



Listing and Technical Evaluation Report™

Report No: 1504-04



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ECOMAXci® 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: 06 16 13 - Insulated Sheathing

Section: 07 21 00 - Thermal Insulation

Section: 07 27 00 - Air Barriers

1 Innovative Product Evaluated¹

1.1 Rmax® ECOMAXci® Ply

2 Product Description and Materials

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



Figure 1. ECOMAXci® Ply



- 2.2 ECOMAXci® Ply is a composite product whose core consists of Rmax® rigid, closed-cell polyisocyanurate (Polyiso) foamed plastic insulation board with inorganic, polymer coated glass fiber mat facers. This insulation board is bonded to fire-retardant treated (FRT) plywood with liquid adhesive.
 - 2.2.1 Rmax® Polyiso foam insulation conforms to ASTM C1289 in accordance with IBC Section 2603.
 - 2.2.2 The FRT plywood is manufactured in accordance with DOC PS 2 and treated for compliance with IBC Section 2303.2.
 - 2.2.3 The rigid insulation portion of ECOMAXci® Ply is available in the following thicknesses:
 - 2.2.3.1 3/4" (19 mm) through 4 1/2" (114 mm)
 - 2.2.3.2 The FRT plywood portion is available in 5/8" (16 mm) and 3/4" (19 mm) thicknesses.
 - 2.2.3.3 Standard product width: 48" (1,219 mm)
 - 2.2.3.4 Standard product length: 96" (2,438 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 Materialsⁱⁱ 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.ⁱⁱⁱ The design strengths and permissible stresses shall be established by tests^{iv} and/or engineering analysis.^v
- 3.2 Duly Authenticated Reports^{vi} and Research Reports^{vii} are test reports and related engineering evaluations, which are written by an approved agency^{viii} and/or an approved source.^{ix}
 - 3.2.1 These reports contain intellectual property and/or trade secrets, which are protected by the Defend Trade Secrets Act (DTSA).^x
- 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 [RDP]) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.^{xi}
- 3.5 Testing and/or inspections conducted for this Duly Authenticated Report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed RDP.
 - 3.5.1 The Center for Building Innovation (CBI) is ANAB^{xii} ISO/IEC 17025 and ISO/IEC 17020 accredited.
- 3.6 The regulatory authority shall enforce^{xiii} the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing^{xiv} 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.^{xv}
- 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.^{xvi} Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.^{xvii}
- 3.9 Approval equity is a fundamental commercial and legal principle.^{xviii}



4 Applicable Standards for the Listing; Regulations for the Regulatory Evaluation^{xix}

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 E84: Standard Test Method for Surface Burning Characteristics of Building Materials*
- 4.1.7 *ASTM E136: Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C*
- 4.1.8 *ASTM E1354: Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*
- 4.1.9 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*
- 4.1.10 *AWC TR 12: General Dowel Equations for Calculating Lateral Connection Values*
- 4.1.11 *DOC PS 2: Performance Standard for Wood-based Structural-use Panels*
- 4.1.12 *NFPA 285-12: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components^{xx}*
- 4.1.13 *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®*

5 Listed^{xxi}

- 5.1 A nationally recognized testing laboratory such as CBI, states that the materials, designs, methods of construction, and/or equipment have met nationally recognized standards and/or have been tested and found suitable for use in a specified manner.

6 Tabulated Properties Generated from Nationally Recognized Standards

- 6.1 ECOMAXci® Ply is a composite insulation panel for use in the following applications:

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

- 6.2 The Environmental Product Declaration (EPD) for ECOMAXci® is available at www.polyiso.org.

6.3 Thermal Insulation

- 6.3.1 ECOMAXci® Ply is intended for use as an exterior continuous insulation under any type of permitted cladding.



6.4 Air Barrier

6.4.1 ECOMAXci® 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 and with all seams, including the top and bottom edges, sealed.

6.4.1.1 Air permeance of ECOMAXci® Ply is shown in **Table 1**.

Table 1. Air Barrier Properties¹

Product	Air Permeance [L/(s·m ²)]
ECOMAXci® Ply	< 0.02
1. Tested in accordance with ASTM E2178.	

6.4.2 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 liter per second per square meter [L/(s·m²)] at 75 Pa pressure difference when tested in accordance with ASTM E2178.

6.5 Fire Safety Performance

6.5.1 Surface Burn Characteristics

6.5.1.1 The components of ECOMAXci® Ply have the flame spread and smoke developed characteristics shown in **Table 2**.

Table 2. Surface Burn Characteristics^{1,2}

Product	Flame Spread	Smoke Developed	Classification
ECOMAXci® Ply Polyiso Core ¹ <1"	≤ 40	≤ 250	Class B
ECOMAXci® Ply Polyiso Core ¹ ≥1"	≤ 25	≤ 160	Class A
FRT Plywood	≤ 25	≤ 450	Class A
1. Tested in accordance with ASTM E84.			
2. Flame spread and smoke developed numbers are shown for comparison purposes only and are not intended to represent the performance of ECOMAXci® Ply and related components under actual fire conditions.			

6.5.2 Thermal Barrier (IRC and IBC Buildings)

6.5.2.1 Except as noted in Section **6.5.2.2**, ECOMAXci® Ply panels up to 4 1/2" (114 mm) in foam thickness may be installed within the building envelope (including, but not limited to, attics, crawlspaces, and wall assemblies) of all building types when separated from the interior with a thermal barrier. The thermal barrier shall consist of a minimum 1/2" gypsum wallboard or an approved equivalent in accordance with [IBC Section 2603.4](#) and [IRC Section R316.4](#).^{xxii}

6.5.2.2 The thermal barrier required by Section **6.5.2.1** is not required in the following applications:

- 6.5.2.2.1 ECOMAXci® Ply is covered by a minimum 1" thickness of concrete or masonry separating the interior of the building from the sheathing, in accordance with [IBC Section 2603.4.1](#) and [IRC Section R316.5.1](#).
- 6.5.2.2.2 Walk-in coolers in accordance with [IBC Section 2603.4.1.3](#).
- 6.5.2.2.3 Attic, crawlspace, or other uninhabitable space applications in accordance with [IBC Section 2603.4.1.6](#), [IRC Section R316.5.3](#), and [IRC Section R316.5.4](#).



6.5.2.2.4 Where an ignition barrier is permitted in lieu of a thermal barrier, such as attic, crawlspace, or other uninhabitable space applications, ECOMAXci® Ply may be installed on walls only up to 4 1/2" in thickness of the rigid insulation portion, without a thermal barrier or ignition barrier in accordance with IBC Section 2603.4.1.6, IRC Section R316.5.3, and IRC Section R316.5.4.

6.5.2.2.5 For thicknesses greater than 4 1/2" in thickness of the rigid insulation portion, an ignition barrier is required.

6.5.3 *Vertical and Lateral Fire Propagation*

6.5.3.1 ECOMAXci® 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.

6.5.3.2 Engineering analysis has also been conducted to assess substitution of other products within the approved wall assemblies.

6.5.3.3 The wall assemblies listed in **Table 3** are approved for use in Type I-IV, light-frame cold-formed steel construction or metal buildings.

Table 3. Approved NFPA 285 Wall Assemblies¹

Wall Component	Materials
<p>Base Wall System Use either 1, 2, 3, or 4</p> <p>Note: May use 4 optionally when FRTW framing is allowed by code.</p>	<ol style="list-style-type: none"> 1. Cast Concrete Walls 2. CMU Concrete Walls 3. 20-gauge (min.) 3 5/8" (min.) steel studs spaced 24" OC (max.) <ol style="list-style-type: none"> a. 5/8" (min.) type X Gypsum Wallboard Interior 4. Where allowed in Types I, II, III or IV construction, FRTW (Fire-Retardant Treated Wood) studs complying with <u>IBC Section 2303.2</u>, min. nominal 2x4 dimension, spaced 24" OC (max.) <ol style="list-style-type: none"> a. 5/8" type X Gypsum Wallboard Interior b. Bracing as required by code
<p>Fire-Stopping in Stud Cavity at Floor Lines As an option, use 2 with Fire Retardant Treated Wood (FRTW) framing.</p>	<ol style="list-style-type: none"> 1. 4 pcf mineral fiber insulation installed with z-clips 2. FRTW fire blocking at floor line in accordance with applicable code requirements
<p>Cavity Insulation Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, or 15</p> <p>Note: Items 5-15 are SPF Foam Type.</p> <p>EZ FLO may be used inside the box headers and jamb studs for NFPA 285 assemblies requiring SPF in stud cavities.</p>	<ol style="list-style-type: none"> 1. None 2. Any noncombustible insulation per ASTM E136 3. Any Mineral Fiber (board type Class A, faced or un-faced meeting ASTM E84) 4. Any Fiberglass (batt type Class A, faced or un-faced meeting ASTM E84) 5. 5 1/2" (max.) Icynene LD-C-50 spray foam in 6" deep studs (max.). Use with 5/8" exterior sheathing. 6. 5 1/2" (max.) Icynene MD-C-200 2 pcf spray foam in 6" deep studs (max.) full fill without an air gap. Use with 5/8" exterior sheathing. 7. 5 1/2" (max.) Icynene MD-R-210 2 pcf spray foam in 6" deep studs (max.) full fill without an air gap. Use with 5/8" exterior sheathing. 8. SWD Urethane QS 112 2 pcf spray foam in 6" deep studs (max.) partial fill with a maximum 2 1/2" air gap or full fill. Use with 5/8" exterior sheathing. 9. Gaco Western 183M (3 1/2" max.). Use with 5/8" exterior sheathing. 10. Gaco Western F1850 (3 1/2" max.). Use with 5/8" exterior sheathing. 11. Demilec SEALECTiON 500 (3 5/8" max.). Use with 5/8" exterior sheathing. 12. Demilec HeatLok Soy 200 Plus (3.4" max.). Use with 5/8" exterior sheathing. 13. Bayer Bayseal (3" max.) Use with 5/8" exterior sheathing. 14. Lapolla FoamLok FL 2000 (3" max.) Use with 5/8" exterior sheathing. 15. BASF SprayTite 81206 or WallTite (US & US-N) (3 5/8" max.). Use with 5/8" exterior sheathing.



Table 3. Approved NFPA 285 Wall Assemblies¹

Wall Component	Materials
<p>Exterior Sheathing Use either 1, 2, or 3.</p> <p>Note: Exterior FRTW sheathing or gypsum board is optional for Base Walls 1 and 2. When SPF is used, 5/8" exterior gypsum sheathing must be used.</p>	<ol style="list-style-type: none"> 1. 1/2" thick or thicker, exterior type gypsum board sheathing 2. 1/2" (min.) FRTW structural panels complying with IBC Section 2303.2 and installed in accordance with code allowances for Types I, I, III, or IV construction. 3. None (only when exterior insulation FRT plywood is on interior side attached direct to studs).
<p>Weather-Resistive Barrier Installed over Exterior Sheathing Use either option 1 or 2 installed per the manufacturer installation instructions.</p> <p>Note 1: Sopraseal Xpress G may replace exterior sheathing, Item 1 above but WRB over Sopraseal Xpress G may not be used since it already incorporates a pre-installed WRB.</p> <p>NLA = No longer available. Replaced with Spraywrap MVP</p>	<ol style="list-style-type: none"> 1. None 2. Any WRB tested in accordance with 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 tested WRB. The following WRB products are allowed: <ol style="list-style-type: none"> a. Carlisle CCW Fire Resist 705FR-A, Barritech NP™, or Barritech VP b. Dorken Systems Inc. Delta Stratus SA c. Dorken Systems Inc. Delta®-Maxx/Plus d. Dorken Systems Inc. Delta®-Fassade S e. Dorken Systems Inc. Delta®-Foxx/Plus f. Dorken Systems Inc. Delta®-Vent S/Plus g. Dorken Systems Inc. Delta®-Vent SA h. Dow Dowsil™ DefendAir 200 (or LT version) or DefenderAir 200C (Charcoal) i. Dryvit Backstop® NT™ j. DuPont™ Tyvek® (Various per ESR 2375) k. DuPont™ WeatherMate™ Housewrap or WeatherMate™ Plus Housewrap l. GCP PERM-A-BARRIER® Aluminum Wall Membrane m. GCP PERM-A-BARRIER® NPL 10 n. GCP PERM-A-BARRIER® VPL o. GCP PERM-A-BARRIER® VPL 50 Membrane p. GCP PERM-A-BARRIER® VPL Low Temperature q. GCP PERM-A-BARRIER® VPS r. Henry® Air-Bloc® 17 s. Henry® Air-Bloc® 21 FR t. Henry® Air-Bloc® 31 MR u. Henry® Air-Bloc® 32 MR v. Henry® Air-Bloc® 33 MR w. Henry® Blueskin® Metal Clad® x. Henry® Blueskin® SA y. Henry® Blueskin® VP160 z. Henry® EnviroCap aa. Henry® FoilSkin bb. Henry® Super Jumbo Tex 60 Minute® (Fortifiber) cc. Henry® WeatherSmart® Drainable Housewrap (Fortifiber) dd. Kingspan (Pactiv) GreenGuard® Max Building Wrap ee. MasterSeal® AWB 660 (Formerly BASF Enershield® HP) ff. MasterSeal® AWB 660 I (Formerly BASF Enershield® I) gg. NaturaSeal Airseal NS-A-250HP™ hh. NaturaSeal Airseal NS-A-250LP™ ii. Parex WeatherSeal Spray & Roll-On jj. Pecora ProPerm VP kk. Pecora XL-Perm^{ULTRA} NP ll. Pecora XL-Perm^{ULTRA} VP (10 mil DFT) mm. Prosoco R-Guard MVP (NLA) nn. Prosoco R-Guard Spray Wrap (NLA)



Table 3. Approved NFPA 285 Wall Assemblies¹

Wall Component	Materials
<p>Weather-Resistive Barrier Installed over Exterior Sheathing</p> <p>Use either option 1 or 2 installed per the manufacturer installation instructions</p> <p>Note 1: Sopraseal Xpress G may replace exterior sheathing, Item 1 above but WRB over Sopraseal Xpress G may not be used since it already incorporates a pre-installed WRB.</p> <p>NLA = No longer available. Replaced with Spraywrap MVP</p>	<ul style="list-style-type: none"> oo. Prosoco R-Guard® Cat 5™ pp. Prosoco R-Guard® Spray Wrap MVP qq. Prosoco R-Guard® VB rr. Siga Majvest® 500 SA ss. Sika Sikagard®-530 tt. Sika Sikagard®-535 uu. Soprema Sopraseal® LM 204 VP vv. Soprema Sopraseal® Stick 1100T ww. Soprema Sopraseal® Stick VP xx. Soprema Sopraseal® Xpress G yy. Soprema Soprasolin® HD zz. Vaproshield RevealShield SA® aaa. Vaproshield WrapShield SA® bbb. W.R. Meadows® Air-Shield™ LMP (Black) ccc. W.R. Meadows® Air-Shield™ LMP (Gray) ddd. W.R. Meadows® Air-Shield™ LSR eee. W.R. Meadows® Air-Shield™ SMP fff. W.R. Meadows® Air-Shield™ TMP
<p>Exterior Insulation</p> <p>Installation may use FRT plywood on exterior side (installed over exterior sheathing) or interior side (applied direct to studs). This option (plywood on interior) negates use of exterior sheathing since the FRT ply acts as the sheathing.</p>	<ul style="list-style-type: none"> 1. Rmax® ECOMAXci® Ply, 4 1/2" (max.) foam with 5/8" (min.) FRT plywood <p>Note: FRT plywood may be applied in the field or factory applied. Adhesive must not be full coverage.</p>
<p>Weather-Resistive Barrier Installed over Exterior Insulation or FRTW</p> <p>Use any in option 1 or 2 depending on cladding used.</p> <p>Note: Exterior WRB Items in option 1 b-d are not traditional WRB products, but are insulation panel joint tapes. The insulation panel joints shall be staggered.</p> <p>NLA = No longer available. Replaced with Spraywrap MVP.</p>	<ul style="list-style-type: none"> 1. For use with all cladding options: <ul style="list-style-type: none"> a. None b. 6" (max.) Venture Tape CW over insulation joints c. 6" (max.) Rmax® R-SEAL 3000, R-SEAL 6000 or R-SEAL 2000 LF over insulation joints d. 6" (max.) asphalt or butyl based tape or liquid flashing over insulation joints e. Pactiv Green Guard®Max Building Wrap f. DuPont™ Tyvek® (Various per ESR 2375) g. DuPont™ WeatherMate™ Housewrap h. DuPont™ WeatherMate™Plus Housewrap i. Henry® FoilSkin j. Henry® Blueskin® Metal Clad® k. Prosoco R-Guard® Spray Wrap MVP l. Soprema Soprasolin® HD m. Carlisle CCW Fire Resist 705FR-A n. GCP PERM-A-BARRIER® Aluminum Wall Membrane 2. For use with cladding options 1-6 (heavy masonry): <ul style="list-style-type: none"> a. Henry® Air Bloc 31MR b. Henry® Envirocap c. Henry® Air-Bloc® 33MR d. Henry® Air-Bloc® 21 FR e. Henry® Air-Bloc® 17 f. Henry® Blueskin® VP 160 g. Soprema Sopraseal® Stick VP h. Carlisle CCW Fire Resist Barritech NP™ i. Carlisle CCW Fire Resist Barritech VP



Table 3. Approved NFPA 285 Wall Assemblies¹

Wall Component	Materials
<p>Weather-Resistive Barrier Installed over Exterior Insulation or FRTW</p> <p>Use any in option 1 or 2 depending on cladding used.</p> <p>Note: Exterior WRB Items in option 1 b-d are not traditional WRB products, but are insulation panel joint tapes. The insulation panel joints shall be staggered.</p> <p>NLA = No longer available. Replaced with Spraywrap MVP</p>	<ul style="list-style-type: none"> j. Prosoco R-Guard® Spray Wrap (NLA) k. Prosoco R-Guard® MVP (NLA) l. Prosoco R-Guard® VB m. Prosoco R-Guard® Cat 5™ n. Vaproshield RevealShield SA® o. Vaproshield WrapShield SA® p. Pecora XL-Perm^{ULTRA} VP (10 mil DFT) q. Pecora XL-Perm^{ULTRA} NP r. Pecora ProPerm VP s. GCP PERM-A-BARRIER® VPL t. GCP PERM-A-BARRIER® VPL Low Temperature u. GCP PERM-A-BARRIER® VPS v. Dryvit Backstop® NT™ w. W.R. Meadows® Air-Shield™ LMP (Gray) x. W.R. Meadows® Air-Shield™ LMP (Black) y. W.R. Meadows® Air-Shield™ TMP z. W.R. Meadows® Air-Shield™ LSR aa. W.R. Meadows® Air-Shield™ SMP bb. Siga Majvest® 500 SA cc. Sika SikaGard®-535 dd. Dow Dowsil™ DefendAir 200 (or LT version) or DefendAir 200C (Charcoal) ee. Dorken Systems Inc. Delta®-Vent S/Plus ff. Dorken Systems Inc. Delta®-Fassade S gg. Dorken Systems Inc. Delta®-Foxy/Plus hh. Dorken Systems Inc. Delta®-Maxx/Plus ii. Fortifiber WeatherSmart Drainable jj. Fortifiber Super Jumbo Tex 60 minute (only with Cladding #2 min. 3/4" stucco) kk. Parex WeatherSeal Spray & Roll-On
<p>Exterior Cladding</p> <p>Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, or 14.</p>	<ul style="list-style-type: none"> 1. Brick – Nominal 4" thick clay brick or veneer with maximum 2" air gap behind the brick. Brick Ties/Anchors 24" OC (max.) 2. Stucco – Minimum 3/4" thick, exterior cement plaster and lath. A secondary WRB shall be installed between the exterior insulation and the lath to provide a bond break. The secondary WRB shall not be full-coverage asphalt or butyl-based self-adhered membranes. 3. Limestone – Minimum 2" thick using any 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 1/2" thick, using any standard installation technique. Cast stone complying with ICC-ES AC 51. 6. Terracotta cladding – Minimum 1 1/4" thick using any standard installation technique. 7. Any MCM or ACM (aluminum, steel copper, zinc) (w/ 2 1/2" max air gap) that has successfully passed NFPA 285 using any standard installation technique. 8. Uninsulated sheet metal building panels including aluminum, steel, or copper using any standard installation technique. 9. Uninsulated fiber-cement panel siding using any standard installation technique. 10. Stone/Aluminum honeycomb composite building panels that have passed NFPA 285 or equivalent such as Stone Panels Inc., Stone Lite Panel System. 11. Autoclaved Aerated Concrete (AAC) panels that have successfully passed NFPA 285 using any standard installation technique. 12. Thin set brick such as Glen Gery ThinTech Elite or Tabs II Panel System with 1/2" bricks using Tabs Wall Adhesive. 13. Natural Stone Veneer – minimum 1 1/4" (adhered with mortar or concrete/cement based adhesive).



Table 3. Approved NFPA 285 Wall Assemblies¹

Wall Component	Materials
Exterior Cladding Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, or 14.	14. FunderMax M.Look using the manufacturer standard installation technique. The air gap between cladding and insulation or WRB must not exceed 1½".
1. All WRBs shall be installed at recommended application rates and per the manufacturer installation instructions. 2. Window headers for all wall assemblies shall incorporate minimum 20 ga. steel flashing to cover air gaps between the exterior sheathing or exterior insulation and the exterior veneer. All fenestrations and penetrations shall be flashed in accordance with the applicable code using asphalt, acrylic, or butyl-based flashing tape or liquid flashing, R-SEAL 6000, or R-SEAL 2000 LF up to 12" maximum width.	

6.5.4 Fire Resistance Ratings

6.5.4.1 ECOMAXci® Ply has been tested and meet the requirements of UL 263 in accordance with IBC Section 2603.5.1 for use in the following assembly designs when installed in accordance with the manufacturer installation instructions and this report:

6.5.4.1.1 45 minutes: U424, U425, V321, V499, W456

6.5.4.1.2 1 hour: U026, U326, U330, U354, U355, U364, U424, U425, U460, V302, V303, V454, V499, W307, W417, W456

6.5.4.1.3 1.5 hour: U424, U425, V499, W456

6.5.4.1.4 2 hour: U349, U424, U425, U905, U906, V332, V499, W456

6.5.4.1.5 3 hour: U904, U907

6.5.4.1.6 4 hour: U902, U907

6.6 Fastener Attachments to Wood and Steel Framing for ECOMAXci® Ply to Support Cladding Weight

6.6.1 Fasteners are required to attach the ECOMAXci® Ply sheathing to the wall framing to carry the cladding weight.

6.6.1.1 See **Table 4** and **Table 5** allowable cladding loads for various fastener types and sheathing thicknesses for light-frame cold-formed steel construction.

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

6.6.1.1.2 See **Table 6** through **Table 7** for allowable cladding loads for various fastener types and sheathing thicknesses for wood stud framing.

6.6.1.1.3 Minimum allowable penetration into FRT wood wall framing is 1¼".

6.6.2 The fasteners attaching the ECOMAXci® Ply sheathing to the wall framing shall have a minimum size and maximum spacing as shown in **Table 4** through **Table 7** and all panel edges shall be supported by framing or blocking.

6.6.3 For attaching to cold-form steel studs, fasteners with equal or greater design properties shall be permitted:

6.6.3.1 #8 screw: 0.164" shank diameter, 0.313" head diameter

6.6.3.2 #10 screw: 0.190" shank diameter, 0.363" head diameter

6.6.3.3 #12 screw: 0.216" shank diameter, 0.414" head diameter

6.6.3.4 Rmax® Nail Board Fastener SIP LD: 0.189" shank diameter, 0.625" head diameter

6.6.3.5 Rmax® Nail Board Fastener SIP HD: 0.189" shank diameter, 0.625" head diameter

6.6.3.6 TRUFAST SIP LD: 0.189" shank diameter, 0.625" head diameter

6.6.3.7 TRUFAST SIP HD: 0.189" shank diameter, 0.635" head diameter

6.6.3.8 FastenMaster HeadLOK: 0.191" shank diameter, 0.625" head diameter



- 6.6.4 For attaching to FRT wood studs, fasteners with equal or greater design properties shall be permitted:
 - 6.6.4.1 Rmax® Nail Board Fastener SIP TP: 0.189" shank diameter, 0.625" head diameter
 - 6.6.4.2 12d nail (0.148" x 3.25"): 0.312" head diameter
 - 6.6.4.3 Simpson Strong-Drive SDWS22: 0.22" shank diameter, 0.435" head diameter
 - 6.6.4.4 FastenMaster HeadLOK: 0.191" shank diameter, 0.625" head diameter
 - 6.6.4.5 TRUFAST SIP TP: 0.189" shank diameter, 0.625" head diameter
- 6.6.5 Fasteners shall be coated to protect against FRT wood per IBC Section 2304.10.6.^{xxiii}

Table 4. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical Steel Studs 16" o.c.^{3,4,5,6}

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
20-Gauge Structural (33 mil)	Rmax® Nail Board Fastener SIP LD	1	24	16	12	8	8	6
		1½	24	16	8	8	6	4
		2	24	12	8	6	4	4
		2½	16	8	6	4	4	-
		3	16	8	6	4	-	-
		3½	12	6	4	-	-	-
		4	6	-	-	-	-	-
	HeadLOK	1	24	16	12	8	8	6
		1½	24	16	8	8	6	4
		2	24	12	8	6	4	4
		2½	24	12	8	6	4	4
		3	16	8	6	4	-	-
		3½	12	6	4	-	-	-
		4	8	4	-	-	-	-
	#12 screw	1	24	16	12	8	8	6
		1½	24	16	12	8	6	6
		2	24	16	8	8	6	4
		2½	24	12	8	6	4	4
		3	24	12	8	6	4	4
		3½	16	8	6	4	-	-
	#10 screw or TRUFAST SIP LD	1	24	16	12	8	8	6
		1½	24	16	8	8	6	4
		2	24	12	8	6	4	4
		2½	16	8	6	4	4	-
TRUFAST SIP LD	3	16	8	6	4	-	-	
	3½	12	6	4	-	-	-	



Table 4. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical Steel Studs 16" o.c.^{3,4,5,6}

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
20-Gauge Structural (33 mil)	TRUFAST SIP LD	4	6	-	-	-	-	-
	#8 screw	3/4	24	16	12	8	6	6
		1	24	16	8	8	6	4
		1 1/2	24	12	8	6	4	4
		2	24	12	8	6	4	4
		2 1/2	16	8	6	4	-	-
18-Gauge Structural (43 mil)	Rmax® Nail Board Fastener SIP LD	3/4	24	24	16	12	12	8
		1	24	24	16	12	8	8
		1 1/2	24	24	16	12	8	8
		2	24	16	12	8	8	6
		2 1/2	24	16	8	8	6	4
		3	24	12	8	6	4	4
		3 1/2	16	8	6	4	-	-
	4	8	4	-	-	-	-	
	HeadLOK	1	24	24	16	12	12	8
		1 1/2	24	24	16	12	8	8
		2	24	16	12	8	8	6
		2 1/2	24	16	12	8	6	6
		3	24	12	8	6	4	4
		3 1/2	16	8	6	4	4	-
		4	12	6	4	-	-	-
	4 1/2	4	-	-	-	-	-	
	#12 screw	1	24	24	16	16	12	8
		1 1/2	24	24	16	12	8	8
		2	24	24	16	12	8	8
		2 1/2	24	16	12	8	8	6
		3	24	16	12	8	6	6
		3 1/2	24	12	8	6	4	4
	#10 common or TRUFAST SIP LD	1	24	24	16	12	8	8
		1 1/2	24	24	16	12	8	8
		2	24	16	12	8	8	6
		2 1/2	24	16	8	8	6	4
	TRUFAST SIP LD	3	24	12	8	6	4	4



Table 4. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical Steel Studs 16" o.c.^{3,4,5,6}

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
18-Gauge Structural (43 mil)	TRUFAST SIP LD	3 1/2	16	8	6	4	-	-
		4	8	4	-	-	-	-
	#8 screw	3/4	24	16	12	8	6	6
		1	24	16	8	8	6	4
		1 1/2	24	12	8	6	4	4
		2	24	12	8	6	4	4
2 1/2	16	8	6	4	-	-		
16-Gauge Structural (54 mil)	Rmax® Nail Board Fastener SIP HD	1	24	24	24	24	16	16
		1 1/2	24	24	24	16	16	12
		2	24	24	16	16	12	8
		2 1/2	24	24	16	12	8	8
		3	24	16	12	8	8	6
		3 1/2	24	12	8	6	6	4
		4	16	8	6	4	-	-
		4 1/2	4	-	-	-	-	-
	HeadLOK	3/4	24	24	24	24	16	16
		1	24	24	24	24	16	16
		1 1/2	24	24	24	16	16	12
		2	24	24	16	16	12	8
		2 1/2	24	24	16	12	8	8
		3	24	16	12	8	8	6
		3 1/2	24	16	8	8	6	4
		4	16	8	6	4	4	-
	#12 screw	1	24	24	16	16	12	8
		1 1/2	24	24	16	12	8	8
		2	24	24	16	12	8	8
		2 1/2	24	16	12	8	8	6
		3	24	16	12	8	6	6
		3 1/2	24	12	8	6	4	4
	#10 screw	1	24	24	16	12	8	8
		1 1/2	24	24	16	12	8	8
		2	24	16	12	8	8	6



Table 4. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical Steel Studs 16" o.c.^{3,4,5,6}

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
16-Gauge Structural (54 mil)	#10 screw	2 1/2	24	16	8	8	6	4
	#8 screw	3/4	24	16	12	8	6	6
		1	24	16	8	8	6	4
		1 1/2	24	12	8	6	4	4
		2	24	12	8	6	4	4
		2 1/2	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® Ply.
4. ECOMAXci® 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 5. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical Steel Studs 24" o.c.^{3,4,5,6}

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
20-Gauge Structural (33 mil)	Rmax® Nail Board Fastener SIP LD	1	24	12	8	6	4	4
		1 1/2	16	8	6	4	4	-
		2	16	8	6	4	-	-
		2 1/2	12	6	4	-	-	-
		3	12	6	4	-	-	-
		3 1/2	8	4	-	-	-	-
		4	4	-	-	-	-	-
	HeadLOK	1	24	12	8	6	4	4
		1 1/2	16	8	6	4	4	-
		2	16	8	6	4	-	-
		2 1/2	16	8	4	4	-	-
		3	12	6	4	-	-	-
		3 1/2	8	4	-	-	-	-
		4	4	-	-	-	-	-
	#12 common	3/4	24	12	8	6	6	4
1		24	12	8	6	4	4	



Table 5. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical Steel Studs 24" o.c.^{3,4,5,6}

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
20-Gauge Structural (33 mil)		1 1/2	24	12	8	6	4	4
		2	16	8	6	4	4	-
		2 1/2	16	8	6	4	-	-
		3	16	8	4	4	-	-
		3 1/2	12	6	4	-	-	-
	#10 common or TRUFAST SIP LD	1	24	12	8	6	4	4
		1 1/2	16	8	6	4	4	-
		2	16	8	6	4	-	-
		2 1/2	12	6	4	-	-	-
	TRUFAST SIP LD	3	12	6	4	-	-	-
		3 1/2	8	4	-	-	-	-
		4	4	-	-	-	-	-
	#8 common	3/4	24	12	8	6	4	4
		1	16	8	6	4	4	-
		1 1/2	16	8	6	4	-	-
		2	16	8	4	4	-	-
		2 1/2	12	6	4	-	-	-
	18-Gauge Structural (43 mil)	Rmax® Nail Board Fastener SIP LD	3/4	24	16	12	8	8
1			24	16	12	8	6	6
1 1/2			24	16	8	8	6	4
2			24	12	8	6	4	4
2 1/2			16	8	6	4	4	-
3			16	8	6	4	-	-
3 1/2			12	6	4	-	-	-
4			6	-	-	-	-	-
HeadLOK		1	24	16	12	8	8	6
		1 1/2	24	16	8	8	6	4
		2	24	12	8	6	4	4
		2 1/2	24	12	8	6	4	4
		3	16	8	6	4	-	-
		3 1/2	12	6	4	-	-	-
4	8	4	-	-	-	-		



Table 5. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical Steel Studs 24" o.c.^{3,4,5,6}

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
18-Gauge Structural (43 mil)	#12 common	1	24	16	12	8	8	6
		1½	24	16	12	8	6	6
		2	24	16	8	8	6	4
		2½	24	12	8	6	4	4
		3	24	12	8	6	4	4
		3½	16	8	6	4	-	-
	#10 common or TRUFAST SIP LD	¾	24	16	12	8	8	6
		1	24	16	12	8	6	6
		1½	24	16	8	8	6	4
		2	24	12	8	6	4	4
		2½	16	8	6	4	4	-
	TRUFAST SIP LD	3	16	8	6	4	-	-
		3½	12	6	4	-	-	-
		4	6	-	-	-	-	-
	#8 common	¾	24	12	8	6	4	4
		1	16	8	6	4	4	-
		1½	16	8	6	4	-	-
		2	16	8	4	4	-	-
		2½	12	6	4	-	-	-
	16-Gauge Structural (54 mil)	Rmax® Nail Board Fastener SIP HD	1	24	24	16	16	12
1½			24	24	16	12	8	8
2			24	16	12	8	8	6
2½			24	16	12	8	6	6
3			24	12	8	6	6	4
3½			16	8	6	4	4	-
4			12	6	4	-	-	-
HeadLOK		1	24	24	16	16	12	8
		1½	24	24	16	12	8	8
		2	24	16	12	8	8	6
		2½	24	16	12	8	6	6
		3	24	12	8	6	6	4
		3½	16	8	6	4	4	-



Table 5. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical Steel Studs 24" o.c.^{3,4,5,6}

Framing Member	Fastener Type and Min. Size ²	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Vertical Fastener Spacing ¹ (in)					
			Cladding Weight (psf)					
			5	10	15	20	25	30
16-Gauge Structural (54 mil)		4	12	6	4	-	-	-
	#12 common	1	24	16	12	8	8	6
		1½	24	16	12	8	6	6
		2	24	16	8	8	6	4
		2½	24	12	8	6	4	4
		3	24	12	8	6	4	4
		3½	16	8	6	4	-	-
	#10 common	¾	24	16	12	8	8	6
		1	24	16	12	8	6	6
		1½	24	16	8	8	6	4
		2	24	12	8	6	4	4
		2½	16	8	6	4	4	-
	#8 common	¾	24	12	8	6	4	4
		1	16	8	6	4	4	-
		1½	16	8	6	4	-	-
		2	16	8	4	4	-	-
		2½	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® Ply.
4. ECOMAXci® 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® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical FRT Wood Studs 16" o.c.

Fastener Type and Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Fastener Spacing (in)					
		Specified Cladding Weight ² (psf)					
		5	10	15	20	25	30
Rmax® Nail Board Fastener SIP TP	3/4	24	24	20	16	12	8
	1	24	20	16	12	8	8
	1 1/2	24	20	12	8	8	8
	2	24	16	12	8	8	6
	2 1/2	16	12	8	6	6	4
	3	12	8	6	6	4	4
	3 1/2	8	8	6	4	4	-
	4	8	6	4	4	-	-
	4 1/2	8	4	4	-	-	-
12d (0.148" x 3.25")	3/4	24	16	8	8	6	6
	1	20	12	8	6	6	4
TRUFAST SIP TP	3/4	24	24	20	16	12	8
	1	24	20	16	12	8	8
	1 1/2	24	16	12	8	8	6
	2	16	12	8	6	6	4
	2 1/2	12	8	6	6	4	4
	3	8	8	6	4	4	-
	3 1/2	8	6	4	4	-	-
	4	8	4	4	-	-	-
	4 1/2	6	4	4	-	-	-
FastenMaster HeadLOK	3/4	24	24	24	16	12	12
	1	24	24	20	16	12	8
	1 1/2	24	16	12	8	8	8
	2	20	12	8	8	6	6
	2 1/2	16	12	8	6	6	4
	3	12	8	6	6	4	4
	3 1/2	8	8	6	4	4	-
	4	8	6	4	4	-	-
	4 1/2	8	4	4	-	-	-
Simpson Strong-Drive SDWS22	3/4	24	24	24	20	16	16
	1	24	24	24	20	16	12
	1 1/2	24	24	16	12	12	8



Table 6. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical FRT Wood Studs 16" o.c.

Fastener Type and Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Fastener Spacing (in)					
		Specified Cladding Weight ² (psf)					
		5	10	15	20	25	30
Simpson Strong-Drive SDWS22	2	24	16	12	8	8	8
	2½	20	12	8	8	6	6
	3	16	12	8	6	6	4
	3½	12	8	8	6	6	4
	4	12	8	6	6	4	4
	4½	8	8	6	4	4	4

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

- Minimum fastener penetration into the stud is 1¼".
- The weight of ECOMAXci® Ply is included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials besides the ECOMAXci® Ply.
- ECOMAXci® 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. Confirm reduction factor per the FRT manufacturer code evaluation report.
- 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 7. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical FRT Wood Studs 24" o.c.

Fastener Type and Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Fastener Spacing (in)					
		Specified Cladding Weight ² (psf)					
		5	10	15	20	25	30
Rmax® Nail Board Fastener SIP TP	¾	24	16	12	8	8	6
	1	24	12	8	8	6	6
	1½	16	8	8	6	4	4
	2	12	8	6	4	4	-
	2½	8	6	4	4	-	-
	3	6	4	4	-	-	-
	3½	6	4	-	-	-	-
	4	4	-	-	-	-	-
	4½	4	-	-	-	-	-
12d (0.148" x 3.25")	¾	16	8	6	6	4	4
	1	12	8	6	4	4	-
TRUFAST SIP TP	¾	24	16	12	8	8	6
	1	24	12	8	8	6	6
	1½	16	8	8	6	4	4



Table 7. ECOMAXci® Ply with 5/8" or 3/4" Fire Treated Plywood – Vertical FRT Wood Studs 24" o.c.

Fastener Type and Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Max. Fastener Spacing (in)					
		Specified Cladding Weight ² (psf)					
		5	10	15	20	25	30
TRUFAST SIP TP	2	12	8	6	4	4	-
	2 1/2	8	6	4	4	-	-
	3	6	4	4	-	-	-
	3 1/2	6	4	-	-	-	-
	4	4	-	-	-	-	-
	4 1/2	4	-	-	-	-	-
FastenMaster HeadLOK	3/4	24	20	16	12	8	8
	1	24	16	12	8	8	6
	1 1/2	16	12	8	6	6	4
	2	12	8	6	6	4	4
	2 1/2	8	8	6	4	4	-
	3	8	6	4	4	-	-
	3 1/2	6	4	4	-	-	-
	4	6	4	-	-	-	-
4 1/2	4	-	-	-	-	-	
Simpson Strong-Drive SDWS22	3/4	24	24	20	12	12	8
	1	24	20	16	12	8	8
	1 1/2	24	16	12	8	8	6
	2	16	12	8	6	6	4
	2 1/2	12	8	6	6	4	4
	3	8	8	6	4	4	-
	3 1/2	8	6	4	4	4	-
	4	8	6	4	4	-	-
4 1/2	6	4	4	-	-	-	

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

1. Minimum fastener penetration into the stud is 1 1/4".
2. The weight of ECOMAXci® Ply is included in the fastener spacing calculations. The specified cladding weight shall include all other supported materials besides the ECOMAXci® Ply.
3. ECOMAXci® 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. Confirm reduction factor per the manufacturer code evaluation report.
6. Nail and screw values determined using NDS Yield Limit Equations and TR-12 for evaluating the foam as a gap.
7. Nail fasteners shall comply with ASTM F1667, except nail length shall be permitted to exceed ASTM F1667 standard lengths. Minimum bending yield strength for nails with a diameter up to 0.148", 0.162", and 0.225" shall be 90,000 psi, 90,000 psi, and 80,000 psi respectively. Proprietary fastener properties are per published data or testing.



6.7 *Fastener Attachments to Concrete and Masonry Substrates for ECOMAXci® Ply to Support Cladding Weight*

6.7.1 Fasteners are required to attach the ECOMAXci® Ply sheathing to the substrate to carry the cladding weight listed in the tables below. The cladding weight shall include the weight of the ECOMAXci® Ply sheathing as well as any additional cladding attached to the sheathing. The tables below only consider the gravity (dead) loads corresponding to the tabulated cladding weights.

6.7.1.1 See **Table 8** through **Table 10** for allowable cladding loads for various fastener types and sheathing thicknesses for connection to minimum 2,500 psi concrete (at 28 days).

6.7.1.2 See **Table 11** through **Table 13** for allowable cladding loads for various fastener types and sheathing thicknesses for connection to concrete masonry unit (CMU) block.

6.7.1.2.1 All fasteners shall be installed into the face of CMU block.

6.7.2 For attaching to concrete substrate, fasteners with equal or greater design properties shall be permitted:

6.7.2.1 ITW Buildex Tapcon® Hex: 3/16" nominal diameter

6.7.2.2 Hilti KH-EZ C: 1/4" nominal diameter

6.7.2.3 Simpson Strong-Tie® Titen HD®: 1/4" nominal diameter

6.7.3 For attaching to CMU block, fasteners with equal or greater design properties shall be permitted:

6.7.3.1 ITW Buildex Tapcon® Hex: 3/16" nominal diameter

6.7.3.2 Hilti KH-EZ C: 1/4" nominal diameter

6.7.3.3 Simpson Strong-Tie® Titen HD®: 1/4" nominal diameter

6.7.3.4 TRUFAST SIP LD: 0.189" shank diameter



Table 8. Maximum Vertical Fastener Spacing for ECOMAXci® 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® 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	3/4	24	24	24	16	12	12
		1	24	24	20	16	12	8
		1 1/2	24	24	20	12	12	8
		2	24	24	16	12	8	8
		2 1/2	24	20	12	8	8	6
		3	24	16	8	8	6	4
		3 1/2	24	12	8	6	4	4
		4	16	8	4	4	-	-
		4 1/2	8	4	-	-	-	-
	1/4" Hilti KH-EZ C ²	3/4	24	24	24	20	16	12
		1	24	24	24	16	12	12
		1 1/2	24	24	20	16	12	8
		2	24	24	20	12	12	8
		2 1/2	24	24	16	12	8	8
		3	24	20	12	8	8	6
		3 1/2	24	20	12	8	8	6
		4	24	16	8	8	6	4
		4 1/2	24	12	8	6	4	4
	1/4" Simpson Strong-Tie® Titen HD® ³	3/4	24	24	16	12	8	8
		1	24	24	16	12	8	8
		1 1/2	24	20	12	8	8	6
		2	24	20	12	8	8	6
		2 1/2	24	16	12	8	6	6
		3	24	16	8	8	6	4
		3 1/2	24	12	8	6	4	4
		4	20	8	6	4	4	-
		4 1/2	16	8	4	4	-	-



Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® 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 1 ⁵ / ₈ " and minimum edge distance of 1 ¹ / ₂ ". 3. Minimum nominal embedment depth of 1 ⁵ / ₈ " and minimum edge distance of 1 ¹ / ₂ ". 4. The cladding weight shall include the weight of the ECOMAXci® Ply sheathing as well as any additional cladding attached to the sheathing.								

Table 9. Maximum Vertical Fastener Spacing for ECOMAXci® 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® 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	3/4	24	24	16	12	8	8
		1	24	20	12	8	8	6
		1 1/2	24	20	12	8	8	6
		2	24	16	8	8	6	4
		2 1/2	24	12	8	6	4	4
		3	20	8	6	4	4	-
		3 1/2	16	8	4	4	-	-
		4	8	4	-	-	-	-
		4 1/2	4	-	-	-	-	-
	1/4" Hilti KH-EZ C ²	3/4	24	24	16	12	8	8
		1	24	24	16	12	8	8
		1 1/2	24	20	12	8	8	6
		2	24	20	12	8	8	6
		2 1/2	24	16	12	8	6	6
		3	24	12	8	6	6	4
		3 1/2	24	12	8	6	4	4
		4	20	8	6	4	4	-
		4 1/2	16	8	4	4	-	-
	1/4" Simpson Strong-Tie® Titen HD® ³	3/4	24	16	12	8	6	6
		1	24	16	8	8	6	4
		1 1/2	24	12	8	6	6	4
		2	24	12	8	6	4	4

Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁴ (psf)					
			5	10	15	20	25	30
		2½	24	12	8	6	4	4
		3	20	8	6	4	4	-
		3½	16	8	6	4	-	-
		4	12	6	4	-	-	-
		4½	8	4	-	-	-	-

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

- Minimum nominal embedment depth of 2" and minimum edge distance of 2".
- Minimum nominal embedment depth of 1⅝" and minimum edge distance of 1½".
- Minimum nominal embedment depth of 1⅝" and minimum edge distance of 1½".
- The cladding weight shall include the weight of the ECOMAXci® Ply sheathing as well as any additional cladding attached to the sheathing.

Table 10. Maximum Vertical Fastener Spacing for ECOMAXci® 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® Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁴ (psf)					
			5	10	15	20	25	30
Concrete (f _c ' = 2,500 psi)	¾" ITW Buildex Tapcon® Hex ¹	¾	24	12	8	6	4	4
		1	20	8	6	4	4	-
		1½	20	8	6	4	4	-
		2	16	8	4	4	-	-
		2½	12	6	4	-	-	-
		3	8	4	-	-	-	-
		3½	8	4	-	-	-	-
		4	4	-	-	-	-	-
	¼" Hilti KH-EZ C ²	¾	24	12	8	6	4	4
		1	24	12	8	6	4	4
		1½	20	8	6	4	4	-
		2	20	8	6	4	4	-
		2½	16	8	6	4	-	-
		3	12	6	4	-	-	-
		3½	12	6	4	-	-	-
		4	8	4	-	-	-	-
		4½	8	4	-	-	-	-



Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁴ (psf)					
			5	10	15	20	25	30
	1/4" Simpson Strong-Tie® Titen HD® ³	3/4	16	8	6	4	-	-
		1	16	8	4	4	-	-
		1 1/2	12	6	4	-	-	-
		2	12	6	4	-	-	-
		2 1/2	12	6	4	-	-	-
		3	8	4	-	-	-	-
		3 1/2	8	4	-	-	-	-
		4	6	-	-	-	-	-
4 1/2	4	-	-	-	-	-		

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

- Minimum nominal embedment depth of 2" and minimum edge distance of 2".
- Minimum nominal embedment depth of 1 5/8" and minimum edge distance of 1 1/2".
- Minimum nominal embedment depth of 1 5/8" and minimum edge distance of 1 1/2".
- The cladding weight shall include the weight of the ECOMAXci® Ply sheathing as well as any additional cladding attached to the sheathing.

Table 11. Maximum Vertical Fastener Spacing for ECOMAXci® 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® Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
CMU Block	3/16" ITW Buildex Tapcon® Hex ¹	3/4	24	12	8	6	6	4
		1	24	12	8	6	4	4
		1 1/2	24	12	8	6	4	4
		2	20	8	6	4	4	-
		2 1/2	16	8	4	4	-	-
		3	12	6	4	-	-	-
		3 1/2	8	4	-	-	-	-
		4	4	-	-	-	-	-
	1/4" Hilti KH-EZ C ²	3/4	24	24	24	24	24	20
		1	24	24	24	24	24	20
		1 1/2	24	24	24	24	20	16
		2	24	24	24	24	16	16
		2 1/2	24	24	24	20	16	12
		3	24	24	20	16	12	8
3 1/2	24	24	16	12	8	8		



Substrate Material	Screw Fastener Type & Minimum Size	Max. Nominal Thickness of the Polyiso Portion of ECOMAXci® Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
		4	24	20	12	8	8	6
		4 1/2	24	12	8	6	4	4
	1/4" Simpson Strong-Tie® Titen HD® ³	3/4	24	24	24	24	24	20
		1	24	24	24	24	24	20
		1 1/2	24	24	24	24	20	16
		2	24	24	24	24	16	16
		2 1/2	24	24	24	20	16	12
		3	24	24	24	16	12	12
		3 1/2	24	24	20	12	12	8
		4	24	24	16	12	8	8
		4 1/2	24	20	12	8	8	6
		TRUFAST SIP LD ⁴	3/4	24	24	24	20	16
	1		24	24	24	20	16	12
	1 1/2		24	24	20	16	12	8
	2		24	24	16	12	8	8
	2 1/2		24	20	12	8	8	6
	3		24	16	12	8	6	6
	3 1/2		24	16	8	8	6	4
	4		24	12	8	6	4	4
	4 1/2	24	12	8	6	4	4	

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



Table 12. Maximum Vertical Fastener Spacing for ECOMAXci® 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® Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
CMU Block	3/16" ITW Buildex Tapcon® Hex ¹	3/4	20	8	6	4	4	-
		1	16	8	6	4	-	-
		1 1/2	16	8	4	4	-	-
		2	12	6	4	-	-	-
		2 1/2	8	4	-	-	-	-
		3	8	4	-	-	-	-
		3 1/2	6	-	-	-	-	-
	1/4" Hilti KH-EZ C ²	3/4	24	24	24	20	16	12
		1	24	24	24	20	16	12
		1 1/2	24	24	24	16	12	12
		2	24	24	20	16	12	8
		2 1/2	24	24	16	12	8	8
		3	24	20	12	8	8	6
		3 1/2	24	16	12	8	6	6
		4	24	12	8	6	4	4
	1/4" Simpson Strong-Tie® Titen HD® ³	3/4	24	24	24	20	16	12
		1	24	24	24	20	16	12
		1 1/2	24	24	24	16	12	12
		2	24	24	20	16	12	8
		2 1/2	24	24	16	12	8	8
		3	24	24	16	12	8	8
		3 1/2	24	20	12	8	8	6
		4	24	16	8	8	6	4
		4 1/2	24	12	8	6	4	4
	TRUFAST SIP LD ⁴	3/4	24	24	20	12	12	8
		1	24	24	20	12	12	8
		1 1/2	24	20	12	8	8	6
		2	24	16	12	8	6	6
		2 1/2	24	12	8	6	6	4
		3	24	12	8	6	4	4
		3 1/2	20	8	6	4	4	-
		4	16	8	6	4	-	-



Table 12. Maximum Vertical Fastener Spacing for ECOMAXci® 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® Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
		4 1/2	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® Ply sheathing as well as any additional cladding attached to the sheathing.

Table 13. Maximum Vertical Fastener Spacing for ECOMAXci® 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® Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
CMU Block	3/16" ITW Buildex Tapcon® Hex ¹	3/4	8	4	-	-	-	-
		1	8	4	-	-	-	-
		1 1/2	8	4	-	-	-	-
		2	6	-	-	-	-	-
		2 1/2	4	-	-	-	-	-
		3	4	-	-	-	-	-
	1/4" Hilti KH-EZ C ²	3/4	24	20	12	8	8	6
		1	24	20	12	8	8	6
		1 1/2	24	16	12	8	6	6
		2	24	16	8	8	6	4
		2 1/2	24	12	8	6	4	4
		3	20	8	6	4	4	-
		3 1/2	16	8	6	4	-	-
		4	12	6	4	-	-	-
	1/4" Simpson Strong-Tie® Titen HD® ³	3/4	24	20	12	8	8	6
		1	24	20	12	8	8	6
		1 1/2	24	16	12	8	6	6



Table 13. Maximum Vertical Fastener Spacing for ECOMAXci® 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® Ply (in)	Maximum Vertical Fastener Spacing (in)					
			Specified Cladding Weight ⁵ (psf)					
			5	10	15	20	25	30
		2	24	16	8	8	6	4
		2½	24	12	8	6	4	4
		3	24	12	8	6	4	4
		3½	20	8	6	4	4	-
		4	16	8	4	4	-	-
		4½	12	6	4	-	-	-
	TRUFAST SIP LD ⁴	¾	24	12	8	6	6	4
		1	24	12	8	6	6	4
		1½	20	8	6	4	4	-
		2	16	8	6	4	-	-
		2½	12	6	4	-	-	-
		3	12	6	4	-	-	-
		3½	8	4	-	-	-	-
		4	8	4	-	-	-	-
4½	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 1½" 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 2½", 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® Ply sheathing as well as any additional cladding attached to the sheathing.

6.8 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 Performance^{xxiv}

- 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.^{xxv}
- 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.^{xxvi}



8 Regulatory Evaluation and Accepted Engineering Practice

- 8.1 Rmax® ECOMAXci® Ply comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:
 - 8.1.1 Foam plastic insulation performance in accordance with [IBC Section 2603](#).
 - 8.1.2 Performance for use as an air barrier in accordance with [IECC Section C402](#).
 - 8.1.3 Flame spread and smoke-developed index ratings in accordance with [IBC Section 2603.5.4](#).
 - 8.1.4 Vertical and lateral fire propagation in accordance with [2018 IBC Section 2603.5.5](#).
 - 8.1.5 Connection to light-frame cold-formed steel framing to support cladding weight in accordance with [IBC Section 1609.1.1](#).
 - 8.1.6 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](#).
 - 8.1.7 Connection to concrete substrate to support cladding weight in accordance with [IBC Section 1901.3](#).
 - 8.1.8 Performance for use in a fire resistance rated assembly in accordance with [IBC Section 2603.5.1](#).
- 8.2 ECOMAXci® Ply is not designed as a structural bracing material. Adequate building bracing shall be provided through other means and methods.
- 8.3 Design of cladding fastening to ECOMAXci® Ply 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 report 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 qualified^{xxvii} 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 *Installation Procedure*
 - 9.3.1 *Orientation*
 - 9.3.1.1 ECOMAXci® 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 in accordance with **Table 4** through **Table 7**.
 - 9.3.1.2 ECOMAXci® Ply may be installed vertically or horizontally over concrete or CMU block in accordance with **Table 8** through **Table 13**.
 - 9.3.2 *Attachment*
 - 9.3.2.1 Fasteners shall be installed with a nominal edge distance of $\frac{3}{8}$ " (9.5 mm), unless noted otherwise.
 - 9.3.2.2 Fasteners, including nuts and washers, for FRT wood used in exterior applications or wet or damp locations shall be of hot-dipped zinc-coated galvanized steel, stainless steel, silicon bronze, or copper in accordance with [IBC Section 2304.10.6^{xxviii}](#) for FRT wood.
 - 9.3.2.3 Fasteners shall be installed with the maximum on-center spacing as indicated in **Table 4** through **Table 13**.



- 9.3.2.4 Bending yield strength of commodity fasteners shall be as shown in NDS Table 12N, Footnote 2. Bending yield of proprietary fasteners are as published by the fastener manufacturer.
- 9.3.2.5 See footnotes of **Table 8** through **Table 13** for more installation information into concrete and masonry substrates.
 - 9.3.2.5.1 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 Air permeance in accordance with ASTM E2178
 - 10.1.2 Flame spread and smoke developed ratings in accordance with ASTM E84
 - 10.1.3 Fire performance criteria in accordance with NFPA 285
 - 10.1.4 Fire resistance ratings in accordance with UL 263
- 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.^{xxix}
- 10.6 Where additional condition of use and/or regulatory compliance information is required, please search for Rmax® ECOMAXci® Ply on the DrJ Certification website.

11 Findings

- 11.1 As outlined in Section 6, Rmax® ECOMAXci® 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, Rmax® ECOMAXci® Ply shall be approved for the following applications:
 - 11.2.1 ECOMAXci® Ply is approved for use in exterior walls of buildings when installed in accordance with the IBC for Type I-IV construction.
 - 11.2.2 Use as a nailbase for cladding materials when installed in accordance with the manufacturer installation instructions and this report.
 - 11.2.3 Performance of foam plastics in accordance with IBC Section 2603 and IRC Section R316.
 - 11.2.4 Performance for use as an air barrier in accordance with IECC Section C402.5.1.
 - 11.2.5 Flame spread and smoke developed indices in accordance with IBC Section 2603.5.4 and IRC Section R316.3.



- 11.2.6 Vertical and lateral fire propagation in accordance with 2018 IBC Section 2603.5.5.
- 11.2.7 Performance for use in a fire resistance rated assembly in accordance with IBC Section 2603.5.1.
- 11.3 Unless exempt by state statute, when Rmax® ECOMAXci® Ply is to be used as a structural and/or building envelope component in the design of a specific building, the design shall be performed by an RDP.
- 11.4 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Rmax®.
- 11.5 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10^{xxx} 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.
- 11.6 **Approved:**^{xxxi} Building regulations require that the building official shall accept duly authenticated reports.^{xxxii}
 - 11.6.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited.
 - 11.6.2 An approved source is “approved” when an RDP is properly licensed to transact engineering commerce.
 - 11.6.3 Federal law, Title 18 US Code Section 242, requires that where the alternative product, material, service, design, assembly and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.
- 11.7 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB-Accredited Product Certification Body – Accreditation #1131.
- 11.8 Through the IAF Multilateral 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.^{xxxiii}

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 When ECOMAXci® Ply is used as a nailbase for the cladding, fastening of the cladding to the ECOMAXci® Ply shall be designed to resist the weight of the cladding and the imposed wind pressure.
 - 12.3.1 Fastener size and spacing shall be in accordance with **Table 4** through **Table 13**.
- 12.4 Walls shall be fully braced with other materials in accordance with IBC Section 2308.6.4 or IRC Section R602.10.
- 12.5 A separate WRB shall be installed in accordance with IBC Section 1403.2^{xxxiv} and IRC Section R703.2.
- 12.6 ECOMAXci® Ply shall not be used to resist horizontal loads from concrete and masonry walls.
- 12.7 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:
 - 12.7.1 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.
 - 12.7.2 This report and the installation instructions shall be submitted at the time of permit application.
 - 12.7.3 This innovative product has an internal quality control program and a third-party quality assurance program.
 - 12.7.4 At a minimum, this innovative product shall be installed per Section 9 of this report.



- 12.7.5 The review of this report by the AHJ shall comply with IBC Section 104 and IBC Section 105.4.
- 12.7.6 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.
- 12.7.7 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.
- 12.8 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.
- 12.9 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).
- 12.10 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® 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, and
 - 1.1.3 Benefit consumers through lower prices, better quality and greater choice.
- 1.2 **Adopted Legislation:** The following local, state and federal regulations affirmatively authorize 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),^{xxxv} where providing test reports, engineering analysis and/or other related IP/TS is subject to prison of not more than ten years^{xxxvi} and/or a \$5,000,000 fine or 3 times the value of^{xxxvii} the Intellectual Property (IP) and Trade Secrets (TS).
 - 1.2.3.1 Compliance with public records and trade secret legislation requires approval through the use of Listings, certified reports, Technical Evaluation Reports, duly authenticated reports and/or research reports prepared by approved agencies and/or approved sources.
 - 1.2.4 For new materials^{xxxviii} 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.^{xxxix}
 - 1.2.6 The commerce of approved sources (i.e., registered PEs) is regulated by professional engineering legislation. Professional engineering commerce shall always be approved by AHJs, except where there is evidence provided in writing, that specific legislation has been violated by an individual registered PE.
 - 1.2.7 The AHJ shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in IBC Section 104.11.^{xl}



- 1.3 **Approved^{xli} 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.^{xlii} 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.^{xliii}
- 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 deemed^{xliv} an approved testing agency via ISO/IEC 17025 accreditation, an approved inspection agency via ISO/IEC 17020 accreditation and an approved product evaluation agency via ISO/IEC 17065 accreditation. Accrediting agencies, other than federal agencies, must be members of an internationally recognized cooperation of laboratory and inspection accreditation bodies subject to a mutual recognition agreement^{xlv} (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.
- 1.7 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;
- 1.7.1 A certification mark, listing or label from a commission-approved certification agency indicating that the product complies with the code,
 - 1.7.2 A test report from a commission-approved testing laboratory indicating that the product tested complies with the code,
 - 1.7.3 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,
 - 1.7.4 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
 - 1.7.5 A statewide product approval issued by the Florida Building Commission.



- 1.8 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).
- 1.9 **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.
- 1.10 **Approved by New Jersey:** Pursuant to the 2018 Building Code of New Jersey in IBC Section 1707.1 General,^{xlvi} 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)”*.^{xlvii} Furthermore N.J.A.C 5:23-3.7 states: *“Municipal approvals of alternative materials, equipment, or methods of construction.”*
 - 1.10.1 **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.
 - 1.10.1.1 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.
 - 1.10.1.2 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.
 - 1.10.2 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”*.
- 1.11 **Approved by the Code of Federal Regulations Manufactured Home Construction and Safety Standards:** Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14^{xlviii} and Part 3280,^{xlix} 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:
 - 1.11.1 *“All construction methods shall be in conformance with accepted engineering practices”*
 - 1.11.2 *“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.”*
 - 1.11.3 *“The design stresses of all materials shall conform to accepted engineering practice.”*



- 1.12 **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:
- 1.12.1 For new materials that are not specifically provided for in this code, the design strengths and permissible stresses shall be established by tests.ⁱ
 - 1.12.2 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.ⁱⁱ
 - 1.12.2.1 An approved agency is “approved” when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is in the ANAB directory.
 - 1.12.2.2 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.ⁱⁱⁱ
 - 1.12.3 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.ⁱⁱⁱⁱ
- 1.13 **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:
- 1.13.1 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.
 - 1.13.2 **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.
 - 1.13.3 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.^{iv}
 - 1.13.4 Therefore, all ANAB ISO/IEC 17065 Duly Authenticated Reports are approval equivalent.^{iv}
- 1.14 Approval equity is a fundamental commercial and legal principle.^{vi}



Notes

- i For more information, visit drjcertification.org or call us at 608-310-6748.
- ii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1702>
- iii 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>
- iv <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
- v 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
- vi <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:--:text=the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies
- vii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1703.4.2>
- viii https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_agency
- ix https://up.codes/viewer/wyoming/ibc-2021/chapter/2/definitions#approved_source
- x <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](#).
- xi <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/>
- xii <https://www.cbittest.com/accreditation/>
- xiii <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104>:--:text=to%20enforce%20the%20provisions%20of%20this%20code
- xiv <https://up.codes/viewer/colorado/ibc-2021/chapter/1/scope-and-administration#104.11>:--:text=Where%20the%20alternative%20material%20design%20or%20method%20of%20construction%20is%20not%20approved%20the%20building%20official%20shall%20respond%20in%20writing%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%20the%20building%20official%20shall%20reject%20such%20application%20in%20writing%20stating%20the%20reasons%20therefore
- xv <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>:--: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
- xvi <https://iaf.nu/en/about-iaf-mia/#>:--: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%20with%20the%20appropriate%20scope
- xvii True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- xviii <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>
- xix Unless otherwise noted, all references in this report 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.
- xx References to NFPA 285-12 in this TER are code compliant through the 2018 version of the IBC.
- xxi <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#listed> AND <https://up.codes/viewer/colorado/ibc-2021/chapter/2/definitions#labeled>
- xxii 2015 IRC also allows for 23/32" wood structural panel.
- xxiii 2018 IBC Section 2304.10.5
- xxiv <https://up.codes/viewer/colorado/ibc-2021/chapter/17/special-inspections-and-tests#1703.4>
- xxv <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#>:--:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%20livable%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades
- xxvi <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#>:--:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur
- xxvii 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.
- xxviii 2018 IBC Section 2304.10.5
- xxix See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition.



- xxx [2018 IFC Section 104.9](#)
- xxxi Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC [Section 201.4](#) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.
- xxxii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1707.1>
- xxxiii Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- xxxiv [2015 IBC Section 1404.2](#)
- xxxv <http://www.drjengineering.org/AppendixC> AND <https://www.drjcertification.org/cornell-2016-protection-trade-secrets>
- xxxvi <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=imprisoned%20not%20more%20than%2010%20years>
- xxxvii <https://www.law.cornell.edu/uscode/text/18/1832#:~:text=Any%20organization%20that,has%20thereby%20avoided>
- xxxviii <https://up.codes/viewer/wyoming/ibc-2021/chapter/17/special-inspections-and-tests#1706.2>
- xxxix [IBC 2021, Section 1706.1 Conformance to Standards](#)
- xl [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General](#)
- xli See **Section 11.6** for the distilled building code definition of **Approved**.
- xlii [Los Angeles Municipal Code, SEC. 98.0503. TESTING AGENCIES](#)
- xliii <https://up.codes/viewer/california/ca-building-code-2022/chapter/17/special-inspections-and-tests#1707.1>
- xliv [New York City, The Rules of the City of New York, § 101-07 Approved Agencies](#)
- xlv [New York City, The Rules of the City of New York, § 101-07 Approved Agencies](#)
- xlvi https://up.codes/viewer/new_jersey/ibc-2018/chapter/17/special-inspections-and-tests#1707.1
- xlvii <https://www.nj.gov/dca/divisions/codes/codreg/ucc.html>
- xlviii <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14>
- xlvi <https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280>
- i [IBC 2021, Section 1706 Design Strengths of Materials, 1706.2 New Materials.](#) Adopted law pursuant to IBC model code language 1706.2.
- ii [IBC 2021, Section 1707 Alternative Test Procedure, 1707.1 General.](#) Adopted law pursuant to IBC model code language 1707.1.
- iii <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/>
- iiii [IBC 2021, Section 1706 Design Strengths of Materials, Section 1706.1 Conformance to Standards](#) Adopted law pursuant to IBC model code language 1706.1.
- lv <https://iaf.nu/en/about-iaf-mia/#:~: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>
- lv True for all ANAB accredited product evaluation agencies and all International Trade Agreements.
- lvi <https://www.justice.gov/crt/deprivation-rights-under-color-law> AND <https://www.justice.gov/atr/mission>