



Listing and Technical Evaluation Report™

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Rmax® ECOMAXci® FR Ply

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CSI Designations:

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

Section: 06 16 00 - Sheathing

Section: 07 20 00 - Thermal Protection

Section: 07 27 00 - Air Barriers

Section: 06 16 13 - Insulated Sheathing

Section: 07 21 00 - Thermal Insulation

Section: 07 27 23 - Board Product Air Barriers

Section: 06 16 53 - Moisture-Resistant Sheathing Board

Section: 07 21 13 - Foam Board Insulation

1 Innovative Product Evaluated¹

1.1 Rmax ECOMAXci FR Ply

2 Product Description and Materials

2.1 The innovative product evaluated in this report is shown in **Figure 1**.



Figure 1. ECOMAXci FR Ply

- 2.1.1 ECOMAXci FR Ply is a non-structural, composite product consisting of a Foam Plastic Insulating Sheathing (FPIS) layer bonded to Fire-Retardant Treated (FRT) plywood on one side (ASTM C1289 Type V).



- 2.1.2 The FPIS layer consists of Rmax rigid, closed-cell polyisocyanurate (polyiso) foamed plastic insulation board bonded to glass fiber reinforced aluminum facers on each side (ASTM C1289 Type I, Class 1 and Class 2).
- 2.1.3 The FRT plywood is manufactured in accordance with DOC PS 2 and treated for compliance with IBC Section 2303.2.
- 2.2 *Material Availability*
 - 2.2.1 *Thickness:*
 - 2.2.1.1 *FPIS Insulation Layer:*
 - 2.2.1.1.1 0.75" (19 mm) through 4.5" (114 mm)
 - 2.2.1.2 *FRT Plywood:*
 - 2.2.1.2.1 0.625" (16 mm)
 - 2.2.1.2.2 0.75" (19 mm)
 - 2.2.1.3 *Standard Product Width:*
 - 2.2.1.3.1 48" (1219 mm)
 - 2.2.1.4 *Standard Product Length:*
 - 2.2.1.4.1 96" (2438 mm)
- 2.3 As needed, review material properties for design in **Section 6** and to regulatory evaluation in **Section 8**.

3 Definitions

- 3.1 New Materials² 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.³ The design strengths and permissible stresses shall be established by tests⁴ and/or engineering analysis.⁵
- 3.2 Duly Authenticated Reports⁶ and Research Reports⁷ are test reports and related engineering evaluations, which are written by an approved agency⁸ and/or an approved source.⁹
 - 3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).¹⁰
- 3.3 An approved agency is "approved" when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is listed in the ANAB directory.
- 3.4 An approved source is "approved" when a professional engineer (i.e., Registered Design Professional) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.¹¹
- 3.5 Testing and/or inspections conducted for this Duly Authenticated Report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed Registered Design Professional (RDP).
 - 3.5.1 The Center for Building Innovation (CBI) is ANAB¹² ISO/IEC 17025 and ISO/IEC 17020 accredited.
- 3.6 The regulatory authority shall enforce¹³ 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 writing¹⁴ stating the nonconformance and the path to its cure.
- 3.7 The regulatory authority shall accept Duly Authenticated Reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.¹⁵



- 3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope, shall be approved.¹⁶ Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.¹⁷
- 3.9 Approval equity is a fundamental commercial and legal principle.¹⁸

4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation¹⁹

4.1 Standards

- 4.1.1 *AISI S100: North American Specification for the Design of Cold-formed Steel Structural Members*
- 4.1.2 *ANSI/AWC NDS: National Design Specification (NDS) for Wood Construction*
- 4.1.3 *ASTM C90: Standard Specification for Loadbearing Concrete Masonry Units*
- 4.1.4 *ASTM C1019: Standard Test Method for Sampling and Testing Grout for Masonry*
- 4.1.5 *ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*
- 4.1.6 *ASTM D1929: Standard Test Method for Determining Ignition Temperature of Plastics*
- 4.1.7 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*
- 4.1.8 *ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials*
- 4.1.9 *ASTM E136: Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*
- 4.1.10 *ASTM E1354: Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*
- 4.1.11 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*
- 4.1.12 *AWC TR 12: General Dowel Equations for Calculating Lateral Connection Values*
- 4.1.13 *DOC PS 2: Performance Standard for Wood-based Structural-use Panels*
- 4.1.14 *NFPA 259: Standard Test Method for Potential Heat of Building Materials*
- 4.1.15 *NFPA 285-12: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components*
- 4.1.16 *UL 263: Standard for Fire Tests of Building Construction and Materials*

4.2 Regulations

- 4.2.1 *IBC – 15, 18, 21: International Building Code®*
- 4.2.2 *IRC – 15, 18, 21: International Residential Code®*
- 4.2.3 *IECC – 15, 18, 21: International Energy Conservation Code®*
- 4.2.4 *CBC—19, 22: California Building Code (Title 24, Part 2)²⁰*
- 4.2.5 *CRC—19, 22: California Residential Code (Title 24, Part 2.5)²⁰*
- 4.2.6 *FBC-B—20, 23: Florida Building Code – Building²¹*
- 4.2.7 *FBC-R—20, 23: Florida Building Code – Residential²¹*

5 Listed²²

- 5.1 Equipment, materials, products or services included in a List published by a nationally recognized testing laboratory (i.e., CBI), approved agency (i.e., CBI and DrJ), and/or approved source (i.e., DrJ) or other organization concerned with product evaluation (i.e., DrJ) that maintains periodic inspection (i.e., 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 General

- 6.1.1 ECOMAXci FR Ply is used as wall sheathing, continuous insulation and as a nail base for cladding materials, on buildings constructed in accordance with the IBC for light-frame cold-formed steel construction, metal buildings, FRT wood framed buildings, concrete masonry buildings or concrete buildings.
- 6.1.2 Stud walls insulated with ECOMAXci FR Ply must be properly braced for lateral loads according to the requirements of local building codes.
- 6.1.3 The wall system shall be designed to handle wind load per the applicable code.
- 6.1.4 The Environmental Product Declaration (EPD) for the insulation layer is available at polyiso.org.

6.2 Thermal Resistance (R-Value)

- 6.2.1 ECOMAXci FR Ply meets the continuous insulating sheathing requirements complying with the provisions of [IECC Section C402](#), [IRC Section N1102](#) and [IECC Section R402](#). It is intended to be used as exterior continuous insulation under any type of permitted cladding.

6.3 Air Barrier

- 6.3.1 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 installation instructions and this report.
- 6.3.2 The air barrier material properties of ECOMAXci FR Ply are shown in **Table 1**.

Table 1. Air Barrier Material Properties

Property
$< 0.005 \text{ L}/(\text{s}\cdot\text{m}^2)^1$
IP: $1 \text{ L}/(\text{s}\cdot\text{m}^2) = 0.2 \text{ cfm}/\text{ft}^2$
1. Tested in accordance with ASTM E2178.

- 6.3.3 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 $0.02 \text{ L}/(\text{s}\cdot\text{m}^2)$ at 75 Pa pressure difference when tested in accordance with ASTM E2178.
 - 6.3.4 When used as part of an air barrier assembly, all sheathing panel joints, the top and bottom of walls and all penetrations shall be sealed in accordance with the manufacturer installation instructions and this report.
- ### 6.4 Draftstop
- 6.4.1 ECOMAXci FR Ply may be used as a draftstop material in accordance with [IBC Section 708.4.2](#), [IBC Section 718.3](#), [IBC Section 718.4](#) and [IRC Section R302.12](#).
 - 6.4.2 When installed as a draftstop, ECOMAXci FR Ply shall be installed in accordance with Section 9.



6.5 Fire Safety Performance

6.5.1 Surface Burning Characteristics:

- 6.5.1.1 The components of ECOMAXci FR Ply have 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 Burning Characteristics

Product	Flame Spread Index	Smoke Developed Index
FPIS	< 25	< 250
FRT Plywood	< 25	< 450
SI: 1 in = 25.4 mm 1. Tested in accordance with ASTM E84.		

6.5.2 Thermal Barrier (IBC and IRC Buildings):

- 6.5.2.1 ECOMAXci FR Ply shall be separated from the building interior by a thermal barrier meeting the provisions of [IBC Section 2603.4](#), except in one-story buildings when the building is equipped throughout with an automatic sprinkler system and the foam sheathing, in a thickness of not more than 4.5 inches, is covered by one of the following:

- 6.5.2.1.1 Minimum 0.032 inch thick aluminum
- 6.5.2.1.2 Minimum 0.016 inch thick corrosion resistance steel

6.5.3 Fire Resistance Ratings (Fire-Rated Assemblies):

- 6.5.3.1 ECOMAXci FR Ply has been tested and meets the requirements of UL 263 (ASTM E119) in accordance with [IBC Section 2603.5.1](#) for use in the following assembly designs when installed in accordance with the manufacturer installation instructions and this report:

- 6.5.3.1.1 45 minutes: [U424](#), [U425](#), [V321](#), [V499](#), [W456](#)
- 6.5.3.1.2 1 hour: [U026](#), [U326](#), [U330](#), [U354](#), [U355](#), [U364](#), [U424](#), [U425](#), [U460](#), [V302](#), [V303](#), [V454](#), [V499](#), [W307](#), [W417](#), [W456](#)
- 6.5.3.1.3 1.5 hour: [U424](#), [U425](#), [V499](#), [W456](#)
- 6.5.3.1.4 2 hour: [U349](#), [U424](#), [U425](#), [U905](#), [U906](#), [V332](#), [V499](#), [W456](#)
- 6.5.3.1.5 3 hour: [U904](#), [U907](#)
- 6.5.3.1.6** 4 hour: [U902](#), [U907](#)

6.5.4 Potential Heat:

- 6.5.4.1 The FPIS layer of 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 Heat¹

Potential Heat (Btu/lb)
11,054
SI: 1 Btu/lb = 2.326 kJ/kg 1. FPIS layer tested in accordance with NFPA 259.



6.5.5 Vertical and Lateral Fire Propagation (NFPA 285 Applications):

- 6.5.5.1 ECOMAXci FR Ply has been tested to assess its performance with regard to vertical and lateral fire propagation in accordance with NFPA 285 and 2018 IBC Section 2603.5.5.
- 6.5.5.2 Engineering analysis has also been conducted to assess substitution of other products within the approved wall assemblies.
- 6.5.5.3 The wall assemblies listed in **Table 4** are approved for use in buildings of Type I-IV construction.

Table 4. Fire Performance - Vertical & Lateral Fire Propagation¹

Wall Component	Materials
Base Wall System Select option 1, 2, 3, or 4	<ol style="list-style-type: none"> 1. Cast concrete walls 2. CMU Concrete walls 3. 20-gauge (min.) 3.625" (min.) steel studs spaced 24" o.c. (max.) <ol style="list-style-type: none"> a. 0.5" (min.) type X Special Fire Resistant Gypsum Wallboard Interior b. Bracing as required by code 4. Where allowed by code in Types I, II, III or IV construction, FRTW (fire-retardant-treated wood) studs complying with IBC Section 2303.2, minimum nominal 2x4 dimension, spaced 24" o.c. (max.) <ol style="list-style-type: none"> a. 0.625" type X Gypsum Wallboard Interior b. Bracing as required by code
Floorline Firestopping Select option 1 or 2	<ol style="list-style-type: none"> 1. 4 pcf mineral wool installed with Z-clips 2. FRTW fire blocking at floor line in accordance with applicable code requirements (use with FRTW framing)
Cavity Insulation Select option 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, or 15 EZ FLO may be used inside the box headers and jamb studs for NFPA 285 assemblies requiring SPF in stud cavities	<ol style="list-style-type: none"> 1. None 2. Any noncombustible insulation per ASTM E136 3. Any Mineral Fiber (board type Class A, ASTM E84 faced or un-faced) 4. Any Fiberglass (batt type Class A ASTM E84 faced or unfaced) 5. 5.5" (max.) Icynene LD-C-50 SPF in 6" deep studs (max.). Use with 0.625" exterior sheathing. 6. 5.5" (max.) Icynene MD-C-200 2 pcf SPF in 6" deep studs (max.) full fill without an air gap. Use with 0.625" exterior sheathing. 7. 5.5" (max.) Icynene MD-R-210 2 pcf SPF in 6" deep studs (max.) full fill without an air gap. Use with 0.625" exterior sheathing. 8. SWD Urethane QS 112 2 pcf SPF in 6" deep studs (max.) partial fill with a maximum 2.5" air gap or full fill. Use with 0.625" exterior sheathing. 9. Gaco Western 183M SPF (3.5" max). Use with 0.625" exterior sheathing. 10. Gaco Western F 1850 SPF (3.5" max.). Use with 0.625" exterior sheathing. 11. Demilec Sealection 500 SPF (3.625" max). Use with 0.625" exterior sheathing. 12. Demilec HeatLok Soy 200 Plus SPF (3.4" max). Use with 0.625" exterior sheathing. 13. Bayer Bayseal SPF (3" max). Use with 0.625" exterior sheathing. 14. Lapolla FoamLok FL 2000 SPF (3" max). Use with 0.625" exterior sheathing. 15. BASF SprayTite 81206 or WallTite (US & US-N) SPF (3.625" max). Use with 0.625" exterior sheathing.

Table 4. Fire Performance - Vertical & Lateral Fire Propagation¹

Wall Component	Materials
<p>Exterior Sheathing Select option 1, 2, 3, 4, 5, 6, 7, or 8</p> <p>Note: When SPF is used, 0.625" exterior gypsum sheathing must be used.</p>	<ol style="list-style-type: none"> None (when using Base Wall 1 or 2) None (3" max. exterior insulation with claddings 7-15) None (4.5" max. exterior insulation with claddings 1-6) 0.5" (min.), exterior gypsum board sheathing 0.5" (min.) FRTW structural panels complying with IBC Section 2303.2 and installed in accordance with code allowances for Types I, II, III, or IV construction. 0.625" DensElement with DensDefy or Prosoco FastFlash flashing at joints/fasteners Soprema Sopraseal Xpress G Tremco/USG Securock® ExoAir® 430
<p>Weather-Resistive Barrier Applied to Exterior Sheathing Select option 1 or 2 installed per manufacturer installation instructions.</p> <p>Note: WRB over Exterior Sheathing items 6-8 may not be used since they already incorporate a pre-installed WRB.</p> <p>Note: When no exterior sheathing is used, sheet building wraps may be applied directly to studs.</p> <p>NLA = No Longer Available</p>	<ol style="list-style-type: none"> None Any WRB tested in accordance with ASTM E1354 (at a minimum of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than the baseline WRB or exterior insulation foam core. The following WRB products are allowed: <ol style="list-style-type: none"> Carlisle CCW Fire Resist 705FR-A Carlisle CCW Fire Resist Barritech NP™ Carlisle CCW Fire Resist Barritech VP Dörken Systems Inc, Delta Stratus SA Dörken Systems Inc, Delta®-Fassade S Dörken Systems Inc, Delta®-Foxyx/Plus Dörken Systems Inc, Delta®-Maxx/Plus Dörken Systems Inc, Delta®-Vent S/Plus Dörken Systems Inc, Delta®-Vent SA Dow Corning DOWSIL DefendAir 200 (or LT version) Dow Corning DOWSIL DefendAir 200C (Charcoal) Dryvit Backstop® NT™ DuPont™ Tyvek® (Various per ESR 2375) DuPont™ WeatherMate™ Housewrap DuPont™ WeatherMate™ Plus Housewrap GCP PERM-A-BARRIER® Aluminum Wall Membrane GCP PERM-A-BARRIER® NPL 10 GCP PERM-A-BARRIER® VPL GCP PERM-A-BARRIER® VPL 50 Membrane GCP PERM-A-BARRIER® VPL Low Temperature GCP PERM-A-BARRIER® VPS Henry Air-Bloc All Weather STPE Henry® Air-Bloc® 16 MR Henry® Air-Bloc® 17 MR Henry® Air-Bloc® 21 FR Henry® Air-Bloc® 31MR [NLA] Henry® Air-Bloc® 32MR [NLA] Henry® Air-Bloc® 33MR [NLA] Henry® Blueskin® Metal Clad® Henry® Blueskin® SA Henry® Blueskin® VP 160 Henry® EnviroCap Henry® FoilSkin Henry® Super Jumbo Tex 60 Minute® (Fortifiber) Henry® WeatherSmart® Drainable Housewrap (Fortifiber) Kingspan (Pactiv) GreenGuard® MAX™ Building Wrap MBCC MasterSeal® AWB 660 (Formerly BASF Enershield® HP)



Table 4. Fire Performance - Vertical & Lateral Fire Propagation¹

Wall Component	Materials
	ll. MBCC MasterSeal® AWB 660 I (Formerly BASF Enershield® I) mm. NaturaSeal AirSeal NS A-250LP™ nn. NaturaSeal NS-A-250HP™ oo. Parex WeatherSeal Spray & Roll-On pp. Pecora ProPerm VP qq. Pecora XL-PermULTRA NP rr. Pecora XL-PermULTRA VP (10 mil DFT) ss. Prosoco R-Guard® Cat 5™ tt. Prosoco R-Guard® MVP (NLA) uu. Prosoco R-Guard® Spray Wrap (NLA) vv. Prosoco R-Guard® Spray Wrap MVP ww. Prosoco R-Guard® VB xx. Siga Majvest® 500 SA yy. Sika Sikagard®-530 zz. Sika Sikagard®-535 aaa. Soprema Sopraseal® LM 204 VP bbb. Soprema Sopraseal® Stick 1100T ccc. Soprema Sopraseal® Stick VP ddd. Soprema Soprasolin HD eee. Tremco ExoAir 110AT fff. Tremco ExoAir 230 ggg. Vaproshield RevealShield SA® hhh. Vaproshield WrapShield SA® iii. W.R. Meadows® Air-Shield™ LMP (Black) jjj. W.R. Meadows® Air-Shield™ LMP (Gray) kkk. W.R. Meadows® Air-Shield™ LSR mmm. W.R. Meadows® Air-Shield™ SMP nnn. W.R. Meadows® Air-Shield™ TMP
Exterior Insulation Installation may include FRT plywood layer on exterior side or interior side. Use with plywood on interior side negates use of exterior sheathing since the FRT ply acts as the sheathing.	1. ECOMAXci FR Ply – 4.5" (max.) foam thickness, 0.625" (min.) FRT plywood thickness.
FRTW Structural Panels over Exterior Insulation (Optional)	For use with all cladding options, installed in accordance with applicable code requirements. Must be applied with joints staggered. Fasteners used for securing FRTW panels must penetrate through the foam plastic into FRTW or steel framing. The system must be designed to handle the cladding load and wind load per the applicable code. Note: May be applied in the field or factory applied. Adhesive must not be full coverage.
Weather-Resistive Barrier Applied over Exterior Insulation (or FRTW) Use any in item 1 or 2 depending on the cladding used. Note: Exterior WRB items in 1.02 are not traditional WRB products but are insulation panel joint tapes. The	1. For use with all claddings: 1.01 None 1.02 6" (max) tape or flashing over insulation joints a. Rmax® R-SEAL 3000 b. Rmax® R-SEAL 6000 c. Rmax® R-SEAL 2000 LF d. Venture Tape CW

Table 4. Fire Performance - Vertical & Lateral Fire Propagation¹

Wall Component	Materials
insulation panel joints shall be staggered.	e. Asphalt or butyl based tape
NLA = No longer available	f. Liquid flashing
	1.03 Carlisle (CCW) Fire Resist 705FR-A
	1.04 Dupont™ Tyvek® (Various per 2375)
	1.05 Dupont™ Weathermate™ Housewrap
	1.06 Dupont™ Weathermate™ Plus Housewrap
	1.07 GCP PERM-A-BARRIER® Aluminum Wall Membrane
	1.08 Henry® Blueskin® Metal Clad®
	1.09 Henry® FoilSkin
	1.10 Kingspan (Pactiv) GreenGuard® MAX™ Building Wrap
	1.11 Prosoco R-Guard® Spray Wrap MVP
	1.12 Soprema Soprasolin® HD
	2. For use with cladding options 1-6 (heavy masonry) with non-open joint installation techniques (i.e., shiplap, etc.):
	2.01 Carlisle CCW Fire Resist Barritech NP™
	2.02 Carlisle CCW Fire Resist Barritech VP
	2.03 Dörken Systems Inc. Delta®-Fassade S
	2.04 Dörken Systems Inc. Delta®-Foxx/Plus
	2.05 Dörken Systems Inc. Delta®-Maxx/Plus
	2.06 Dörken Systems Inc. Delta®-Vent S/Plus
	2.07 Dow Corning DOWSIL™ DefendAir 200
	2.08 Dow Corning DOWSIL™ DefendAir 200C
	2.09 Dryvit Backstop® NT™
	2.10 GCP PERM-A-BARRIER® VPS
	2.11 GCP PERM-A-BARRIER® VPL
	2.12 GCP PERM-A-BARRIER® VPL Low Temperature
	2.13 Henry Air-Bloc All Weather STPE
	2.14 Henry Super Jumbo Tex 60 minutes (only with 3/4" stucco cladding) (Fortifiber)
	2.15 Henry WeatherSmart Drainable (Fortifiber)
	2.16 Henry® Air-Bloc® 16 MR
	2.17 Henry® Air-Bloc® 17 MR
	2.18 Henry® Air-Bloc® 21 FR
	2.19 Henry® Air-Bloc® 31MR
	2.20 Henry® Air-Bloc® 33MR
	2.21 Henry® Blueskin® VP160
	2.22 Henry® Envirocap
	2.23 Parex WeatherSeal Spray & Roll-On
	2.24 Pecora ProPerm VP
	2.25 Pecora XL-PermULTRA NP
	2.26 Pecora XL-PermULTRA VP (10 mil DFT)
	2.27 Prosoco R-Guard® Cat 5™
	2.28 Prosoco R-Guard® MVP (NLA)
	2.29 Prosoco R-Guard® Spray Wrap (NLA)
	2.30 Prosoco R-Guard® VB
	2.31 Siga Majvest® 500 SA
	2.32 Sika SikaGard® 535
	2.33 Soprema Sopraseal® Stick VP
	2.34 Vaproshield Revealshield SA®
	2.35 Vaproshield Wrapshield SA®
	2.36 W.R. Meadows® Air-Shield™ LMP (Black)



Table 4. Fire Performance - Vertical & Lateral Fire Propagation¹

Wall Component	Materials
	2.37 W.R. Meadows® Air-Shield™ LMP (Gray) 2.38 W.R. Meadows® Air-Shield™ LSR 2.39 W.R. Meadows® Air-Shield™ SMP 2.40 W.R. Meadows® Air-Shield™ TMPHenry® Air-Bloc® 31MR
Exterior Cladding Select option 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, or 17 Note: For WRB over exterior insulation option 2 above, heavy masonry claddings 1-6 shall incorporate non-open joints.	Heavy Masonry: 1. Brick – nominal 4" clay brick or veneer with a maximum 2" air gap behind brick. Brick ties/anchors – 24" o.c. (max.) 2. Stucco – Minimum 0.75" thick, exterior cement plaster and lath with an optional secondary water resistive barrier between the exterior insulation and lath.* 3. Limestone – minimum 2" thick any using standard installation technique. 4. Natural Stone Veneer – Minimum 2" thick using any standard installation technique. 5. Cast Artificial Stone, Precast Concrete Panels, or CMU – Minimum 1.5" thick, using any standard installation technique. Cast stone complying with ICC-ES AC 51. 6. Terra Cotta Cladding – Minimum 1.25" thick using any standard installation technique. Other: 7. Any MCM or ACM (aluminum, steel, copper, zinc) (w/ 2.5" maximum air gap) that has successfully passed NFPA 285 using any standard installation technique, such as: a. Carter Companies EVO Architectural Panel Systems for use with any FR ACM/MCM NFPA 285 material. 8. Uninsulated sheet metal building panels including aluminum, zinc, steel, or copper using any standard installation technique. 9. Uninsulated fiber-cement board siding using any standard installation technique. 10. Stone/Aluminum honeycomb composite building panels that have passed NFPA 285 or equivalent. a. Stone Panels Inc. Stone Lite Panel system has been analyzed using manufacturer standard installation technique. 11. Autoclaved-aerated-concrete (AAC) panels that have successfully passed NFPA 285 using any standard installation technique. 12. Thin Set Brick: a. Glen-Gary Thin Tech™ Elite Series has been analyzed using manufacturer standard installation technique. b. Tabs II Panel System with 0.5" bricks using Tabs Wall Adhesive. 13. Natural Stone Veneer – minimum 1.25" (adhered with mortar or concrete/cement based adhesive). 14. FunderMax M. Look at using the manufacturer standard installation technique. The air gap between cladding and insulation or WRB must not exceed 1.5". 15. Glen-Gery Tru-Brix (only with optional non-combustible mortar). 16. Thin brick (minimum 0.75" thick clay brick) fully adhered with cementitious mortar (standard or polymer-modified) to minimum 0.5" thick cement backer board or gypsum sheathing. A secondary water resistive barrier can be installed between the exterior sheathing and the brick.* 17. Natural stone or artificial stone (minimum 0.75" thick) fully adhered with cementitious mortar (standard or polymer-modified) to minimum 0.5" thick cement backer board or gypsum sheathing. A secondary water resistive barrier can be installed between the exterior sheathing and the brick.* *NOTE: The secondary barriers shall not be full-coverage asphalt or butyl-based self-adhered membranes.



Table 4. Fire Performance - Vertical & Lateral Fire Propagation¹

Wall Component	Materials
<p>Rough Openings</p> <p>Note: Must cover both the air gap between the cladding and the exterior insulation and the exposed edge of the exterior insulation.</p>	<p>Rough opening perimeters shall incorporate one of the following, spanning at a minimum from the interior edge of the cladding to the interior edge of the exterior insulation at the rough opening:</p> <ol style="list-style-type: none"> 1. 0.08" (min.) aluminum (examples include window frame, flashing, lintel, C-channel) 2. 20-gauge (min.) sheet steel (examples include window frame, flashing, lintel, C-channel) 3. 0.5" (min.) 4pcf (min.) mineral wool 4. 0.75" (min.) FRT wood buck 5. 0.75" (min.) FRT plywood 6. 0.625" (min.) type X GWB 7. 0.25" (min.) fiber cement board <p>All fenestrations and penetrations shall be flashed in accordance with the applicable code using asphalt, acrylic or butyl flashing tape, liquid flashing, R-SEAL 6000, or R-SEAL 2000 LF up to 12" maximum width.</p>
<p>SI: 1 in = 25.4 mm</p> <p>1. All WRBs shall be installed at recommended application rates and per the manufacturer installation instructions.</p>	

6.5.6 Ignition Properties:

6.5.6.1 ECOMAXci FR Ply was evaluated to assess performance with regard to ignition in accordance with 2018 IBC Section 2603.5.7.

6.5.6.1.1 The insulation boards comply with this section when the exterior side of the sheathing is protected with one of the following materials:

6.5.6.1.1.1 A thermal barrier in accordance with IBC Section 2603.4

6.5.6.1.1.2 Masonry or concrete: minimum 1" (25.4 mm) thick

6.5.6.1.1.3 Glass-fiber reinforced concrete panels: minimum 0.375" (9.5 mm) thick

6.5.6.1.1.4 Metal-faced panels with a minimum 0.019" (0.5 mm) thick aluminum or 0.016" (0.4 mm) thick corrosion-resistant steel outer facings

6.5.6.1.1.5 Stucco: minimum 0.875" (22.2 mm) thick complying with IBC Section 2510

6.6 Attachment to Steel Framing to Support Cladding Weight

6.6.1 Allowable cladding loads are shown in **Table 5** and **Table 6** in **Appendix B** for attaching ECOMAXci FR Ply to light-frame cold-formed steel with various fastener types and sheathing thicknesses.

6.6.1.1 The cladding weight shall include the weight of the ECOMAXci FR Ply sheathing as well as any additional cladding attached to the sheathing. The tables in **Appendix B** only consider the gravity (dead) loads corresponding to the tabulated cladding weights.

6.6.1.2 The fasteners shall have a minimum size and maximum spacing as shown.

6.6.1.3 All panel edges shall be supported by framing or blocking.

6.6.1.4 Minimum allowable penetration into steel framing is the steel thickness plus three threads plus the tip.



6.6.2 Use one of the following (fasteners with equal or greater design properties shall be permitted):

- 6.6.2.1 #8 screw: 0.164" shank diameter, 0.3125" head diameter
- 6.6.2.2 #10 screw: 0.190" shank diameter, 0.363" head diameter
- 6.6.2.3 #12 screw: 0.216" shank diameter, 0.414" head diameter
- 6.6.2.4 Rmax Nail Board Fastener SIP LD: 0.189" shank diameter, 0.625" head diameter
- 6.6.2.5 Rmax Nail Board Fastener SIP HD: 0.189" shank diameter, 0.625" head diameter
- 6.6.2.6 TRUFAST SIP LD: 0.189" shank diameter, 0.625" head diameter
- 6.6.2.7 TRUFAST SIP HD: 0.189" shank diameter, 0.625" head diameter
- 6.6.2.8 FastenMaster HeadLOK®: 0.191 inch shank diameter, 0.625 inch head diameter

6.7 *Attachment to Fire-Rated Treated (FRT) Wood Framing to Support Cladding Weight*

6.7.1 Allowable cladding loads are shown in **Table 7** and **Table 8** in **Appendix B** for attaching ECOMAXci FR Ply to FRT wood stud framing with various fastener types and sheathing thicknesses.

- 6.7.1.1 The cladding weight shall include the weight of the ECOMAXci FR Ply sheathing as well as any additional cladding attached to the sheathing. The tables in **Appendix B** only consider the gravity (dead) loads corresponding to the tabulated cladding weights.
- 6.7.1.2 The fasteners shall have a minimum size and maximum spacing as shown.
- 6.7.1.3 All panel edges shall be supported by framing or blocking.
- 6.7.1.4 Minimum allowable penetration into FRT wood wall framing is 1.25".

6.7.2 Use one of the following (fasteners with equal or greater design properties shall be permitted):

- 6.7.2.1 Rmax Nail Board Fastener SIP TP: 0.189" shank diameter, 0.625" head diameter
- 6.7.2.2 12d nail (0.148" x 3.25"): 0.312" head diameter
- 6.7.2.3 Simpson Strong-Drive SDWS22: 0.22" shank diameter, 0.435" head diameter
- 6.7.2.4 FastenMaster HeadLOK: 0.191" shank diameter, 0.625" head diameter
- 6.7.2.5 TRUFAST SIP TP: 0.189" shank diameter, 0.625" head diameter

6.7.3 Fasteners in contact with FRT wood shall be coated to protect against corrosion per IBC Section 2304.10.6.²³

6.8 *Attachment to Concrete to Support Cladding Weight*

6.8.1 Allowable cladding loads are shown in **Table 9**, **Table 10** and **Table 11** in **Appendix B** for attaching ECOMAXci FR Ply to minimum 2,500 psi concrete (at 28 days) with various fastener types and sheathing thicknesses.

- 6.8.1.1 The cladding weight shall include the weight of the ECOMAXci FR Ply sheathing as well as any additional cladding attached to the sheathing. The tables in **Appendix B** only consider the gravity (dead) loads corresponding to the tabulated cladding weights.
- 6.8.1.2 The fasteners shall have a minimum size and maximum spacing as shown.
- 6.8.1.3 Minimum allowable embedment into concrete is dependent on the fastener as noted in **Table 9**, **Table 10** and **Table 11** in **Appendix B**.

6.8.2 Use one of the following (fasteners with equal or greater design properties shall be permitted):

- 6.8.2.1 ITW Buildex Tapcon Hex: 0.1875" nominal shank diameter
- 6.8.2.2 Hilti KH-EZ C: 0.25" nominal diameter
- 6.8.2.3 Simpson Strong-Tie Titen HD: 0.25" nominal diameter
- 6.8.2.4 TRUFAST SIP LD: 0.189" shank diameter



6.9 Attachment to Concrete Masonry Units (CMU) to Support Cladding Weight

- 6.9.1 Allowable cladding loads are shown in **Table 12**, **Table 13** and **Table 14** in **Appendix B** for attaching ECOMAXci FR Ply to CMU block with various fastener types and sheathing thicknesses.
 - 6.9.1.1 The cladding weight shall include the weight of the ECOMAXci FR Ply sheathing as well as any additional cladding attached to the sheathing. The tables in **Appendix B** only consider the gravity (dead) loads corresponding to the tabulated cladding weights.
 - 6.9.1.2 The fasteners shall have a minimum size and maximum spacing as shown.
 - 6.9.1.3 Minimum allowable embedment into CMU is dependent on the fastener as noted in **Table 12**, **Table 13** and **Table 14** in **Appendix B**.
- 6.9.2 All fasteners shall be installed into the face of CMU block.
- 6.9.3 Use one of the following (fasteners with equal or greater design properties shall be permitted):
 - 6.9.3.1 Rmax Nail Board Fastener SIP LD: 0.189" shank diameter
 - 6.9.3.2 ITW Buildex Tapcon Hex: 0.1875" nominal shank diameter
 - 6.9.3.3 Hilti KH-EZ C: 0.25" nominal diameter
 - 6.9.3.4 Simpson Strong-Tie Titen HD: 0.25" nominal diameter
 - 6.9.3.5 TRUFAST SIP LD: 0.189" shank diameter
- 6.10 Where the application falls outside of the performance evaluation, conditions of use and/or installation requirements set forth herein, alternative techniques shall be permitted in accordance with accepted engineering practice and experience. This includes but is not limited to the following areas of engineering: mechanics or materials, structural, building science, and fire science.

7 Certified Performance²⁴

- 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.²⁵
- 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.²⁶

8 Regulatory Evaluation and Accepted Engineering Practice

- 8.1 ECOMAXci FR Ply complies with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:
 - 8.1.1 Performance in accordance with foam plastic requirements of IBC Section 2603.
 - 8.1.2 Performance for use as a continuous air barrier in accordance with IECC Section C402.5.1.
 - 8.1.3 Performance for use in exterior walls of buildings of Type I-IV construction in accordance with 2018 IBC Section 2603.5.
 - 8.1.3.1 Fire resistance rated assembly in accordance with IBC Section 2603.5.1.
 - 8.1.3.2 Potential heat in accordance with IBC Section 2603.5.3.
 - 8.1.3.3 Flame spread and smoke developed ratings in accordance with IBC Section 2603.5.4 and IRC Section R316.3.
 - 8.1.3.4 Vertical and lateral fire propagation in accordance with IBC Section 2603.5.5.
 - 8.1.3.5 Ignition characteristics in accordance with 2018 IBC Section 2603.5.7.



- 8.1.4 Connection to light-frame cold-formed steel framing to support cladding weight in accordance with IBC Section 1609.1.1.
- 8.1.5 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.
- 8.1.6 Connection to concrete substrate to support cladding weight in accordance with IBC Section 1901.3.
- 8.2 Design of cladding fastening to ECOMAXci FR Ply is outside the scope of this report.
- 8.3 ECOMAXci FR Ply is not designed as a structural bracing material. Adequate building bracing shall be provided through other means and methods.
 - 8.3.1 Use of ECOMAXci FR Ply in structures where the exterior wall covering is unable to resist 100% of the transverse wind load is outside the scope of this report.
- 8.4 Any building code, regulation, and/or accepted engineering evaluations (i.e., research reports, Duly Authenticated Reports, etc.) that are conducted for this Listing were performed by DrJ Engineering, LLC (DrJ), an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP/approved sources. DrJ is qualified²⁷ to practice product and regulatory compliance services within its scope of accreditation and engineering expertise, respectively.
- 8.5 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which are also its areas of professional engineering competence.
- 8.6 Any regulation specific issues not addressed in this section are outside the scope of this report.

9 Installation

- 9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report and the applicable building code.
- 9.2 In the event of a conflict between the manufacturer installation instructions and this report, the more restrictive shall govern.
- 9.3 *Orientation*
 - 9.3.1 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.
 - 9.3.2 ECOMAXci FR Ply may be installed vertically or horizontally over concrete or CMU block in accordance with **Table 9, Table 10, Table 11, Table 12, Table 13** and **Table 14** in **Appendix B**.
- 9.4 *Attachment*
 - 9.4.1 For steel and FRT wood framing, fasteners shall be installed with a nominal edge distance of 0.375" (9.5 mm) in the ECOMAXci FR Ply.
 - 9.4.2 For concrete and CMU, fastener edge distance is dependent on the fastener as noted in **Table 9** through **Table 14** in **Appendix B**.
 - 9.4.3 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 2304.10.6²⁸ for FRT wood.
 - 9.4.4 Fasteners shall be installed with the maximum on-center spacing as indicated in **Table 5** through **Table 14** in **Appendix B**.
 - 9.4.5 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.
 - 9.4.6 See footnotes for more installation information into concrete and masonry substrates.
 - 9.4.6.1 All fasteners installed in masonry shall be in the face of CMU block.



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 Material properties testing in accordance with ASTM C1289
 - 10.1.2 Air permeance testing in accordance with ASTM E2178
 - 10.1.3 Flame spread rating and smoke developed ratings testing in accordance with ASTM E84
 - 10.1.4 Fire resistance rating testing in accordance with UL 263
 - 10.1.5 Heat propagation (potential heat) testing in accordance with NFPA 259
 - 10.1.6 Vertical and lateral fire propagation testing in accordance with NFPA 285-12, with analysis by Priest and Associates Consulting, LLC and Hughes Associates
- 10.2 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or RDPs. Accuracy of external test data and resulting analysis is relied upon.
- 10.3 Where pertinent, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.
- 10.4 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or Duly Authenticated Reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this Duly Authenticated Report, may be dependent upon published design properties by others.
- 10.5 Testing and engineering analysis: The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.²⁹
- 10.6 Where additional condition of use and/or regulatory compliance information is required, please search for ECOMAXci FR Ply on the DrJ Certification website.

11 Findings

- 11.1 As outlined in **Section 6**, ECOMAXci FR Ply has performance characteristics that were tested and/or meet applicable regulations and is 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, ECOMAXci FR Ply shall be approved for the following applications:
- 11.2.1 Buildings constructed in accordance with the IBC and the IRC.
 - 11.2.2 Performance of foam plastics in accordance with IBC Section 2603 and IRC Section R316.
 - 11.2.3 Use as insulating sheathing in accordance with IECC Section C402.
 - 11.2.4 Use as a continuous air barrier in accordance with IECC Section C402.5.1.
 - 11.2.5 Use in exterior walls of Type I-IV construction in accordance with IBC Section 2603.5.
 - 11.2.6 Use in a fire-resistance-rated assembly in accordance with IBC Section 2603.5.1.
 - 11.2.7 Flame spread and smoke-developed indices in accordance with IBC Section 2603.5.4.
 - 11.2.8 Potential heat in accordance with IBC Section 2603.5.3.



- 11.2.9 Vertical and lateral fire propagation in accordance with IBC Section 2603.5.5.
- 11.2.10 Ignition characteristics in accordance with IBC Section 2603.5.7.
- 11.2.11 Use as a nailbase for cladding materials.
- 11.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Rmax.
- 11.4 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10³⁰ are similar) in pertinent part states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code. Where the alternative material, design or method of construction is not approved, the building official shall respond in writing, stating the reasons the alternative was not approved.

- 11.5 **Approved:**³¹ Building regulations require that the building official shall accept Duly Authenticated Reports.³²
 - 11.5.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited.
 - 11.5.2 An approved source is “approved” when an RDP is properly licensed to transact engineering commerce.
 - 11.5.3 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.
- 11.6 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB-Accredited Product Certification Body – Accreditation #1131.
- 11.7 Through the IAF Multilateral Agreements (MLA), this Duly Authenticated Report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 Duly Authenticated Reports are equivalent.³³

12 Conditions of Use

- 12.1 Material properties shall not fall outside the boundaries defined in **Section 6**.
- 12.2 As defined in **Section 6**, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.
- 12.3 Installation shall comply with this report and the manufacturer installation instructions. In the event of a conflict between this report and the manufacturer installation instructions, the more restrictive shall govern.
- 12.4 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.
- 12.5 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.
- 12.6 Walls shall be fully braced with other materials in accordance with IBC Section 2308.6.4 or IRC Section R602.10.
- 12.7 A separate WRB shall be installed in accordance with IBC Section 1403.2 and IRC Section R703.2.
- 12.8 Walls shall not be used to resist horizontal loads from concrete and masonry walls.
- 12.9 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 14** in **Appendix B**.



- 12.10 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:
- 12.10.1 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.
 - 12.10.2 This report and the installation instructions shall be submitted at the time of permit application.
 - 12.10.3 This innovative product has an internal quality control program and a third-party quality assurance program.
 - 12.10.4 At a minimum, this innovative product shall be installed per **Section 9** of this report.
 - 12.10.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.
 - 12.10.6 This innovative product has an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.4, IBC Section 110.4, IBC Section 1703, IRC Section R104.4, and IRC Section R109.2.
 - 12.10.7 The application of this innovative product in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2, and any other regulatory requirements that may apply.
- 12.11 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *"the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new material or assemblies as provided for in Section 104.11,"* all of IBC Section 104, and IBC Section 105.4.
- 12.12 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).
- 12.13 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

13 Identification

- 13.1 The innovative product listed in **Section 1.1** is 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.rmax.com.

14 Review Schedule

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

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

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



Appendix A

1 Legislation that Authorizes AHJ Approval

- 1.1 **Fair Competition:** State legislatures have adopted Federal regulations for the examination and approval of building code referenced and alternative products, materials, designs, services, assemblies and/or methods of construction that:
 - 1.1.1 Advance innovation
 - 1.1.2 Promote competition so all businesses have the opportunity to compete on price and quality in an open market on a level playing field unhampered by anticompetitive constraints
 - 1.1.3 Benefit consumers through lower prices, better quality, and greater choice
- 1.2 **Adopted Legislation:** The following local, state, and federal regulations affirmatively authorize this innovative product to be approved by AHJs, delegates of building departments, and/or delegates of an agency of the federal government:
 - 1.2.1 Interstate commerce is governed by the Federal Department of Justice to encourage the use of innovative products, materials, designs, services, assemblies, and/or methods of construction. The goal is to “*protect economic freedom and opportunity by promoting free and fair competition in the marketplace.*”
 - 1.2.2 Title 18 US Code Section 242 affirms and regulates the right of individuals and businesses to freely and fairly have new products, materials, designs, services, assemblies, and/or methods of construction approved for use in commerce. Disapproval of alternatives shall be based upon non-conformance with respect to specific provisions of adopted legislation and shall be provided in writing stating the reasons why the alternative was not approved, with reference to the specific legislation violated.
 - 1.2.3 The federal government and each state have a public records act. In addition, each state also has legislation that mimics the federal Defend Trade Secrets Act 2016 (DTSA),³⁴ where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years³⁵ and/or a \$5,000,000 fine or 3 times the value of³⁶ the Intellectual Property (IP) and Trade Secrets (TS).
 - 1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of Listings, certified reports, Technical Evaluation Reports, Duly Authenticated Reports, and/or research reports prepared by approved agencies and/or approved sources.
 - 1.2.4 For new materials³⁷ that are not specifically provided for in any regulation, the design strengths and permissible stresses shall be established by tests, where suitable load tests simulate the actual loads and conditions of application that occur.
 - 1.2.5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design using accepted engineering practice.³⁸
 - 1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence provided in writing, that specific legislation have been violated by an individual registered PE.
 - 1.2.7 The AHJ shall accept Duly Authenticated Reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.³⁹



- 1.3 **Approved⁴⁰ by Los Angeles:** The Los Angeles Municipal Code (LAMC) states in pertinent part that the provisions of LAMC are not intended to prevent the use of any material, device, or method of construction not specifically prescribed by LAMC. The Department shall use Part III, Recognized Standards in addition to Part II, Uniform Building Code Standards of Division 35, Article 1, Chapter IX of the LAMC in evaluation of products for approval where such standard exists for the product or the material and may use other approved standards that apply. Whenever tests or certificates of any material or fabricated assembly are required by Chapter IX of the LAMC, such tests or certification shall be made by a testing agency approved by the Superintendent of Building to conduct such tests or provide such certifications. The testing agency shall publish the scope and limitation(s) of the listed material or fabricated assembly.⁴¹ The Superintendent of Building Approved Testing Agency Roster is provided by the Los Angeles Department of Building and Safety (LADBS). The Center for Building Innovation (CBI) Certificate of Approval License is TA24945. Tests and certifications found in a DrJ Listing are LAMC approved. In addition, the Superintendent of Building shall accept Duly Authenticated Reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in the California Building Code (CBC) Section 1707.1.⁴²
- 1.4 **Approved by Chicago:** The Municipal Code of Chicago (MCC) states in pertinent part that an Approved Agency is a Nationally Recognized Testing Laboratory (NRTL) acting within its recognized scope and/or a certification body accredited by the American National Standards Institute (ANSI) acting within its accredited scope. Construction materials and test procedures shall conform to the applicable standards listed in the MCC. Sufficient technical data shall be submitted to the building official to substantiate the proposed use of any product, material, service, design, assembly, and/or method of construction not specifically provided for in the MCC. This technical data shall consist of research reports from approved sources (i.e., MCC defined Approved Agencies).
- 1.5 **Approved by New York City:** The 2022 NYC Building Code (NYCBC) states in part that an approved agency shall be deemed⁴³ an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation, and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement⁴⁴ (i.e., ANAB, International Accreditation Forum [IAF], etc.).
- 1.6 **Approved by Florida:** Statewide approval of products, methods, or systems of construction shall be approved, without further evaluation by:
- 1.6.1 A certification mark or listing of an approved certification agency,
 - 1.6.2 A test report from an approved testing laboratory,
 - 1.6.3 A product evaluation report based upon testing or comparative or rational analysis, or a combination thereof, from an approved product evaluation entity, or
 - 1.6.4 A product evaluation report based upon testing, comparative or rational analysis, or a combination thereof, developed, signed and sealed by a professional engineer or architect, licensed in Florida.
 - 1.6.5 For local product approval, products or systems of construction shall demonstrate compliance with the structural wind load requirements of the Florida Building Code (FBC) through one of the following methods:
 - 1.6.5.1 A certification mark, listing or label from a commission-approved certification agency indicating that the product complies with the code,
 - 1.6.5.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,
 - 1.6.5.3 A product-evaluation report based upon testing, comparative or rational analysis, or a combination thereof, from a commission-approved product evaluation entity which indicates that the product evaluated complies with the code,



- 1.6.5.4 A product-evaluation report or certification based upon testing or comparative or rational analysis, or a combination thereof, developed and signed and sealed by a Florida professional engineer or Florida registered architect, which indicates that the product complies with the code, or
- 1.6.5.5 A statewide product approval issued by the Florida Building Commission.
- 1.6.6 The [Florida Department of Business and Professional Regulation \(DBPR\)](#) website provides a listing of companies certified as a [Product Evaluation Agency](#) (i.e., EVLMiami 13692), a [Product Certification Agency](#) (i.e., CER10642), and as a [Florida Registered Engineer](#) (i.e., ANE13741).
- 1.7 **Approved by Miami-Dade County (i.e., Notice of Acceptance [NOA]):** A Florida statewide approval is an NOA. An NOA is a Florida local product approval. By Florida law, Miami-Dade County shall accept the statewide and local Florida Product Approval as provided for in Florida legislation [553.842](#) and [553.8425](#).
- 1.8 **Approved by New Jersey:** Pursuant to the 2018 Building Code of New Jersey in [IBC Section 1707.1 General](#),⁴⁵ it states: *"In the absence of approved rules or other approved standards, the building official shall accept duly authenticated reports from [approved agencies](#) in respect to the quality and manner of use of new materials or assemblies as provided for in the administrative provisions of the Uniform Construction Code (N.J.A.C. 5:23)"*.⁴⁶ Furthermore N.J.A.C 5:23-3.7 states: *"Municipal approvals of alternative materials, equipment, or methods of construction."*
 - 1.8.1 **Approvals:** Alternative materials, equipment, or methods of construction shall be approved by the appropriate subcode official provided the proposed design is satisfactory and that the materials, equipment, or methods of construction are suitable for the intended use and are at least the equivalent in quality, strength, effectiveness, fire resistance, durability, and safety of those conforming with the requirements of the regulations.
 - 1.8.1.1 A field evaluation label and report or letter issued by a nationally recognized testing laboratory verifying that the specific material, equipment, or method of construction meets the identified standards or has been tested and found to be suitable for the intended use, shall be accepted by the appropriate subcode official as meeting the requirements of the above.
 - 1.8.1.2 Reports of engineering findings issued by nationally recognized evaluation service programs such as but not limited to, the Building Officials and Code Administrators (BOCA), the International Conference of Building Officials (ICBO), the Southern Building Code Congress International (SBCCI), the International Code Council (ICC), and the National Evaluation Service, Inc., shall be accepted by the appropriate subcode official as meeting the requirements of the above.
 - 1.8.2 The [New Jersey Department of Community Affairs](#) has confirmed that technical evaluation reports, from any accredited entity listed by [ANAB](#), meets the requirements of item the previous paragraph, given that the listed entities are no longer in existence and/or do not provide *"reports of engineering findings."*
- 1.9 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, [Part 3282.14](#)⁴⁷ and [Part 3280](#),⁴⁸ the Department encourages innovation and the use of new technology in manufactured homes. The design and construction of a manufactured home shall conform to the provisions of Part 3282 and Part 3280 where key approval provisions in mandatory language follow:
 - 1.9.1 *"All construction methods shall be in conformance with accepted engineering practices."*
 - 1.9.2 *"The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur."*
 - 1.9.3 *"The design stresses of all materials shall conform to accepted engineering practice."*



- 1.10 **Approval by US, Local and State Jurisdictions in General:** In all other local and state jurisdictions, the adopted building code legislation states in pertinent part that:
- 1.10.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.⁴⁹
 - 1.10.2 For innovative alternatives and/or methods of construction, the building official shall accept Duly Authenticated Reports from approved agencies with respect to the quality and manner of use of new materials or assemblies.⁵⁰
 - 1.10.2.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is in the ANAB directory.
 - 1.10.2.2 An approved source is “approved” when an RDP is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.⁵¹
 - 1.10.3 The design strengths and permissible stresses of any structural material...shall conform to the specifications and methods of design of accepted engineering practice performed by an approved source.⁵²
- 1.11 **Approval by International Jurisdictions:** The USMCA and GATT agreements provide for approval of innovative materials, designs, services, and/or methods of construction through the Agreement on Technical Barriers to Trade and the IAF Multilateral Recognition Arrangement (MLA), where these agreements:
- 1.11.1 State that conformity assessment procedures (i.e., ISO/IEC 17020, 17025, 17065, etc.) are prepared, adopted, and applied so as to grant access for suppliers of like products originating in the territories of other Members under conditions no less favourable than those accorded to suppliers of like products of national origin or originating in any other country, in a comparable situation.
 - 1.11.2 **Approved:** The purpose of the MLA is to ensure mutual recognition of accredited certification and validation/verification statements between signatories to the MLA and subsequently, acceptance of accredited certification and validation/verification statements in many markets based on one accreditation for the timely approval of innovative materials, designs, services, and/or methods of construction.
 - 1.11.3 ANAB is an IAF-MLA signatory where recognition of certificates, validation, and verification statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA, with the appropriate scope, shall be approved.⁵³
 - 1.11.4 Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.⁵⁴
- 1.12 Approval equity is a fundamental commercial and legal principle.⁵⁵



Appendix B

Base Wall	Stud/Horizontal Spacing	Reference
Steel Studs	16" o.c.	Table 5
	24" o.c.	Table 6
FRT Wood Studs	16" o.c.	Table 7
	24" o.c.	Table 8
Concrete	16" o.c.	Table 9
	24" o.c.	Table 10
	48" o.c.	Table 11
CMU	16" o.c.	Table 12
	24" o.c.	Table 13
	48" o.c.	Table 14



Table 5. ECOMAXci FR Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical Steel Studs 16" o.c.^{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 ³ (psf)					
			5	10	15	20	25	30
20-gauge Structural (33 mil)	Rmax Nail Board Fastener SIP LD	0.75	24	16	12	8	8	6
		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	0.75	24	16	12	8	8	6
		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	0.75	24	16	12	8	8	6
		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 SIP LD	0.75	24	16	12	8	8	6
		1.00	24	16	12	8	8	6
		1.50	24	16	8	8	6	4



Table 5. ECOMAXci FR Ply with ⁵/₈" or ³/₄" Fire Treated Plywood – Vertical Steel Studs 16" o.c.^{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 ³ (psf)					
			5	10	15	20	25	30
		2.00	24	12	8	6	4	4
		2.50	16	8	6	4	4	-
	TRUFAST SIP LD	3.00	16	8	6	4	-	-
		3.50	12	6	4	-	-	-
		4.00	6	-	-	-	-	-
	#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-gauge Structural (43 mil)	Rmax Nail Board Fastener SIP LD	0.75	24	24	16	12	8	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
		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	0.75	24	24	16	12	12	8
		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	-	-	-



Table 5. ECOMAXci FR Ply with ⁵/₈" or ³/₄" Fire Treated Plywood – Vertical Steel Studs 16" o.c.^{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 ³ (psf)					
			5	10	15	20	25	30
		4.50	4	-	-	-	-	-
	#12 common	0.75	24	24	16	16	12	8
		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 SIP LD	0.75	24	24	16	12	8	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
		2.50	24	16	8	8	6	4
	TRUFAST SIP LD	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	-	-
	Rmax Nail Board Fastener SIP HD	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



Table 5. ECOMAXci FR Ply with ⁵/₈" or ³/₄" Fire Treated Plywood – Vertical Steel Studs 16" o.c.^{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 ³ (psf)					
			5	10	15	20	25	30
16-gauge Structural (54 mil)		3.00	24	16	12	8	8	6
		3.50	24	12	8	6	6	4
		4.00	16	8	6	4	-	-
		4.50	4	-	-	-	-	-
	TRUFast SIP HD	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	12	8	6	6	4
		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	0.75	24	24	16	16	12	8
		1.00	24	24	16	16	12	8
		1.50	24	24	16	12	8	8
		2.00	24	24	16	12	8	8



Table 5. ECOMAXci FR Ply with $\frac{5}{8}$ " or $\frac{3}{4}$ " Fire Treated Plywood – Vertical Steel Studs 16" o.c.^{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 ³ (psf)					
			5	10	15	20	25	30
		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	0.75	24	24	16	12	8	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
		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.^{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 ³ (psf)					
			5	10	15	20	25	30
20-gauge Structural (33 mil)	Rmax Nail Board Fastener SIP LD	0.75	24	12	8	6	4	4
		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	0.75	24	12	8	6	4	4
		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 SIP LD	0.75	24	12	8	6	4	4
		1.00	24	12	8	6	4	4
		1.50	16	8	6	4	4	-



Table 6. ECOMAXci FR Ply with ⁵/₈" or ³/₄" Fire Treated Plywood – Vertical Steel Studs 24" o.c.^{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 ³ (psf)					
			5	10	15	20	25	30
		2.00	16	8	6	4	-	-
		2.50	12	6	4	-	-	-
	TRUFAST SIP LD	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	-	-
		2.50	12	6	4	-	-	-
18-gauge Structural (43 mil)	Rmax Nail Board Fastener SIP LD	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	0.75	24	16	12	8	8	6
		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	-	-	-	-



Table 6. ECOMAXci FR Ply with ⁵/₈" or ³/₄" Fire Treated Plywood – Vertical Steel Studs 24" o.c.^{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 ³ (psf)					
			5	10	15	20	25	30
	#12 common	0.75	24	16	12	8	8	6
		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 SIP LD	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 SIP LD	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	-	-
		2.00	16	8	4	4	-	-
		2.50	12	6	4	-	-	-
16-gauge Structural (54 mil)	Rmax Nail Board Fastener SIP HD	0.75	24	24	16	16	12	8
		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



Table 6. ECOMAXci FR Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical Steel Studs 24" o.c.^{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 ³ (psf)					
			5	10	15	20	25	30
		3.50	16	8	6	4	4	-
		4.00	12	6	4	-	-	-
	TRUFAST SIP HD	0.75	24	24	16	16	12	8
		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	0.75	24	24	16	16	12	8
		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	0.75	24	16	12	8	8	6
		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



Table 6. ECOMAXci FR Ply with $\frac{5}{8}$ " or $\frac{3}{4}$ " Fire Treated Plywood – Vertical Steel Studs 24" o.c.^{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 ³ (psf)					
			5	10	15	20	25	30
		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	-	-	-

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 $\frac{5}{8}$ " or $\frac{3}{4}$ " Fire Treated Plywood – Vertical FRT Wood Studs 16" o.c.^{1,3,4,5,6,7}

Fastener Type and 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 SIP TP	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	-	-	-
12d (0.148" x 3.25")	0.75	24	16	8	8	6	6
	1.00	20	12	8	6	6	4
TRUFAST SIP TP	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



Table 7. ECOMAXci FR Ply with $\frac{5}{8}$ " or $\frac{3}{4}$ " Fire Treated Plywood – Vertical FRT Wood Studs 16" o.c.^{1,3,4,5,6,7}

Fastener Type and 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
	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
	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 $\frac{1}{4}$ ".
 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. Verify strength reduction based on FRT manufacturer installation instructions.
 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 $\frac{5}{8}$ " or $\frac{3}{4}$ " Fire Treated Plywood – Vertical FRT Wood Studs 24" o.c.^{1,3,4,5,6,7}

Fastener Type and 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 SIP TP	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 SIP TP	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	-	-



Table 8. ECOMAXci FR Ply with $\frac{5}{8}$ " or $\frac{3}{4}$ " Fire Treated Plywood – Vertical FRT Wood Studs 24" o.c.^{1,3,4,5,6,7}

Fastener Type and 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
	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
	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	-	-	-
<p>SI: 1 in = 25.4 mm, 1 psf = 0.0479 kN/m²</p> <ol style="list-style-type: none"> Minimum fastener penetration into the stud is $1\frac{1}{4}$". 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. ECOMAXci FR Ply is installed directly to the studs with the plywood to the exterior of the structure. FRT wood studs shall be a minimum of 2x4 and have a minimum specific gravity of 0.42. The tabulated calculations are based on a strength design reduction factor of 0.90 for fasteners in FRT wood. Verify strength reduction based on FRT manufacturer installation instructions. Nail and screw values determined using NDS Yield Limit Equations and TR-12 for evaluating the foam as a gap. 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 9. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to Concrete
(Horizontally Spaced at 16" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁴ (psf)					
			5	10	15	20	25	30
Concrete ($f'_c = 2,500$ psi)	3/16" ITW Buildex Tapcon Hex ¹	0.75	24	24	24	16	12	12
		1.00	24	24	20	16	12	8
		1.50	24	24	20	12	12	8
		2.00	24	24	16	12	8	8
		2.50	24	20	12	8	8	6
		3.00	24	16	8	8	6	4
		3.50	24	12	8	6	4	4
		4.00	16	8	4	4	-	-
		4.50	8	4	-	-	-	-
	1/4" Hilti KH-EZ C ²	0.75	24	24	24	20	16	12
		1.00	24	24	24	16	12	12
		1.50	24	24	20	16	12	8
		2.00	24	24	20	12	12	8
		2.50	24	24	16	12	8	8
		3.00	24	20	12	8	8	6
		3.50	24	20	12	8	8	6
		4.00	24	16	8	8	6	4
		4.50	24	12	8	6	4	4
	1/4" Simpson Strong-Tie Titen HD ³	0.75	24	24	16	12	8	8
		1.00	24	24	16	12	8	8
		1.50	24	20	12	8	8	6
		2.00	24	20	12	8	8	6
		2.50	24	16	12	8	6	6
		3.00	24	16	8	8	6	4
		3.50	24	12	8	6	4	4
		4.00	20	8	6	4	4	-



Table 9. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to Concrete
(Horizontally Spaced at 16" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁴ (psf)					
			5	10	15	20	25	30
		4.50	16	8	4	4	-	-

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psf = 47.88 N/m²

1. Minimum nominal embedment depth of 2" and minimum edge distance of 2".
2. Minimum nominal embedment depth of 1⁵/₈" and minimum edge distance of 1.5".
3. Minimum nominal embedment depth of 1⁵/₈" and minimum edge distance of 1.5".
4. The cladding weight shall include the weight of the ECOMAXci FR Ply sheathing as well as any additional cladding attached to the sheathing.



Table 10. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to Concrete
(Horizontally Spaced at 24" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁴ (psf)					
			5	10	15	20	25	30
Concrete ($f'_c = 2,500$ psi)	3/16" ITW Buildex Tapcon Hex ¹	0.75	24	24	16	12	8	8
		1.00	24	20	12	8	8	6
		1.50	24	20	12	8	8	6
		2.00	24	16	8	8	6	4
		2.50	24	12	8	6	4	4
		3.00	20	8	6	4	4	-
		3.50	16	8	4	4	-	-
		4.00	8	4	-	-	-	-
		4.50	4	-	-	-	-	-
	1/4" Hilti KH-EZ C ²	0.75	24	24	16	12	8	8
		1.00	24	24	16	12	8	8
		1.50	24	20	12	8	8	6
		2.00	24	20	12	8	8	6
		2.50	24	16	12	8	6	6
		3.00	24	12	8	6	6	4
		3.50	24	12	8	6	4	4
		4.00	20	8	6	4	4	-
		4.50	16	8	4	4	-	-
	1/4" Simpson Strong-Tie Titen HD ³	0.75	24	16	12	8	6	6
		1.00	24	16	8	8	6	4
		1.50	24	12	8	6	6	4
		2.00	24	12	8	6	4	4
		2.50	24	12	8	6	4	4
		3.00	20	8	6	4	4	-
		3.50	16	8	6	4	-	-
		4.00	12	6	4	-	-	-



Table 10. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to Concrete
(Horizontally Spaced at 24" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁴ (psf)					
			5	10	15	20	25	30
		4.50	8	4	-	-	-	-

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psf = 47.88 N/m²

1. Minimum nominal embedment depth of 2" and minimum edge distance of 2".
2. Minimum nominal embedment depth of 1⁵/₈" and minimum edge distance of 1.5".
3. Minimum nominal embedment depth of 1⁵/₈" and minimum edge distance of 1.5".
4. The cladding weight shall include the weight of the ECOMAXci FR Ply sheathing as well as any additional cladding attached to the sheathing.



Table 11. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to Concrete
(Horizontally Spaced at 48" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁴ (psf)					
			5	10	15	20	25	30
Concrete ($f'_c = 2,500$ psi)	$\frac{3}{16}$ " ITW Buildex Tapcon Hex ¹	0.75	24	12	8	6	4	4
		1.00	20	8	6	4	4	-
		1.50	20	8	6	4	4	-
		2.00	16	8	4	4	-	-
		2.50	12	6	4	-	-	-
		3.00	8	4	-	-	-	-
		3.50	8	4	-	-	-	-
		4.00	4	-	-	-	-	-
	$\frac{1}{4}$ " Hilti KH-EZ C ²	0.75	24	12	8	6	4	4
		1.00	24	12	8	6	4	4
		1.50	20	8	6	4	4	-
		2.00	20	8	6	4	4	-
		2.50	16	8	6	4	-	-
		3.00	12	6	4	-	-	-
		3.50	12	6	4	-	-	-
		4.00	8	4	-	-	-	-
		4.50	8	4	-	-	-	-
	$\frac{1}{4}$ " Simpson Strong-Tie Titen HD ³	0.75	16	8	6	4	-	-
		1.00	16	8	4	4	-	-
		1.50	12	6	4	-	-	-
		2.00	12	6	4	-	-	-
		2.50	12	6	4	-	-	-
		3.00	8	4	-	-	-	-
		3.50	8	4	-	-	-	-
		4.00	6	-	-	-	-	-
		4.50	4	-	-	-	-	-



Table 11. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to Concrete
(Horizontally Spaced at 48" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁴ (psf)					
			5	10	15	20	25	30
SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psf = 47.88 N/m ² 1. Minimum nominal embedment depth of 2" and minimum edge distance of 2". 2. Minimum nominal embedment depth of 1⅝" and minimum edge distance of 1.5". 3. Minimum nominal embedment depth of 1⅝" and minimum edge distance of 1.5". 4. The cladding weight shall include the weight of the ECOMAXci FR Ply sheathing as well as any additional cladding attached to the sheathing.								



Table 12. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to CMU Block
(Horizontally Spaced at 16" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
CMU Block	Rmax Nail Board Fastener SIP LD	0.75	24	24	24	20	16	12
		1.00	24	24	24	20	16	12
		1.50	24	24	20	16	12	8
		2.00	24	24	16	12	8	8
		2.50	24	20	12	8	8	6
		3.00	24	16	12	8	6	6
		3.50	24	16	8	8	6	4
		4.00	24	12	8	6	4	4
		4.50	24	12	8	6	4	4
	³ / ₁₆ " ITW Buildex Tapcon Hex ¹	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	20	8	6	4	4	-
		2.50	16	8	4	4	-	-
		3.00	12	6	4	-	-	-
		3.50	8	4	-	-	-	-
		4.00	4	-	-	-	-	-
	¹ / ₄ " Hilti KH-EZ C ²	0.75	24	24	24	24	24	20
		1.00	24	24	24	24	24	20
		1.50	24	24	24	24	20	16
		2.00	24	24	24	24	16	16
		2.50	24	24	24	20	16	12
		3.00	24	24	20	16	12	8
		3.50	24	24	16	12	8	8
		4.00	24	20	12	8	8	6
		4.50	24	12	8	6	4	4



Table 12. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to CMU Block
(Horizontally Spaced at 16" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
	1/4" Simpson Strong-Tie Titen HD ³	0.75	24	24	24	24	24	20
		1.00	24	24	24	24	24	20
		1.50	24	24	24	24	20	16
		2.00	24	24	24	24	16	16
		2.50	24	24	24	20	16	12
		3.00	24	24	24	16	12	12
		3.50	24	24	20	12	12	8
		4.00	24	24	16	12	8	8
		4.50	24	20	12	8	8	6
	TRUFAST SIP LD ⁴	0.75	24	24	24	20	16	12
		1.00	24	24	24	20	16	12
		1.50	24	24	20	16	12	8
		2.00	24	24	16	12	8	8
		2.50	24	20	12	8	8	6
		3.00	24	16	12	8	6	6
		3.50	24	16	8	8	6	4
		4.00	24	12	8	6	4	4
		4.50	24	12	8	6	4	4

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psf = 47.88 N/m²

1. Allowable connection design strength is based on attachment to minimum Grade N, Type II, medium- or normal-weight CMU (conforming to ASTM C90) filled with 2,000 psi grout (conforming to ASTM C1019) and a minimum embedment of 1", edge distance of 4", and spacing of 3".
2. Allowable connection design strength is based on attachment to minimum Grade N, Type II, lightweight CMU (conforming to ASTM C90) filled with 2,000 psi grout (conforming to ASTM C1019) and a minimum embedment of 1 5/8", edge distance of 4", and spacing of 4". At 28 days, the compressive strength of masonry, f_m , shall be a minimum of 1,500 psi.
3. Allowable connection design strength is based on attachment to minimum Grade N, Type II, lightweight CMU (conforming to ASTM C90) filled with 2,000 psi grout (conforming to ASTM C1019) and a minimum embedment of 2 1/2", edge distance of 4", and spacing of 4". At 28 days, the compressive strength of masonry, f_m , shall be a minimum of 1,500 psi.
4. Tabulated values do not consider the masonry strength in holding the fastener as a post-installed embedment. Minimum nominal embedment depth shall be determined in accordance with accepted practice.
5. The cladding weight shall include the weight of the ECOMAXci FR Ply sheathing as well as any additional cladding attached to the sheathing.



Table 13. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to CMU Block
(Horizontally Spaced at 24" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
CMU Block	Rmax Nail Board Fastener SIP LD	0.75	24	24	20	12	12	8
		1.00	24	24	20	12	12	8
		1.50	24	20	12	8	8	6
		2.00	24	16	12	8	6	6
		2.50	24	12	8	6	6	4
		3.00	24	12	8	6	4	4
		3.50	20	8	6	4	4	-
		4.00	16	8	6	4	-	-
		4.50	16	8	4	4	-	-
	³ / ₁₆ " ITW Buildex Tapcon Hex ¹	0.75	20	8	6	4	4	-
		1.00	16	8	6	4	-	-
		1.50	16	8	4	4	-	-
		2.00	12	6	4	-	-	-
		2.50	8	4	-	-	-	-
		3.00	8	4	-	-	-	-
		3.50	6	-	-	-	-	-
	1/4" Hilti KH-EZ C ²	0.75	24	24	24	20	16	12
		1.00	24	24	24	20	16	12
		1.50	24	24	24	16	12	12
		2.00	24	24	20	16	12	8
		2.50	24	24	16	12	8	8
		3.00	24	20	12	8	8	6
		3.50	24	16	12	8	6	6
		4.00	24	12	8	6	4	4
		4.50	16	8	4	4	-	-
		0.75	24	24	24	20	16	12



Table 13. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to CMU Block
(Horizontally Spaced at 24" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
	1/4" Simpson Strong-Tie Titen HD ³	1.00	24	24	24	20	16	12
		1.50	24	24	24	16	12	12
		2.00	24	24	20	16	12	8
		2.50	24	24	16	12	8	8
		3.00	24	24	16	12	8	8
		3.50	24	20	12	8	8	6
		4.00	24	16	8	8	6	4
		4.50	24	12	8	6	4	4
	TRUFAST SIP LD ⁴	0.75	24	24	20	12	12	8
		1.00	24	24	20	12	12	8
		1.50	24	20	12	8	8	6
		2.00	24	16	12	8	6	6
		2.50	24	12	8	6	6	4
		3.00	24	12	8	6	4	4
		3.50	20	8	6	4	4	-
		4.00	16	8	6	4	-	-
		4.50	16	8	4	4	-	-

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psf = 47.88 N/m²

- Allowable connection design strength is based on attachment to minimum Grade N, Type II, medium- or normal-weight CMU (conforming to ASTM C90) filled with 2,000 psi grout (conforming to ASTM C1019) and a minimum embedment of 1", edge distance of 4", and spacing of 3".
- Allowable connection design strength is based on attachment to minimum Grade N, Type II, lightweight CMU (conforming to ASTM C90) filled with 2,000 psi grout (conforming to ASTM C1019) and a minimum embedment of 1 5/8" edge distance of 4", and spacing of 4". At 28 days, the compressive strength of masonry, f_m , shall be a minimum of 1,500 psi.
- Allowable connection design strength is based on attachment to minimum Grade N, Type II, lightweight CMU (conforming to ASTM C90) filled with 2,000 psi grout (conforming to ASTM C1019) and a minimum embedment of 2 1/2", edge distance of 4", and spacing of 4". At 28 days, the compressive strength of masonry, f_m , shall be a minimum of 1,500 psi.
- Tabulated values do not consider the masonry strength in holding the fastener as a post-installed embedment. Minimum nominal embedment depth shall be determined in accordance with accepted practice.
- The cladding weight shall include the weight of the ECOMAXci FR Ply sheathing as well as any additional cladding attached to the sheathing.



Table 14. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to CMU Block
(Horizontally Spaced at 48" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
CMU Block	Rmax Nail Board Fastener SIP LD	0.75	24	12	8	6	6	4
		1.00	24	12	8	6	6	4
		1.50	20	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	8	4	-	-	-	-
		4.50	8	4	-	-	-	-
	3/16" ITW Buildex Tapcon Hex ¹	0.75	8	4	-	-	-	-
		1.00	8	4	-	-	-	-
		1.50	8	4	-	-	-	-
		2.00	6	-	-	-	-	-
		2.50	4	-	-	-	-	-
		3.00	4	-	-	-	-	-
	1/4" Hilti KH-EZ C ²	0.75	24	20	12	8	8	6
		1.00	24	20	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	20	8	6	4	4	-
		3.50	16	8	6	4	-	-
		4.00	12	6	4	-	-	-
		4.50	8	4	-	-	-	-
	1/4" Simpson Strong-Tie Titen HD ³	0.75	24	20	12	8	8	6
		1.00	24	20	12	8	8	6



Table 14. Maximum Vertical Fastener Spacing for ECOMAXci FR Ply Attached to CMU Block
(Horizontally Spaced at 48" o.c.)

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci FR Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
		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	20	8	6	4	4	-
		4.00	16	8	4	4	-	-
		4.50	12	6	4	-	-	-
	TRUFAST SIP LD ⁴	0.75	24	12	8	6	6	4
		1.00	24	12	8	6	6	4
		1.50	20	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	8	4	-	-	-	-
		4.50	8	4	-	-	-	-

SI: 1 in = 25.4 mm, 1 lb = 4.45 N, 1 psf = 47.88 N/m²

- Allowable connection design strength is based on attachment to minimum Grade N, Type II, medium- or normal-weight CMU (conforming to ASTM C90) filled with 2,000 psi grout (conforming to ASTM C1019) and a minimum embedment of 1", edge distance of 4", and spacing of 3".
- Allowable connection design strength is based on attachment to minimum Grade N, Type II, lightweight CMU (conforming to ASTM C90) filled with 2,000 psi grout (conforming to ASTM C1019) and a minimum embedment of 1⁵/₈" edge distance of 4", and spacing of 4". At 28 days, the compressive strength of masonry, f_m , shall be a minimum of 1,500 psi.
- Allowable connection design strength is based on attachment to minimum Grade N, Type II, lightweight CMU (conforming to ASTM C90) filled with 2,000 psi grout (conforming to ASTM C1019) and a minimum embedment of 2¹/₂", edge distance of 4", and spacing of 4". At 28 days, the compressive strength of masonry, f_m , shall be a minimum of 1,500 psi.
- Tabulated values do not consider the masonry strength in holding the fastener as a post-installed embedment. Minimum nominal embedment depth shall be determined in accordance with accepted practice.
- The cladding weight shall include the weight of the ECOMAXci FR Ply sheathing as well as any additional cladding attached to the sheathing.



Issue Date: August 4, 2022

Subject to Renewal: July 1, 2025

CBC and CRC Supplement to Report Number 1811-02

REPORT HOLDER: Rmax

1 Evaluation Subject

1.1 ECOMAXci FR Ply

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show ECOMAXci FR Ply, recognized in Report Number 1811-02 has also been evaluated for compliance with the codes listed below.

2.2 *Applicable Code Editions*

2.2.1 *CBC—19, 22: California Building Code (Title 24, Part 2)*

2.2.2 *CRC—19, 22: California Residential Code (Title 24, Part 2.5)*

2.2.3 *CEC —19, 22: California Energy Code (Title 24, Part 6)*

3 Conclusions

3.1 ECOMAXci FR Ply, described in Report Number 1811-02, complies with the CBC and CRC and is subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the CBC and CRC applicable to this report, they are listed here:

3.2.1 CBC Section 104.11 replaces IBC Section 104.11.

3.2.2 CBC Section 1707.1 replaces IBC Section 1707.1.

3.2.3 CRC Section R104.11 replaces IRC Section R104.11.

3.2.4 CEC, Title 24, Part 6 replaces IRC Section N1102.

3.2.5 CEC, Title 24, Part 6 replaces IECC Sections C402 and C402.5.1

4 Conditions of Use

4.1 ECOMAXci FR Ply, described in Report Number 1811-02, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 1811-02.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of CBC and CRC, as applicable.



Issue Date: August 4, 2022
Subject to Renewal: July 1, 2025

FBC Supplement to Report Number 1811-02

REPORT HOLDER: Rmax

1 Evaluation Subject

1.1 ECOMAXci FR Ply

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show ECOMAXci FR Ply, recognized in Report Number 1811-02, has also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 *Applicable Code Editions*

2.2.1 *FBC-B—20, 23: Florida Building Code – Building*

2.2.2 *FBC-R—20, 23: Florida Building Code – Residential*

3 Conclusions

3.1 ECOMAXci FR Ply, described in Report Number 1811-02, complies with the FBC-B and FBC-R and is subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the FBC-B and FBC-R applicable to this report, they are listed here:

3.2.1 FBC-B Section 104.4 and Section 110.4 are reserved.

3.2.2 FBC-R Section R104 and Section R109 are reserved.

3.2.3 FCB-R Section N1101 replaces IRC Section N1102.

4 Conditions of Use

4.1 ECOMAXci FR Ply, described in Report Number 1811-02, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 1811-02.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of FBC-B Chapter 16 and Chapter 17, as applicable.



Notes

- 1 For more information, visit drjcertification.org or call us at 608-310-6748.
- 2 <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1702>
- 3 Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review <https://www.justice.gov/atr/mission> and <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>
- 4 <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706>:-:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests%20as
- 5 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706>:-:text=shall%20conform%20to%20the%20specifications%20and%20methods%20of%20design%20of%20accepted%20engineering%20practice
- 6 <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707>:-:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies
- 7 <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>
- 8 https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_agency
- 9 https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_source
- 10 <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](#).
- 11 <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/>
- 12 <https://www.cbiteest.com/accreditation/>
- 13 <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104>:-:text=to%20enforce%20the%20provisions%20of%20this%20code
- 14 <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>:-:text=Where%20the%20alternative%20material%2C%20design%20or%20method%20of%20construction%20is%20not%20approved%2C%20the%20building%20official%20shall%20respond%20in%20writing%2C%20stating%20the%20reasons%20why%20the%20alternative%20was%20not%20approved AND <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#105.3.1>:-:text=If%20the%20application%20or%20the%20construction%20documents%20do%20not%20conform%20to%20the%20requirements%20of%20pertinent%20laws%2C%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%2C%20stating%20the%20reasons%20therefore
- 15 <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707>:-:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.11
- 16 <https://iaf.eu/en/about-iaf>:-:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope
- 17 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- 18 <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>
- 19 Unless otherwise noted, all references in this Listing are from the 2021 version of the codes and the standards referenced therein. This material, product, design, service and/or method of construction also complies with the 2000-2021 versions of the referenced codes and the standards referenced therein.
- 20 All references to the CBC and CRC are the same as the 2021 IBC and 2021 IRC unless otherwise noted in the California Supplement at the end of this report.
- 21 All references to the FBC-B and FBC-R are the same as the 2021 IBC and 2021 IRC unless otherwise noted in the Florida Supplement at the end of this report.
- 22 <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2> (Listed%20or%20certified); <https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#labeled> AND <https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#labeled>
- 23 2018 IBC Section 2304.10.5
- 24 <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1703.4>
- 25 <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2>:-: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
- 26 <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2>:-: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
- 27 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.
- 28 2018 IBC Section 2304.10.5
- 29 See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.
- 30 2018 IFC Section 104.9



31 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
 32 example conforms to IBC/IRC/IFC Section 201.4 where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.
 33 <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>
 34 Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.
 35 <http://www.drjengineering.org/AppendixC> AND <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>
 36 <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years>
 37 <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided>
 38 <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>
 39 IBC 2021, Section 1706.1 Conformance to Standards
 40 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General
 41 See Section 11 for the distilled building code definition of **Approved**
 42 Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES
 43 <https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>
 44 New York City, The Rules of the City of New York, § 101-07 Approved Agencies
 45 New York City, The Rules of the City of New York, § 101-07 Approved Agencies
 46 <https://up.codes/viewer/new-jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1>
 47 <https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>
 48 <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>
 49 <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>
 50 IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials. Adopted law pursuant to IBC model code language 1706.2.
 51 IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General. Adopted law pursuant to IBC model code language 1707.1.
 52 <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/>
 53 IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards Adopted law pursuant to IBC model code language 1706.1.
 54 <https://iaf.nu/en/about-iaf-mla/#:~:text=it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope>
 55 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
 56 <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>