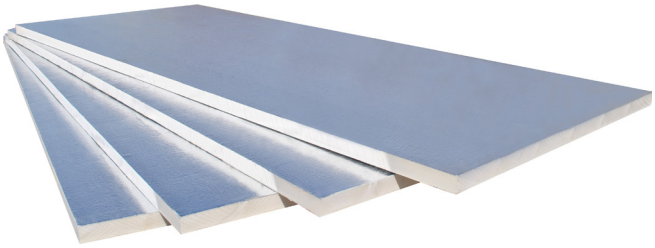
BUILDING TRUST

ARCHITECTURAL SOLUTIONS
NFPA 285 AND EXTERIOR WALLS WITH ECOMAXCI® FR

PRODUCT DESCRIPTION
Rmax ECOMAXci FR is an energy-efficient thermal insulation board composed of a closed-cell polyisocyanurate (polyiso) foam core bonded to embossed, glass fiber reinforced aluminum foil facers on both sides. The exposed side of the board has a heavy embossed 12mil facer with an aluminum reflective surface with a clear coating for limited protection against oxidation. The other side is marked in production to ensure proper installation. ECOMAXci FR utilizes a CFC-, HCFC- and HFC-free blowing agent that has zero Ozone Depletion Potential (ODP) and negligible Global Warming Potential (GWP). This insulation has passed multiple NFPA 285 assemblies and is approved for use in exterior walls of buildings of any height, as described within this document.



THERMAL PROPERTIES / PRODUCT DATA
"R" means resistance to heat flow. The higher the R-value, the greater the insulating power.

Nominal Thickness	Thermal R-Value[1]	System R-Value[2]	Pcs/Bdl
Inches	°F•ft²•hr/Btu	°F•ft²•hr/Btu	
0.75	5.0	7.77	60
1.00	6.0	8.77	48
1.50	9.6	12.37	32
1.55	10.0	12.77	30
2.00	13.1	15.87	24
2.50	16.7	19.47	19
3.00	20.3	23.07	16
3.50	23.9	26.67	13
4.00	27.4	30.17	12
4.50	31.0	33.77	10

[1]Thermal values are determined by using ASTM C518 test method at 75°F mean temperature on material conditioned according to PIMA Technical Bulletin No. 101.
[2]Includes the ASHRAE assigned 2.77 R-value of a ¾" air tight space against a reflective foil in a typical wall assembly.

NOTE: ECOMAXci FR is shipped in bundles that are approximately 48" high and wrapped in plastic for easy handling.

COMPLIANCES
- ASTM C1289 Type I, Class 1 or 2
- ASHRAE 90.1
- Fire Rated Assemblies - ANSI/UL 263
- International Energy Conservation Code (IECC)
- International Building Code (IBC) Section 2603, Foam Plastic
- DrJ TER 1309-03
- Class A Flame Spread and Smoke Developed Indices per IBC Chapter 8, Interior Finishes (ASTM E84)
- Tested per NFPA 285 to comply with IBC Section 2603.5.5
- Water-Resistive Barrier (WRB) per AC71 (ASTM E331, AATCC Test Method 127)
- Air Barrier Material per ASTM E2178

ARCHITECTURAL REVIEW
With the push for continuous insulation in the code arena, there is an increasing demand for foam plastic insulation on exterior walls. In order to meet this need, enhanced fire performance is required. The International Building Code (IBC) has recognized this through a required test method developed by the National Fire Protection Association (NFPA). The test method is NFPA 285 *Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.* This Architectural Solutions document contains an overview of the NFPA 285 test method and describes how Rmax has fulfilled this demand through large-scale assembly testing utilizing its ECOMAXci FR insulation product.

NFPA – THE ORGANIZATION & TEST METHOD

The NFPA was established in 1896 as an international, nonprofit organization with a mission to reduce the worldwide burden of fire and other hazards on the quality of life. As a leading advocate of fire prevention and an authoritative source on public safety, they strive to accomplish this mission through consensus codes and standards, research, training and education. Over 300 consensus codes and standards, intended to minimize the possibility and effects of fire and other risks, have been developed and published by the NFPA.

NFPA 285 provides a method of determining the flammability characteristics of exterior, non-load-bearing wall assemblies, which contain combustible components. The test method is intended to simulate the "full-scale" fire performance of the wall assembly being evaluated. The basic test apparatus consists of a section mock-up of a multi-story building. It is designed to be two rooms, one above the other; the lower of which contains a window opening. Two burners are used to conduct the test; one inside the lower test room and one on the exterior side of the window opening. The primary performance characteristics evaluated in this test are the capability of the test wall assembly to resist the following:

- Flame propagation over the exterior face of the system
- Vertical flame spread within the combustible core components from one story to the next
- Vertical flame spread over the interior (room side surface of the panels from one story to the next)
- Lateral flame spread from the compartment of fire origin to adjacent spaces

The above characteristics are assessed through visual observations and temperature data obtained during the test via thermocouples located throughout the wall assembly.

Rmax ECOMAXci FR has been tested per NFPA 285 and is approved for use up to 4.5" thick within multiple assemblies as described throughout the following sections.

SATISFYING IBC REQUIREMENTS FOR EXTERIOR WALLS OF BUILDINGS OF ANY HEIGHT WITH RMAX ECOMAXci FR

According to the IBC, exterior walls of buildings of Type I, II, III or IV construction of any height, that contain foam plastic insulation, require additional fire testing. Per Section 2603.5.5, "The wall assembly shall be tested in accordance with and comply with the acceptance criteria of NFPA 285. Exception: one-story buildings complying with Section 2603.4.1.4." It should be noted that NFPA 285 is an assembly test, not a building material test. Approval is dependent on all components of the assembly. Furthermore, the foam plastic insulation must have a Class A rating per ASTM E84.

ECOMAXci FR can be specified in exterior walls of buildings of any height utilizing brick veneer, stucco, limestone or natural stone veneer, cast artificial stone veneer, terracotta cladding, metal panel, metal composite (MCM), fiber cement siding, as well as other panel systems. ECOMAXci FR has been tested according to NFPA 285 and successfully passed with the exposed side facing the exterior. A summary of the various assembly components is shown on the following page. All details, including components and installation of the tested assembly, should be followed during construction.

RMAX ECOMAXci FR AS A WATER-RESISTIVE BARRIER

When ECOMAXci FR is installed over steel studs with the joints sealed, it serves as a Water-Resistive Barrier. ECOMAXci FR has been tested per the guidelines set forth in the ICC-ES *Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water-Resistive Barriers* (AC71). For use as a WRB, ECOMAXci FR shall be installed with vertical board joints placed directly over framing spaced a maximum of 24 inches o.c. All insulation board joints shall be covered by R-SEAL 3000 tape. All transitions and throughwall penetrations must be flashed to comply with applicable code.

TYPICAL PHYSICAL PROPERTIES

Physical properties shown are based on data obtained under controlled conditions and are subject to normal manufacturing tolerances.

Property	Test Method	Results
Density, Overall, Nominal	ASTM D1622	2.0 pcf
Compressive Strength[1]	ASTM D1621	20 psi Standard Also Available in 25 psi Upon Request
Flexural Strength	ASTM C203	60 psi
Flame Spread, Faced[2]	ASTM E84	25 or Less
Smoke Developed, Faced[2]	ASTM E84	< 450
Air Barrier	ASTM E2178	< 0.02 L/(s.m^2)
Water Vapor Transmission	ASTM E96	< 0.03 Perm
Water Absorption	ASTM C209	< 0.2% Vol.
Dimensional Stability, Length and Width	ASTM D2126	< 1% Linear Change
Mold Resistance	ASTM D3273	10, no defacement
Reflectance Emittance	ASTM E408	0.96 0.04
Service Temperatures		250°F max

[1]Less than 1" is standard at 16 psi
[2]Flame spread and smoke numbers are shown for comparison purposes only and are not intended to represent the performance of ECOMAXci FR and related components under actual fire conditions.

NFPA 285: ASSEMBLY OPTIONS

The approval of NFPA 285 assemblies with ECOMAXci FR allows for ultimate efficiency through multiple design options, ease of construction, a better building envelope and reduced energy usage. With a direct impact on the savings throughout the life of the building, ECOMAXci FR is an excellent choice for commercial buildings. The various component options throughout the wall system are outlined below. **NOTE: For specific details, requirements and limitations of each component, refer to Rmax NFPA 285 Assembly Guide and DrJ Technical Evaluation Report, TER 1309-03. For more information on these assemblies, contact Rmax Technical at (972) 850-3604.**

BASE WALL

- Concrete or concrete masonry wall
- Steel studs with interior gypsum wallboard

FLOOR LINE FIRE-STOPPING

- Mineral fiber insulation

CAVITY INSULATION

- None
- Mineral fiber or fiberglass (faced or unfaced)
- Any non-combustible insulation

EXTERIOR SHEATHING

- None
- Exterior gypsum sheathing

WRB OVER SHEATHING*

EXTERIOR INSULATION

- Rmax ECOMAXci FR

WRB OVER INSULATION*

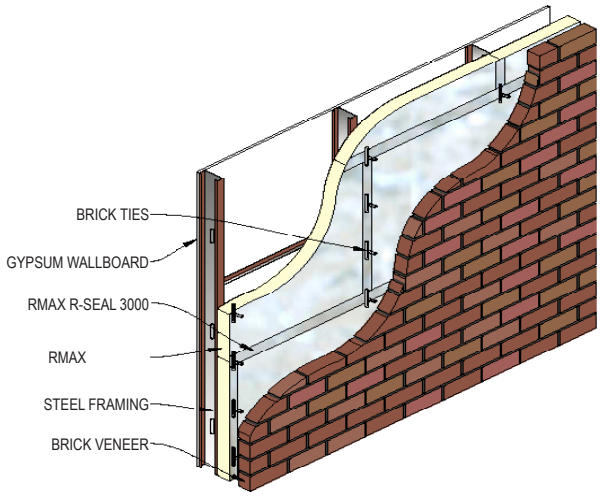
EXTERIOR CLADDING OPTIONS

1. Brick
2. Stucco
3. Limestone
4. Natural Stone Veneer
5. Cast Artificial Stone Veneer
6. Terracotta Cladding
7. Any NFPA 285 MCM (aluminum, steel, copper, zinc)
8. Metal panel, uninsulated (aluminum, steel, copper, zinc)
9. Fiber-cement siding, uninsulated
10. Stone/Aluminum honeycomb composite building panels passing NFPA 285
11. Autoclaved-aerated-concrete (AAC) panels passing NFPA 285
12. Thin Set Brick

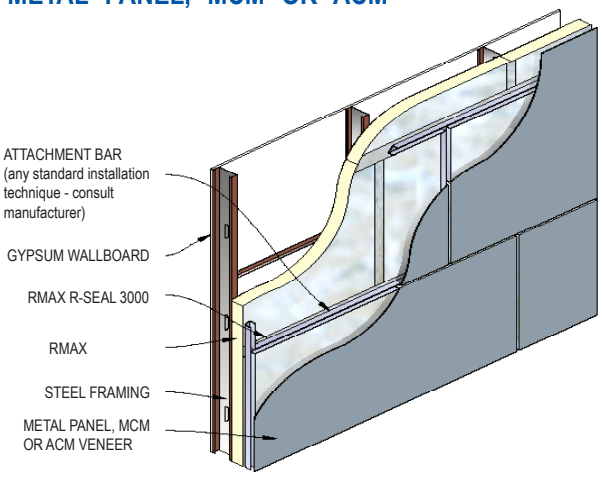
FLASHING

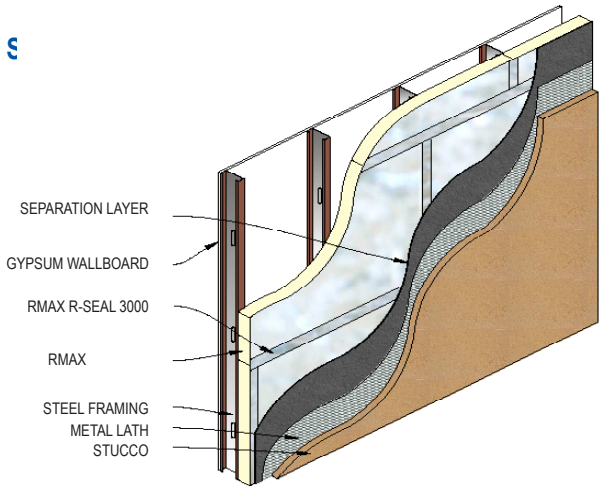
- Rmax R-SEAL 6000; any asphalt, acrylic, or butyl based; liquid flashing

WRB OPTIONS
None
Rmax: R-SEAL 3000; any asphalt, acrylic, or butyl based; liquid flashing
BASF Enershield®-HP or Enershield®-I
Carlisle: Barritech™ NP, Barritech™ VP or Fire Resist 705FR-A
Dörken: DELTA®-STRATUS SA
Dow Corning: DOWSIL™ DEFENDAIR 200
Dow: WEATHERMATE™ or WEATHERMATE™ Plus
Dryvit®: Backstop® NT™
DuPont: Tyvek® (various per ESR-2375)
Henry®: Air-Bloc® 17MR, Air-Bloc® 21FR, Air-Bloc® 31MR, Air-Bloc® 32MR, Air-Bloc® 33MR, BlueskinVP™160, Blueskin® SA, EnviroCap, FOILSKIN® or Metal Clad
Pactiv: GreenGuard® MAX™ Building Wrap
Pecora: XL-Perm[ULTRA] VP (10 mil DFT)
Prosoco: R-Guard® Cat 5®, R-Guard® VB, or R-Guard® Spray Wrap MVP
Siga: Majvest 500 SA
Sika: SikaGard 535
Soprema®: Sopraseal® Stick VP, Sopraseal® Stick 1100T or Sopraseal® LM 204 VP, Soprasolin® HD
W.R. Grace: PAB®NPL 10, PAB® VPL, PAB® VPL LT, PAB®VPS, PAB® AWM or PAB® VPL 50
W.R. Meadows: Air-Shield LMP (Gray or Black), Air-Shield TMP, Air-Shield LSR
VaproShield®: RevealShield SA™ or WrapShield SA®
Refer to TER 1309-03 for specified location and veneer.



METAL PANEL, MCM OR ACM





**For approved use of WRB with specified location and veneer, as well as, approvals with the use of spray foam in the cavity or fire retardant treated wood (FRTW) studs and/or sheathing, refer to TER 1309-03.*

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DISCLAIMERS: It is the responsibility of the project architect, engineer, general contractor and/or building owner to determine the suitability of this product and the information contained within this document as it pertains to local Building Code requirements. For additional recommendations and applications utilizing ECOMAXci FR, refer to the ECOMAXci FR data sheet. ECOMAXci FR is NOT a structural panel. It must NOT be used as a nailing base for any other building products. Furthermore, stud walls insulated with ECOMAXci FR must be properly braced for lateral loads according to the requirements of local Building Codes. Polyiso foam is an organic material which will burn when exposed to an ignition source of sufficient heat and intensity and may contribute to flames spreading. For warranties, limitations and conditions refer to Rmax Sales Policy and applicable warranties. All documents are located at www.rmax.com. For technical support, email technical@rmax.com or call (972) 850-3604. For sales support, pricing and availability, email rmax@rmax.com or call (800) 527-0890. Rmax does not assume any responsibility or liability for the performance of any products other than those manufactured by Rmax. **NOTE: All Rmax products must be tarped, placed on skids and kept dry before and throughout construction.**

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ENERGY STAR PARTNER

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