	8	8	6	4	
1.50		24	12	8	6	4	4	
2.00		24	12	8	6	4	4	
2.50		16	8	6	4	-	-	
18 ga. structural (43 mil)	Rmax Nail Board Fastener SIPLD	0.75	24	24	16	12	12	8
		1.00	24	24	16	12	8	8
		1.50	24	24	16	12	8	8
		2.00	24	16	12	8	8	6



Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® FR Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
18 ga. structural (43 mil)	Rmax Nail Board Fastener SIPLD	2.50	24	16	8	8	6	4
		3.00	24	12	8	6	4	4
		3.50	16	8	6	4	-	-
		4.00	8	4	-	-	-	-
	HeadLOK	1.00	24	24	16	12	12	8
		1.50	24	24	16	12	8	8
		2.00	24	16	12	8	8	6
		2.50	24	16	12	8	6	6
		3.00	24	12	8	6	4	4
		3.50	16	8	6	4	4	-
		4.00	12	6	4	-	-	-
	#12 common	1.00	24	24	16	16	12	8
		1.50	24	24	16	12	8	8
		2.00	24	24	16	12	8	8
		2.50	24	16	12	8	8	6
		3.00	24	16	12	8	6	6
		3.50	24	12	8	6	4	4
	#10 common or TruFast SIPLD	1.00	24	24	16	12	8	8
		1.50	24	24	16	12	8	8
		2.00	24	16	12	8	8	6
		2.50	24	16	8	8	6	4
	TruFast SIPLD	3.00	24	12	8	6	4	4
		3.50	16	8	6	4	-	-
		4.00	8	4	-	-	-	-
	#8 common	0.75	24	16	12	8	6	6
		1.00	24	16	8	8	6	4
		1.50	24	12	8	6	4	4
		2.00	24	12	8	6	4	4
		2.50	16	8	6	4	-	-
	16 ga. structural (54 mil)	Rmax Nail Board Fastener SIPHD	1.00	24	24	24	24	16
1.50			24	24	24	16	16	12
2.00			24	24	16	16	12	8
Rmax Nail Board Fastener SIPHD		2.50	24	24	16	12	8	8
		3.00	24	16	12	8	8	6
		3.50	24	12	8	6	6	4



Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® FR Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
16 ga. structural (54 mil)		4.00	16	8	6	4	-	-
		4.50	4	-	-	-	-	-
	HeadLOK	0.75	24	24	24	24	16	16
		1.00	24	24	24	24	16	16
		1.50	24	24	24	16	16	12
		2.00	24	24	16	16	12	8
		2.50	24	24	16	12	8	8
		3.00	24	16	12	8	8	6
		3.50	24	16	8	8	6	4
		4.00	16	8	6	4	4	-
		4.50	6	-	-	-	-	-
	#12 common	1.00	24	24	16	16	12	8
		1.50	24	24	16	12	8	8
		2.00	24	24	16	12	8	8
		2.50	24	16	12	8	8	6
		3.00	24	16	12	8	6	6
		3.50	24	12	8	6	4	4
	#10 common	1.00	24	24	16	12	8	8
		1.50	24	24	16	12	8	8
		2.00	24	16	12	8	8	6
		2.50	24	16	8	8	6	4
	#8 common	0.75	24	16	12	8	6	6
		1.00	24	16	8	8	6	4
		1.50	24	12	8	6	4	4
		2.00	24	12	8	6	4	4
		2.50	16	8	6	4	-	-

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

1. The maximum vertical fastener spacing along each stud spaced 16" o.c. to support the specified cladding weight (psf)
2. Minimum fastener penetration into stud is steel thickness plus three threads plus the tip.
3. The specified cladding weight shall include all supported materials, including the ECOMAXci FR Ply.
4. ECOMAXci® FR Ply is installed with foam directly to the studs.
5. Screw values determined using NDS Yield Limit Equations and TR-12 for evaluating the foam as a gap.
6. Proprietary fastener properties are per published data or testing.

TABLE 6. ECOMAXCI® FR PLY WITH 5/8" OR 3/4" FIRE TREATED PLYWOOD – VERTICAL STEEL STUDS 24" O.C. 3,4,5,6

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® FR Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
20 ga. structural (33 mil)	Rmax Nail Board Fastener SIPLD	1.00	24	12	8	6	4	4
		1.50	16	8	6	4	4	-
		2.00	16	8	6	4	-	-
		2.50	12	6	4	-	-	-
		3.00	12	6	4	-	-	-
		3.50	8	4	-	-	-	-
		4.00	4	-	-	-	-	-
	HeadLOK	1.00	24	12	8	6	4	4
		1.50	16	8	6	4	4	-
		2.00	16	8	6	4	-	-
		2.50	16	8	4	4	-	-
		3.00	12	6	4	-	-	-
		3.50	8	4	-	-	-	-
		4.00	4	-	-	-	-	-
	#12 common	0.75	24	12	8	6	6	4
		1.00	24	12	8	6	4	4
		1.50	24	12	8	6	4	4
		2.00	16	8	6	4	4	-
		2.50	16	8	6	4	-	-
		3.00	16	8	4	4	-	-
		3.50	12	6	4	-	-	-
	#10 common or TruFast SIPLD	1.00	24	12	8	6	4	4
		1.50	16	8	6	4	4	-
		2.00	16	8	6	4	-	-
		2.50	12	6	4	-	-	-
	TruFast SIPLD	3.00	12	6	4	-	-	-
		3.50	8	4	-	-	-	-
		4.00	4	-	-	-	-	-
	#8 common	0.75	24	12	8	6	4	4
		1.00	16	8	6	4	4	-
		1.50	16	8	6	4	-	-
		2.00	16	8	4	4	-	-

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXCI® FR Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
		2.50	12	6	4	-	-	-
18 ga. structural (43 mil)	Rmax Nail Board Fastener SIPLD	0.75	24	16	12	8	8	6
		1.00	24	16	12	8	6	6
		1.50	24	16	8	8	6	4
		2.00	24	12	8	6	4	4
		2.50	16	8	6	4	4	-
		3.00	16	8	6	4	-	-
		3.50	12	6	4	-	-	-
		4.00	6	-	-	-	-	-
	HeadLOK	1.00	24	16	12	8	8	6
		1.50	24	16	8	8	6	4
		2.00	24	12	8	6	4	4
		2.50	24	12	8	6	4	4
		3.00	16	8	6	4	-	-
		3.50	12	6	4	-	-	-
		4.00	8	4	-	-	-	-
	#12 common	1.00	24	16	12	8	8	6
		1.50	24	16	12	8	6	6
		2.00	24	16	8	8	6	4
		2.50	24	12	8	6	4	4
		3.00	24	12	8	6	4	4
		3.50	16	8	6	4	-	-
	#10 common or TruFast SIPLD	0.75	24	16	12	8	8	6
		1.00	24	16	12	8	6	6
		1.50	24	16	8	8	6	4
		2.00	24	12	8	6	4	4
		2.50	16	8	6	4	4	-
	TruFast SIPLD	3.00	16	8	6	4	-	-
		3.50	12	6	4	-	-	-
		4.00	6	-	-	-	-	-
	#8 common	0.75	24	12	8	6	4	4
1.00		16	8	6	4	4	-	
1.50		16	8	6	4	-	-	

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXCI® FR Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
16 ga. structural (54 mil)		2.00	16	8	4	4	-	-
		2.50	12	6	4	-	-	-
	Rmax Nail Board Fastener SIPHD	1.00	24	24	16	16	12	8
		1.50	24	24	16	12	8	8
		2.00	24	16	12	8	8	6
		2.50	24	16	12	8	6	6
		3.00	24	12	8	6	6	4
		3.50	16	8	6	4	4	-
		4.00	12	6	4	-	-	-
	HeadLOK	1.00	24	24	16	16	12	8
		1.50	24	24	16	12	8	8
		2.00	24	16	12	8	8	6
		2.50	24	16	12	8	6	6
		3.00	24	12	8	6	6	4
		3.50	16	8	6	4	4	-
		4.00	12	6	4	-	-	-
	#12 common	1.00	24	16	12	8	8	6
		1.50	24	16	12	8	6	6
		2.00	24	16	8	8	6	4
		2.50	24	12	8	6	4	4
		3.00	24	12	8	6	4	4
		3.50	16	8	6	4	-	-
	#10 common	0.75	24	16	12	8	8	6
		1.00	24	16	12	8	6	6
		1.50	24	16	8	8	6	4
		2.00	24	12	8	6	4	4
		2.50	16	8	6	4	4	-
	#8 common	0.75	24	12	8	6	4	4
1.00		16	8	6	4	4	-	
1.50		16	8	6	4	-	-	
2.00		16	8	4	4	-	-	
2.50		12	6	4	-	-	-	



Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® FR Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30

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

1. The maximum vertical fastener spacing along each stud spaced 24" o.c. to support the specified cladding weight (psf)
2. Minimum fastener penetration into stud is steel thickness plus three threads plus the tip.
3. The specified cladding weight shall include all supported materials, including the ECOMAXci FR Ply.
4. ECOMAXci FR Ply is installed with foam directly to the studs.
5. Screw values determined using *NDS* Yield Limit Equations and *TR-12* for evaluating the foam as a gap.
6. Proprietary fastener properties are per published data or testing.



TABLE 7. ECOMAXCI® FR PLY WITH 5/8" OR 3/4" FIRE TREATED PLYWOOD – VERTICAL FRT WOOD STUDS 16" O.C.

Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXCI® FR Ply (in)	Max. Fastener Spacing (in)					
		Specified Cladding Weight ² (psf)					
		5	10	15	20	25	30
Rmax Nail Board Fastener SIPTP	0.75	24	24	20	16	12	8
	1.00	24	20	16	12	8	8
	1.50	24	20	12	8	8	8
	2.00	24	16	12	8	8	6
	2.50	16	12	8	6	6	4
	3.00	12	8	6	6	4	4
	3.50	8	8	6	4	4	-
	4.00	8	6	4	4	-	-
	4.50	8	4	4	-	-	-
12d (0.148" x 3.25")	0.75	24	16	8	8	6	6
	1.00	20	12	8	6	6	4
TruFast SIPTP	0.75	24	24	20	16	12	8
	1.00	24	20	16	12	8	8
	1.50	24	16	12	8	8	6
	2.00	16	12	8	6	6	4
	2.50	12	8	6	6	4	4
	3.00	8	8	6	4	4	-
	3.50	8	6	4	4	-	-
	4.00	8	4	4	-	-	-
	4.50	6	4	4	-	-	-
FastenMaster HeadLOK	0.75	24	24	24	16	12	12
	1.00	24	24	20	16	12	8
	1.50	24	16	12	8	8	8
	2.00	20	12	8	8	6	6
	2.50	16	12	8	6	6	4
	3.00	12	8	6	6	4	4
	3.50	8	8	6	4	4	-
	4.00	8	6	4	4	-	-
	4.50	8	4	4	-	-	-
Simpson Strong-Drive SDWS22	0.75	24	24	24	20	16	16
	1.00	24	24	24	20	16	12
	1.50	24	24	16	12	12	8

Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® FR Ply (in)	Max. Fastener Spacing (in)					
		Specified Cladding Weight ² (psf)					
		5	10	15	20	25	30
	2.00	24	16	12	8	8	8
	2.50	20	12	8	8	6	6
	3.00	16	12	8	6	6	4
	3.50	12	8	8	6	6	4
	4.00	12	8	6	6	4	4
	4.50	8	8	6	4	4	4

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

1. Minimum fastener penetration into the stud is 1 ¼".
2. The weight of ECOMAXci® FR Ply is included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials besides the ECOMAXci® FR Ply.
3. ECOMAXci® FR Ply is installed directly to the studs with the plywood to the exterior of the structure.
4. FRT wood studs shall be a minimum of 2x4 and have a minimum specific gravity of 0.42.
5. The tabulated calculations are based on a strength design reduction factor of 0.90 for fasteners in FRT wood.
6. Nail and screw values determined using *NDS* Yield Limit Equations and *TR-12* for evaluating the foam as a gap.
7. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths. Minimum bending yield strength for nails with a diameter up to 0.148", 0.162", and 0.225" shall be 90,000 psi, 90,000 psi, and 80,000 psi respectively. Proprietary fastener properties are per published data or testing.

TABLE 8. ECOMAXCI® FR PLY WITH 5/8" OR 3/4" FIRE TREATED PLYWOOD – VERTICAL FRT WOOD STUDS 24" O.C.

Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXCI® FR Ply (in)	Max. Fastener Spacing (in)					
		Specified Cladding Weight ² (psf)					
		5	10	15	20	25	30
Rmax Nail Board Fastener SIPTP	0.75	24	16	12	8	8	6
	1.00	24	12	8	8	6	6
	1.50	16	8	8	6	4	4
	2.00	12	8	6	4	4	-
	2.50	8	6	4	4	-	-
	3.00	6	4	4	-	-	-
	3.50	6	4	-	-	-	-
	4.00	4	-	-	-	-	-
	4.50	4	-	-	-	-	-
12d (0.148" x 3.25")	0.75	16	8	6	6	4	4
	1.00	12	8	6	4	4	-
TruFast SIPTP	0.75	24	16	12	8	8	6
	1.00	24	12	8	8	6	6
	1.50	16	8	8	6	4	4
	2.00	12	8	6	4	4	-
	2.50	8	6	4	4	-	-
	3.00	6	4	4	-	-	-
	3.50	6	4	-	-	-	-
	4.00	4	-	-	-	-	-
	4.50	4	-	-	-	-	-
FastenMaster HeadLOK	0.75	24	20	16	12	8	8
	1.00	24	16	12	8	8	6
	1.50	16	12	8	6	6	4
	2.00	12	8	6	6	4	4
	2.50	8	8	6	4	4	-
	3.00	8	6	4	4	-	-
	3.50	6	4	4	-	-	-
	4.00	6	4	-	-	-	-
	4.50	4	-	-	-	-	-
Simpson Strong-Drive SDWS22	0.75	24	24	20	12	12	8
	1.00	24	20	16	12	8	8
	1.50	24	16	12	8	8	6

Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXCI® FR Ply (in)	Max. Fastener Spacing (in)					
		Specified Cladding Weight ² (psf)					
		5	10	15	20	25	30
	2.00	16	12	8	6	6	4
	2.50	12	8	6	6	4	4
	3.00	8	8	6	4	4	-
	3.50	8	6	4	4	4	-
	4.00	8	6	4	4	-	-
	4.50	6	4	4	-	-	-

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

1. Minimum fastener penetration into the stud is 1 ¼".
2. The weight of ECOMAXCI® FR Ply is included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials besides the ECOMAXCI® FR Ply.
3. ECOMAXCI® FR Ply is installed directly to the studs with the plywood to the exterior of the structure.
4. FRT wood studs shall be a minimum of 2x4 and have a minimum specific gravity of 0.42.
5. The tabulated calculations are based on a strength design reduction factor of 0.90 for fasteners in FRT wood.
6. Nail and screw values determined using *NDS* Yield Limit Equations and *TR-12* for evaluating the foam as a gap.
7. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths. Minimum bending yield strength for nails with a diameter up to 0.148", 0.162", and 0.225" shall be 90,000 psi, 90,000 psi, and 80,000 psi respectively. Proprietary fastener properties are per published data or testing.

6 INSTALLATION

- 6.1 Installation shall comply with the manufacturer's installation instructions and this TER. In the event of a conflict between the manufacturer's installation instructions and this TER, the more restrictive shall govern.
- 6.2 A copy of the manufacturer's published installation instructions shall be available at all times on the jobsite during installation.
- 6.3 *Orientation*
 - 6.3.1 ECOMAXCI® FR Ply may be installed vertically or horizontally over cold-formed steel studs or FRT wood studs, with framing that has a nominal thickness of not less than 2" (51 mm) and spaced a maximum of 24" (610 mm) o.c.
- 6.4 *Attachment*
 - 6.4.1 Fasteners shall be installed with a nominal edge distance of 3/8" (9.5 mm).
 - 6.4.2 Fasteners, including nuts and washers, for FRT wood used in exterior applications or wet or damp locations shall be of hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze or copper in accordance with *IBC Section 2304.10.5* for FRT wood.
 - 6.4.3 Fasteners shall be installed with the on-center spacing as indicated in Table 5 through Table 8.
 - 6.4.4 Bending yield strength of commodity fasteners shall be as shown in *NDS* Table 12N, and footnote 2. Bending yield of proprietary fasteners are as published by the fastener manufacturer.

7 TEST ENGINEERING SUBSTANTIATING DATA

- 7.1 Air permeance testing in accordance with *ASTM E2178* conducted by Intertek
- 7.2 Water vapor permeance testing in accordance with conducted by Exova
- 7.3 Flame spread and smoke developed ratings in accordance with *ASTM E84* conducted by Intertek
- 7.4 Fire performance criteria in accordance with *NFPA 285* conducted by Intertek

- 7.5 Heat propagation (potential heat) testing conducted by SwRI
- 7.6 Vertical and lateral fire propagation tests conducted by Intertek with analysis by Priest and Associates Consulting, LLC
- 7.7 Fire resistance ratings in accordance with *UL 263* conducted by UL
- 7.8 Foam Sheathing Committee Tech Matters, *Guide to Attaching Exterior Wall Coverings through Foam Sheathing to Wood or Steel Framing*.
- 7.9 New York State Energy Research and Development Authority, *Fastening Systems for Continuous Insulation*.
- 7.10 Some information contained herein is the result of testing and/or data analysis by other sources which conform to *IBC Section 1703* and relevant [professional engineering law](#). DrJ relies on accurate data from these sources to perform engineering analysis. DrJ has reviewed and found the data provided by other professional sources to be credible.
- 7.11 Where appropriate, DrJ's analysis is based on design values that have been codified into law through codes and standards (e.g., *IBC*, *IRC*, *NDS®*, and *SDPWS*). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g., lumber, steel, and concrete), DrJ relies upon the grade mark, stamp, and/or design values provided by raw material suppliers to be accurate and conforming to the mechanical properties defined in the relevant material standard.

8 FINDINGS

- 8.1 When used and installed in accordance with this TER and the manufacturer's installation instructions, the product(s) listed in Section 1.1 are approved for the following:
 - 8.1.1 Buildings constructed in accordance with the *IBC* and the *IRC*
 - 8.1.2 ECOMAXci® FR Ply is approved for use in exterior walls of buildings when installed in accordance with the *IBC* for Type I-IV construction.
 - 8.1.3 Use as a nailbase for cladding materials when installed in accordance with the manufacturer's installation instructions and this TER
 - 8.1.4 Performance of foam plastics in accordance with [IBC Section 2603](#) and [IRC Section R316](#)
 - 8.1.5 Performance for use as an air barrier in accordance with [IECC Section C402.5.1](#)
 - 8.1.6 Performance for use as a vapor retarder in accordance with [IBC Section 202](#) and [IBC Section 1404.3⁷](#), and [IRC Section R202](#) and [IRC Section R702.7](#)
 - 8.1.7 Flame spread and smoke developed indices in accordance with [IBC Section 2603.5.4](#) and [IRC Section R316.3](#)
 - 8.1.8 Special approval for use without a thermal barrier or ignition barrier in accordance with [IBC Section 2603.4](#) and [Section 2603.5.2](#) and [IRC Section R316.4](#)
 - 8.1.9 Potential heat in accordance with [IBC Section 2603.5.3](#)
 - 8.1.10 Ignition characteristics in accordance with [IBC Section 2603.5.7](#)
 - 8.1.11 Vertical and lateral fire propagation in accordance with [IBC Section 2603.5.5](#)
 - 8.1.12 Performance for use in a fire resistance rated assembly in accordance with [IBC Section 2603.5.1](#)

⁷ [2015 IBC Section 1405.3](#)

8.2 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.9 are similar) states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code...Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.

8.3 This product has been evaluated in the context of the codes listed in Section 2 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this TER, they are listed here.

8.3.1 No known variations

9 CONDITIONS OF USE

- 9.1 Installation shall comply with this TER and the manufacturer's installation instructions. In the event of a conflict between this TER and the manufacturer's installation instructions, the more restrictive shall govern.
- 9.2 Exterior wall coverings capable of resisting the full design wind pressure shall be installed over this product and shall provide a direct load path to the structural frame.
- 9.3 When ECOMAXci® FR Ply is used as a nailbase for the cladding, fastening of the cladding to the ECOMAXci® FR Ply shall be designed to resist the weight of the cladding and the imposed wind pressure.
- 9.4 Walls shall be fully braced with other materials in accordance with IBC Section 2308.6.4 or IRC Section R602.10.
- 9.5 A separate WRB shall be installed in accordance with IBC Section 1403.2⁸ and IRC Section R703.2.
- 9.6 Walls shall not be used to resist horizontal loads from concrete and masonry walls.
- 9.7 ECOMAXci® FR Ply may be used as a nail base for cladding. Fastener size and spacing shall be in accordance with Table 5 through Table 8.
- 9.8 Use of these products shall be in accordance with the vapor barrier requirements of IBC Section 1404.3⁹ and IRC Section R702.7.
- 9.9 Where required by the *building official*, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of *permit* application.
- 9.10 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.11 Design loads shall be determined in accordance with the building code adopted by the *jurisdiction* in which the project is to be constructed and/or by the Building Designer (e.g., *owner* or *registered design professional*).
- 9.12 At a minimum, this product shall be installed per Section 5.4.5 of this TER.
- 9.13 This product is manufactured under a third-party quality control program in accordance with IBC Section 104.4 and 110.4 and IRC Section R104.4 and R109.2.
- 9.14 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the *owner* or the owner's authorized agent. Therefore, the TER shall be reviewed for code compliance by the *building official* for acceptance.

⁸ 2015 IBC Section 1404.2

⁹ 2015 IBC Section 1405.3



- 9.15 The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer's instructions, the building official's inspection, and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

10 IDENTIFICATION

- 10.1 The product(s) listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at Rmax.com.

11 REVIEW SCHEDULE

- 11.1 This TER is subject to periodic review and revision. For the most recent version of this TER, visit drjcertification.org.
- 11.2 For information on the current status of this TER, contact DrJ Certification.