



CERTIFICATION



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Technical Evaluation Report

TER 1309-03

Rmax Thermasheath®,
Thermasheath®-XP, TSX-8500, TSX-
8510, ECOMAXci® FR, & ECOMAXci®
FR WHITE

Rmax

Products:

Rmax Thermasheath®
Rmax Thermasheath®-XP
Rmax TSX-8500
Rmax TSX-8510
Rmax ECOMAXci® FR
Rmax ECOMAXci® FR WHITE

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DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES
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SECTION: 06 16 13 - Insulated Sheathing
SECTION: 06 16 53 - Moisture-Resistant Sheathing Board
DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION
SECTION: 07 20 00 - Thermal Protection
SECTION: 07 21 00 - Thermal Insulation
SECTION: 07 25 00 - Water-Resistive Barriers/Weather Barriers
SECTION: 07 27 00 - Air Barriers

1 PRODUCTS EVALUATED¹

- 1.1 Rmax Thermasheath®
Rmax Thermasheath®-XP
Rmax TSX-8500
Rmax TSX-8510
Rmax ECOMAXci® FR
Rmax ECOMAXci® FR WHITE

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

Through ANAB accreditation and the [IAF MLA](#), DrJ certification can be used to obtain product approval in any [jurisdiction](#) or country that has [IAF MLA Members & Signatories](#) to meet the [Purpose of the MLA](#) – “certified once, accepted everywhere.”

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





2 APPLICABLE CODES AND STANDARDS^{2,3}

2.1 Codes

- 2.1.1 *IBC—12, 15, 18: International Building Code®*
- 2.1.2 *IECC— 12, 15, 28: International Energy Conservation Code*
- 2.1.3 *IRC—12, 15, 18: International Residential Code®*

2.2 Standards and Referenced Documents

- 2.2.1 *AATCC Test Method 27: Water Resistance: Hydrostatic Pressure Test*
- 2.2.2 *ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*
- 2.2.3 *ASTM C209: Standard Test Methods for Cellulosic Fiber Insulating Board*
- 2.2.4 *ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*
- 2.2.5 *ASTM E1354: Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter*
- 2.2.6 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*
- 2.2.7 *ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*
- 2.2.8 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*
- 2.2.9 *ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials*
- 2.2.10 *NFPA 259: Standard Test Method for Potential Heat of Building Materials*
- 2.2.11 *NFPA 285: Standard Fire Test Method for the Evaluation of Fire Propagation Characteristics of Exterior Nonload-bearing Wall Assemblies Containing Combustible Components*
- 2.2.12 *NFPA 286: Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*
- 2.2.13 *UL 1715: Fire Test of Interior Finish Material*
- 2.2.14 *UL 263: Standard for Fire Tests of Building Construction and Materials*

3 PERFORMANCE EVALUATION

- 3.1 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE were evaluated to determine the following:
 - 3.1.1 Performance in accordance with foam plastic requirements of *IBC Section 2603* and *IRC Section R316*.
 - 3.1.1.1 Surface burning characteristics in accordance with *IBC Section 2603.3* and *IRC Section R316.3*.
 - 3.1.1.2 Special approval for use without a thermal barrier or ignition barrier in accordance with *IBC Section 2603.4* and *Section 2603.5.2* and *IRC Section R316.4*.
 - 3.1.2 Performance for use as insulating sheathing (R-value) in accordance with *IRC Section N1102* and *IECC Section C402*.
 - 3.1.3 Performance for use as a water-resistive barrier (WRB) in accordance with *IBC Section 1403.2⁴* and *IRC Section R703.2*.

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

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

⁴ *2015 IBC Section 1404.2*

- 3.1.4 Performance for use as a vapor retarder in accordance with IBC Section 202 and Section 1404.3⁵ and IRC Section R202 and Section R702.7.
- 3.1.5 Performance for use as an air barrier in accordance with IECC Section C402.
- 3.2 Thermasheath, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE were evaluated to determine:
 - 3.2.1 Potential heat in accordance with IBC Section 2603.5.3
 - 3.2.2 Vertical and lateral fire propagation in accordance with IBC Section 2603.5.5
 - 3.2.3 Ignition characteristics in accordance with IBC Section 2603.5.7
- 3.3 Use of Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE in structures where the exterior wall covering is unable to resist 100% of the transverse wind load is outside the scope of this TER.
- 3.4 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.5 Any engineering evaluation conducted for this TER was performed on the dates provided in this TER and within DrJ's professional scope of work.

4 PRODUCT DESCRIPTION AND MATERIALS

- 4.1 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE, pictured in Figure 1, are non-structural foam plastic insulating sheathing (FPIS) panels consisting of a closed-cell rigid polyisocyanurate (polyiso) foam core bonded to various facers (ASTM C1289 Type I, Class 1 and Class 2).

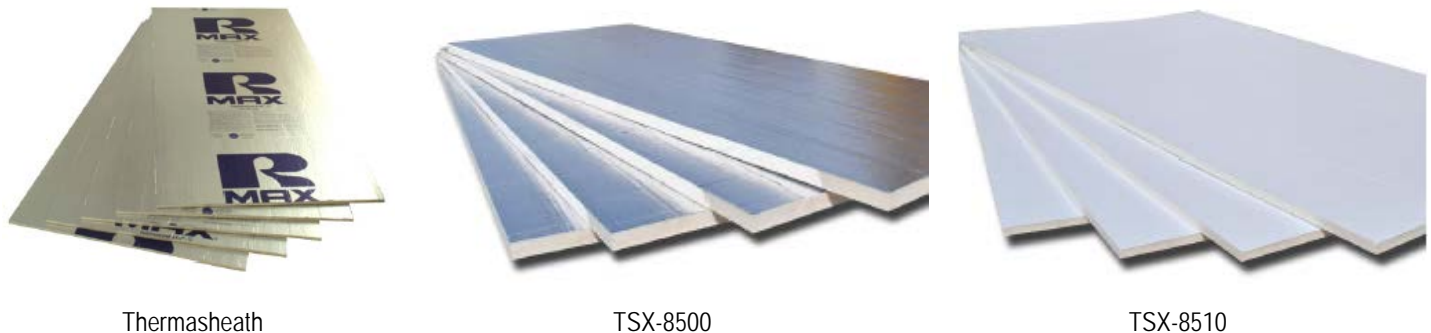


FIGURE 1. THERMASHEATH, TSX-8500, AND TSX-8510

- 4.1.1 Thermasheath consists of a polyiso core bonded to Kraft reinforced aluminum facers on each side. Both sides have a reflective surface.
- 4.1.2 Thermasheath-XP consists of a polyiso core bonded to aluminum facers on each side. Both sides may be left exposed; one side has a white modified acrylic coating, and the other side has a reflective surface with a clear coating.
- 4.1.3 TSX-8500 consists of a polyiso core bonded to glass fiber reinforced aluminum facers on each side. Both sides have a reflective surface. The exposed side has a clear modified acrylic coating. Each board is marked on the non-exposed side.
- 4.1.4 TSX-8510 consists of a polyiso core bonded to glass fiber reinforced aluminum facers on each side. The exposed side has a white modified acrylic coating. The non-exposed side has a reflective surface. (This product is identical to TSX-8500, except for the white coating on the exposed side.)

⁵ 2015 IBC Section 1405.3



- 4.1.5 ECOMAXci FR consists of a polyiso core bonded to glass fiber reinforced aluminum facers on each side. Both sides have a reflective surface. The exposed side has a clear modified acrylic coating. Each board is marked on the non-exposed side.
- 4.1.6 ECOMAXci FR WHITE consists of a polyiso core bonded to glass fiber reinforced aluminum facers on each side. The exposed side has a white modified acrylic coating. The non-exposed side has a reflective surface. (This product is identical to ECOMAXci FR, except for the white coating on the exposed side.)
- 4.1.7 The Environmental Product Declarations (EPD) for the products listed in Section 1.1 is available at polyiso.org.
- 4.2 **Material Availability**
 - 4.2.1 Thickness: ½" (12.7 mm) through 4.5" (114.3 mm)
 - 4.2.2 Standard width: 48" (1219 mm)
 - 4.2.3 Standard length: 96", 108", 120", and 144" (2438 mm, 2743 mm, 3048 mm, and 3658 mm)
 - 4.2.4 Custom widths, lengths, and thicknesses available upon request.

5 APPLICATIONS

5.1 Thermal Insulation

- 5.1.1 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE are non-structural FPIS panels used as thermal insulation within the building envelope, including, but not limited to, attic, crawlspace, wall, roof, ceiling, floor, and foundation assemblies.
- 5.1.2 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE may be installed horizontally under foundations and vertically on the interior side of footings and exterior side of foundation walls.
- 5.1.3 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE meet the continuous insulating sheathing requirements complying with the provisions of IECC Section C402.
- 5.1.4 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE have the thermal properties shown in Table 1.

TABLE 1. THERMAL PROPERTIES

Product	Nominal Thickness (in)	Thermal R-Value ¹ (°F-ft ² -hr/Btu)
Thermasheath Thermasheath-XP TSX-8500 TSX-8510 ECOMAXci FR ECOMAXci FR WHITE	½	3.2
	1.00	6.0
	1.50	9.6
	1.55	10.0
	2.00	13.1
	2.50	16.7
	3.00	20.3
	3.50	23.9
	4.00	27.4
4.50	31.0	

SI: 1 in = 25.4 mm

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.



5.2 Air Barrier

- 5.2.1 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE meet the requirements of IECC Section C402 for use as a component of the air barrier, when installed in accordance with the manufacturer’s installation instructions and this TER with all seams, including the top and bottom edges, sealed.
- 5.2.2 The air barrier properties of Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE properties are shown in Table 2.

TABLE 2. AIR BARRIER PROPERTIES

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

- 5.2.3 The air permeance of an air barrier material is defined by the IECC and the Air Barrier Association of America (ABAA) as being no greater than 0.02 liter per second per square meter (L/[s.m²]) at 75 Pa pressure difference when tested in accordance with ASTM E2178.
- 5.2.4 When used as part of an air barrier assembly, all sheathing panel joints shall be sealed with R-SEAL 3000 or R-SEAL Construction Tape. The top and bottom of walls shall also be sealed in accordance with the manufacturer’s installation instructions and this TER.
- 5.2.5 All penetrations shall be flashed and sealed in accordance with the flashing manufacturer’s installation instructions.

5.3 Water-Resistive Barrier

- 5.3.1 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE may be used as a WRB as prescribed in IBC Section 1403.2⁶ and IRC Section R703.2, when installed on exterior walls as described in this section.
- 5.3.2 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE shall be installed horizontally or vertically with vertical board joints placed directly over exterior framing spaced a maximum of 24" (610 mm) o.c. The fasteners used to attach the board shall be installed in accordance with Section 6.
- 5.3.3 All seams and joints between boards shall be covered by R-SEAL 3000 or R-SEAL Construction Tape.
- 5.3.4 A separate WRB may also be provided. If a separate WRB method is used, taping of the sheathing joints is not required.
- 5.3.5 Flashing of penetrations is required and shall comply with the applicable code.
- 5.3.6 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE have the water-resistance properties shown in Table 3.

TABLE 3. WATER-RESISTANCE PROPERTIES

Product	Property Tested	Test Standard	Test Results
Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, & ECOMAXci FR WHITE	Water Vapor Transmission	ASTM E96	< 0.03 Perm
	Water Absorption	ASTM C209	< 0.2% Volume
		ASTM C272	≤ 0.3% Volume

⁶ 2015 IBC Section 1404.2

5.4 Fire Safety Performance

5.4.1 Surface Burn Characteristics:

5.4.1.1 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE have the flame spread and smoke developed ratings shown in Table 4, when tested in accordance with ASTM E84 per IBC Section 2603.3 and IRC Section R316.3

TABLE 4. SURFACE BURN CHARACTERISTICS¹

Product	Thickness	Flame Spread	Smoke Developed
Thermasheath ²	< 1 inch	≤ 40	≤ 250
	≥ 1 inch	≤ 25	≤ 250
Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, & ECOMAXci FR WHITE	All Thicknesses	≤ 25	≤ 250
SI: 1 in = 25.4 mm 1. Tested in accordance with ASTM E84 2. Foam core			

5.4.2 Thermal Barrier – Thermasheath (IBC and IRC Buildings):

5.4.2.1 Except as noted in Section 5.4.2.3, Thermasheath panels, up to 12" (304.8 mm) in thickness, may be installed within the building envelope (including, but not limited to, attics, crawlspaces, and wall, roof, floor and ceiling assemblies) of all building types when separated from the interior with a thermal barrier consisting of a minimum ½" gypsum wallboard or an approved equivalent in accordance with IBC Section 2603.4 and IRC Section R316.4.⁷

5.4.2.2 Panels may be installed in single or multiple layers.

5.4.2.3 The thermal barrier required by Section 5.4.2.1 is not required in the following applications:

5.4.2.3.1 Thermasheath is covered by a minimum 1" thickness of concrete or masonry on each face of the sheathing in accordance with IBC Section 2603.4.1 or IRC Section R316.5.1.

5.4.2.3.2 Walk-in coolers in accordance with IBC Section 2603.4.1.3.

5.4.2.3.3 When used in a roof assembly where the Thermasheath is separated from the interior of the building by a minimum 15/32" wood structural panel (WSP) in accordance with IBC Section 2603.4.1.5 or IRC Section R316.5.2.

5.4.2.3.4 On the walking surface of a structural floor system, when Thermasheath is covered by a minimum ½" WSP or approved equivalent in accordance with IBC Section 2603.4.1.14 and IRC Section R316.5.13

5.4.2.3.5 Attic, crawlspace or other uninhabitable space applications meeting the following requirements:

5.4.2.3.5.1 Thermasheath is approved for use without a thermal barrier or ignition barrier based testing of the actual end-use configuration including joints, seams and other typical details used in the installation of the assembly in accordance with IRC Section R316.6. This includes, but is not limited to, knee and gable end walls. The conditions of this approval are:

5.4.2.3.5.1.1 For installation on walls and ceilings, Thermasheath is installed at a maximum thickness of 1".

5.4.2.3.5.1.2 For installation on walls only or ceilings only, Thermasheath is installed at a maximum thickness of 4.5".

5.4.2.3.5.2 Use without an approved thermal barrier or ignition barrier is limited to areas where:

⁷ 2015 IRC also allows for 23/32"

- 5.4.2.3.5.2.1 For *IRC* applications only, access to the space is required by *IRC* Section R807.1 or Section R408.4.
- 5.4.2.3.5.2.2 For both *IBC* and *IRC* applications, entry is made only for the purposes of repairs or maintenance. Mechanical equipment in these areas shall be installed in accordance with their listing.
- 5.4.3 *Thermal Barrier – Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE (IBC and IRC Buildings):*
 - 5.4.3.1 Except as provided in Section 5.4.3.2, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE panels, up to 12" (304.8 mm) in thickness, may be installed within the building envelope (including, but not limited to, attics, crawlspaces, and wall, roof, floor and ceiling assemblies) of all building types when separated from the interior with a thermal barrier consisting of a minimum ½" gypsum wallboard or an approved equivalent in accordance with and *IBC* Section 2603.4 and *IRC* Section R316.4.
 - 5.4.3.2 Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE are specifically approved for use without a thermal barrier or ignition barrier as prescribed by *IBC* Section 2603.4 through Section 2603.8 and *IRC* Section R316.4 through Section R316.5.13, based on large-scale testing conducted in accordance with *UL 1715* per *IBC* Section 2603.9⁸ and *IRC* Section R316.6 as follows:
 - 5.4.3.2.1 Panels may be installed in single or multiple layers.
 - 5.4.3.2.2 In a walls-only application, the panels are permitted to be used without a thermal barrier or ignition barrier in thicknesses not to exceed 4.5" (114.3 mm).
 - 5.4.3.2.3 In a ceiling-only application, the panels are permitted to be used without a thermal barrier or ignition barrier in thicknesses not to exceed 12" (304.8 mm).
 - 5.4.3.2.4 In an application where the panels are used on both the walls and ceilings, use of a thermal barrier or ignition barrier is required on either the wall or the ceiling. Panels may be installed in single or multiple layers in thicknesses up to 12" where covered by a thermal barrier or ignition barrier. The exposed wall or ceiling assembly must comply with Section 5.4.3.2.2 or Section 5.4.3.2.3, respectively.
 - 5.4.3.2.5 When the panels are covered, the covering shall comply with the interior finish requirements of *IBC* Chapter 8 and *IRC* Section R702.1, as applicable.
- 5.4.4 *Potential Heat:*
 - 5.4.4.1 TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE have been tested to assess their performance as shown in Table 5 with regard to potential heat in accordance with *NFPA 259* and *IBC* Section 2603.5.4.

TABLE 5. POTENTIAL HEAT

Product	Potential Heat (Btu/lb)
Thermasheath	11,467
ECOMAXci FR and ECOMAXci FR WHITE	11,054
1. Tested in accordance with <i>NFPA 259</i>	

- 5.4.5 *Ignition Properties:*
 - 5.4.5.1 Thermasheath, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE were evaluated to assess performance with regard to ignition in accordance with *IBC* Section 2603.5.7.

⁸ 2012 *IBC* Section 2603.10



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

5.4.5.1.1.1 A thermal barrier in accordance with IBC Section 2603.4

5.4.5.1.1.2 Masonry or concrete – minimum 1" (25 mm) thick

5.4.5.1.1.3 Glass-fiber-reinforced concrete panels – minimum 3/8" (9.5 mm) thick

5.4.5.1.1.4 Metal-faced panels having a minimum 0.019" (0.48 mm) thick aluminum or 0.016" (0.41 mm) thick corrosion-resistant steel outer facings

5.4.5.1.1.5 Stucco – minimum 7/8" (22 mm) thick complying with IBC Section 2510

5.4.6 *Vertical and Lateral Fire Propagation:*

5.4.6.1 Thermasheath, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR White have been tested to assess performance with regard to vertical and lateral fire propagation in accordance with *NFPA 285* and IBC Section 2603.5.5.

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

5.4.6.3 The wall assemblies listed in Table 6 are approved for use in buildings of Type I-IV construction with a maximum 4.5" thickness of TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE.

5.4.6.4 The wall assemblies listed in Table 7 are approved for use in buildings of Type I-IV construction with a maximum 4.5" thickness of Thermasheath.





TABLE 6. VERTICAL & LATERAL FIRE PROPAGATION OF TSX-8500, TSX-8510, ECOMAXCI FR, AND ECOMAXCI FR WHITE

Wall Component	Materials
<p>Base Wall System Select option 1, 2 3 or 4 (option)</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 in. (min.) steel studs spaced 24" o.c. (max.) 1/2 in. (min.) type X Special Fire Resistant Gypsum Wallboard Interior 4. Where allowed in Types I, II, III or IV construction, FRTW (fire-retardant-treated wood) studs complying with <i>IBC</i> Section 2303.2, min. nominal 2x4 dimension, spaced 24" o.c. (max.) <ol style="list-style-type: none"> a. 5/8 in. type X Gypsum Wallboard Interior b. Bracing as required by code
<p>Floorline Firestopping As an option, use 2 with FRTW framing</p>	<ol style="list-style-type: none"> 1. 4 pcf mineral wool installed with Z-clips 2. FRTW fire blocking at floor line in accordance with applicable code requirements
<p>Cavity Insulation Select option 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 or 15</p> <p>Note: Items 5-15 are SPF Foam Type</p> <p>EZ FLO may be used inside the box headers and jamb studs for <i>NFPA 285</i> assemblies requiring SPF in stud cavities</p>	<ol style="list-style-type: none"> 1. None 2. Any noncombustible insulation per <i>ASTM E136</i> 3. Any Mineral Fiber (board type Class A, <i>ASTM E84</i> faced or un-faced) 4. Any Fiberglass (batt type Class A <i>ASTM E84</i> faced or unfaced) 5. 5-1/2 inch (max.) Icynene LD-C-50 spray foam in 6-inch-deep studs (max.). Use with 5/8-inch exterior sheathing. 6. 5-1/2 inch (max.) Icynene MD-C-200 2 pcf spray foam in 6-inch-deep studs (max.) full fill without an air gap. Use with 5/8-inch exterior sheathing. 7. 5-1/2 inch (max.) Icynene MD-R-210 2 pcf spray foam in 6-inch-deep studs (max.) full fill without an air gap. Use with 5/8-inch exterior sheathing 8. SWD Urethane QS 112 2 pcf spray foam in 6-inch-deep studs (max.) partial fill with a maximum 2-1/2 inch air gap or full fill. Use with 5/8 exterior sheathing. 9. Gaco Western 183M (3-1/2 inch max). Use with 5/8 exterior sheathing. 10. Gaco Western F 1850 (3-1/2 inch max.). Use with 5/8 exterior sheathing. 11. Demilec SEALECTION 500 (3-5/8 inch max). Use with 5/8 exterior sheathing. 12. Demilec HeatLok Soy 200 Plus (3.4 inch max). Use with 5/8 exterior sheathing. 13. Bayer Bayseal (3 inch max). Use with 5/8 exterior sheathing. 14. Lapolla FoamLok FL 2000 (3 inch max). Use with 5/8 exterior sheathing. 15. BASF SprayTite 81206 or WallTite (US & US-N) (3-5/8 inch max). Use with 5/8 inch exterior sheathing.
<p>Exterior Sheathing Select option 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 inch exterior gypsum sheathing must be used.</p>	<ol style="list-style-type: none"> 1. 1/2"-thick or thicker, exterior gypsum board sheathing 2. None (for 3 in. max. exterior insulation with claddings 7-12 or 4-1/2 in. max. exterior insulation with claddings 1-6) 3. 1/2" (min.) FRTW structural panels complying with <i>IBC Section 2303.2</i> and installed in accordance with code allowances for Types I, II, III or IV construction.
<p>Weather-Resistive Barrier Applied to Exterior Sheathing Select option 1 or 2 installed per manufacturer's installation instructions.</p> <p>Note 1: when using exterior sheathing, option 2 (no exterior sheathing) items 2 a-d may be applied directly to studs.</p> <p>NLA = No Longer Available. Replace with Spraywrap MVP.</p>	<ol style="list-style-type: none"> 1. None 2. Any WRB tested in accordance with <i>ASTM E1354</i> (at a minimum of 20 kW/m² heat flux) and shown by analysis to be less flammable (improved T_{ign}, Pk. HRR) than the baseline WRB or exterior insulation foam core. The following WRB products are allowed (item t. based on <i>NFPA 285</i>): <ol style="list-style-type: none"> a. Carlisle CCW Fire Resist 705FR-A b. Carlisle CCW Fire Resist Barritech NP™ c. Carlisle CCW Fire Resist Barritech VP d. Dörken Systems Inc, Delta Stratus SA e. Dörken Systems Inc, Delta®-Maxx/Plus f. Dörken Systems Inc, Delta®-Fassade S g. Dörken Systems Inc, Delta®-Foxx/Plus h. Dörken Systems Inc, Delta®-Vent S/Plus





Wall Component	Materials
	<ul style="list-style-type: none"> i. Dörken Systems Inc, Delta®-Vent SA j. Dow Corning DOWSIL DefendAir 200 (or LT version) or Dow Corning DOWSIL DefendAir 200C (Charcoal) k. Dryvit Backstop® NT™ l. DuPont™ Tyvek® (Various per ESR 2375) m. DuPont™ WeatherMate™ Housewrap n. DuPont™ WeatherMate™ Plus Housewrap o. GCP PERM-A-BARRIER® Aluminum Wall Membrane p. GCP PERM-A-BARRIER® NPL 10 q. GCP PERM-A-BARRIER® VPL r. GCP PERM-A-BARRIER® VPL 50 Membrane s. GCP PERM-A-BARRIER® VPL Low Temperature t. GCP PERM-A-BARRIER® VPS u. Henry® Air-Bloc® 17 v. Henry® Air-Bloc® 21 FR w. Henry® Air-Bloc® 31MR x. Henry® Air-Bloc® 32MR y. Henry® Air-Bloc® 33MR z. Henry® Blueskin® Metal Clad® aa. Henry® Blueskin® SA bb. Henry® Blueskin® VP 160 cc. Henry® EnviroCap dd. Henry® FoilSkin ee. Henry® Super Jumbo Tex 60 Minute® (Fortifiber) ff. Henry® WeatherSmart® Drainable Housewrap (Fortifiber) gg. Kingspan (Pactiv) GreenGuard® MAX™ Building Wrap hh. MasterSeal® AWB 660 (Formerly BASF Enershield® HP) ii. MasterSeal® AWB 660 I (Formerly BASF Enershield® I) jj. NaturaSeal NS-A-250HP™, NaturaSeal AirSeal NS A-250LP™ kk. Parex WeatherSeal Spray & Roll-On ll. Pecora ProPerm VP, Pecora XL-PermULTRA NP, Pecora XL-PermULTRA VP (10 mil DFT) mm. Prosoco R-Guard® MVP (NLA) nn. Prosoco R-Guard® Spray Wrap (NLA) 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 or Sika Sikagard®-535 tt. Soprema Sopraseal® LM 204 VP uu. Soprema Sopraseal® Stick 1100T vv. Soprema Sopraseal® Stick VP ww. Soprema Sopraseal® Xpress G xx. Soprema Soprasolin HD yy. Vaproshield RevealShield SA® zz. Vaproshield WrapShield SA® aaa. W.R. Meadows® Air-Shield™ LMP (Gray) bbb. W.R. Meadows® Air-Shield™ LMP (Black) ccc. W.R. Meadows® Air-Shield™ LSR ddd. W.R. Meadows® Air-Shield™ SMP eee. W.R. Meadows® Air-Shield™ TMP
Exterior Insulation Use either 1, 2, or 3	<ul style="list-style-type: none"> 1. 4-½ in. (max. consisting of a single panel or multiple thinner panels) Rmax TSX-8500 2. 4-½ in. (max. consisting of a single panel or multiple thinner panels) Rmax TSX-8510



Wall Component	Materials
<p>Note: See Exterior sheathing options for thickness limitations when no exterior sheathing is used.</p>	<ol style="list-style-type: none"> 3. 4-½ in. (max. consisting of a single panel or multiple thinner panels) Rmax ECOMAXci FR 4. 4-½ in. (max. consisting of a single panel or multiple thinner panels) Rmax ECOMAXci FR White
<p>FRTW Structural Panels over Exterior Insulation (Optional)</p> <p>Note: May be applied in the field or factory applied. Adhesive must not be full coverage.</p>	<p>For use with cladding options 1-14, installed in accordance with applicable code requirements. Must be applied with joints staggered. Fasteners used for securing FRTW panels must penetrate through the foam plastic into FRTW or steel framing. The system must be designed to handle the cladding load and wind load per the applicable code.</p>
<p>Weather-Resistive Barrier Applied over Exterior Insulation (or FRTW) Use any item 1) a-n for claddings 1-6 with non-open joint installation technique, or any item 2) a-aa for all approved claddings 1-14 below.</p> <p>Note: Exterior WRB items 1, b-d are not traditional WRB products but are insulation panel joint tapes. The insulation panel joints shall be staggered. These tapes are listed to allow use in both categories 1-6 OR 1-14.</p> <p>NLA = No longer available. Replaced with Spraywrap MVP</p>	<ol style="list-style-type: none"> 1. For use with all claddings <ol style="list-style-type: none"> a. None b. 6 in. (max.) Venture Tape CW over insulation joints c. 6 in. (max.) Rmax R-SEAL 3000, R-SEAL 6000 or R-SEAL 2000 LF over insulation joints d. 6 in. (max.) asphalt or butyl based tape, or liquid flashing over insulation joints e. Kingspan (Pactiv) GreenGuard® MAX™ Building Wrap f. Dupont Tyvek® (Various per 2375) g. Dow Weathermate™ Housewrap h. Dow 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 (Brick Equivalent) with non-open joint installation techniques (ex. shiplap, etc.) <ol style="list-style-type: none"> a. Henry® Air-Bloc® 31MR b. Henry® Envirocap c. Henry® Air-Bloc® 33MR d. Henry® Air-Bloc® 21 FR e. Henry® Air-Bloc® 17 f. Henry® Blueskin® VP160 g. Soprema Sopraseal® Stick VP h. Carlisle CCW Fire Resist Barritech NP™ i. Carlisle CCW Fire Resist Barritech VP j. Prosoco R-Guard® Spray Wrap (NLA) k. Prosoco R-Guard® MVP (NLA) l. Prosoco R-Guard® VB m. Prosoco R-Guard® Cat 5™ n. Vaproshield Revealshield SA® o. Vaproshield Wrapshield SA® p. Pecora XL-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)



Wall Component	Materials
	<ul style="list-style-type: none"> 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 Corning DOWSIL™ DefendAir 200 (or LT version) ee. Dow Corning DOWSIL™ DefendAir 200C (Charcoal) ff. Dörken Systems Inc. Delta®-Vent S/Plus gg. Dörken Systems Inc. Delta®-Fassade S hh. Dörken Systems Inc. Delta®-Foxx/Plus ii. Dörken Systems Inc. Delta®-Maxx/Plus jj. Fortifiber WeatherSmart Drainable kk. Fortifiber Super Jumbo Tex 60 minutes (only with ¾" stucco cladding) ll. Parex WeatherSeal Spray & Roll-On
<p>Exterior Cladding Select option 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 or 14</p> <p>Note: For WRB over exterior insulation options 1) a-jj above, claddings 1-6 shall incorporate non-open joints.</p> <p>Note: WRB over exterior insulation items 1) b-d are panel joint tapes allowed for all claddings. The panel joints shall be staggered.</p>	<ol style="list-style-type: none"> 1. Brick - nominal 4" clay brick or veneer with a maximum 2 in. air gap behind brick. Brick ties/anchors –24" o.c. (max.) 2. Stucco – Minimum ¾"-thick, exterior cement plaster and lath with an optional secondary water resistive barrier between the exterior insulation and lath. The secondary barrier shall not be full-coverage asphalt or butyl-based self-adhered membranes. 3. Limestone - minimum 2" thick any using standard installation technique. 4. Natural Stone Veneer – Minimum 2 in. thick using any standard installation technique. 5. Cast Artificial Stone, Precast Concrete Panels, or CMU -- Minimum 1-½ in. thick, using any standard installation technique. Cast stone complying with ICC-ES AC 51. 6. Terra Cotta Cladding – Minimum 1-¼ in. thick using any standard installation technique. 7. Any MCM or ACM (aluminum, steel, copper, zinc) (w/ 2 ½ in. max. air gap) that has successfully passed <i>NFPA 285</i> using any standard installation technique, such as <ol style="list-style-type: none"> a. Carter Companies EVO Architectural Panel Systems for use with any FR ACM/MCM <i>NFPA 285</i> material 8. Uninsulated sheet metal building panels including aluminum, zinc, steel or copper using any standard installation technique. 9. Uninsulated fiber-cement board siding using any standard installation technique. 10. Stone/Aluminum honeycomb composite building panels that have passed <i>NFPA 285</i> or equivalent. <ol style="list-style-type: none"> a. Stone Panels Inc. Stone Lite Panel system has been analyzed using manufacturer's standard installation technique 11. Autoclaved-aerated- concrete (AAC) panels that have successfully passed <i>NFPA 285</i> using any standard installation technique. 12. Thin Set Brick <ol style="list-style-type: none"> a. Glen-Gary Thin Tech™ Elite Series has been analyzed using manufacturer's standard installation technique. 13. Natural Stone Veneer – minimum 1¼ inch (adhered with mortar or concrete/cement based adhesive). 14. FunderMax M.Look using the manufacturer standard installation technique. The air gap between cladding and insulation or WRB must not exceed 1 ½ inches.
<p>SI: 1 in = 25.4 mm</p> <ol style="list-style-type: none"> 1. All WRBs shall be installed at recommended application rates and per the manufacturer's installation instructions. 2. Window headers for all wall assemblies shall incorporate minimum 0.08" aluminum 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 flashing tape, liquid flashing, R-SEAL 6000, or R-SEAL 2000 LF up to 12" maximum width. 	



TABLE 7. FIRE PERFORMANCE - VERTICAL AND LATERAL FIRE PROPAGATION¹ OF THERMASHEATH

Wall Component	Materials
Base Wall System Use either 1, 2, 3, or 4	1. Cast Concrete Walls 2. CMU Concrete Walls 3. 20 GC (min.) 3 ⁵ / ₈ " (min.) steel studs spaced 24" OC (max.) a. 5 ⁸ / 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 <i>IBC</i> Section 2303.2, min. nominal 2x4 dimension, spaced 24" OC (max.) a. 5 ⁸ / ₈ " type X Gypsum Wallboard Interior b. Bracing as required by code
Fire-Stopping in Stud Cavity at Floor Lines As an option, use 2 with Fire Retardant Treated Wood (FRTW) framing	1. 4 pcf mineral fiber insulation installed with z-clips 2. FRTW fire blocking at floor line in accordance with applicable code requirements
Cavity Insulation Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 or 15 Note: Items 5-15 are SPF Foam Type EZ FLO may be used inside the box headers and jamb studs for <i>NFPA 285</i> assemblies requiring SPF in stud cavities	1. None 2. Any noncombustible insulation per <i>ASTM E136</i> 3. Any Mineral Fiber (board type Class A, faced or un-faced meeting <i>ASTM E84</i>) 4. Any Fiberglass (batt type Class A, faced or un-faced meeting <i>ASTM E84</i>) 5. 5 ¹ / ₂ " (max.) Icynene LD-C-50 spray foam in 6" deep studs (max.). Use with 5 ⁸ / 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 / 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 / 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 / ₈ " exterior sheathing 9. Gaco Western 183M (3 ¹ / ₂ " max.). Use with 5 ⁸ / ₈ " exterior sheathing 10. Gaco Western F1850 (3 ¹ / ₂ " max.). Use with 5 ⁸ / ₈ " exterior sheathing 11. Demilec SEALECTiON 500 (3 ⁵ / ₈ " max.). Use with 5 ⁸ / ₈ " exterior sheathing 12. Demilec HeatLok Soy 200 Plus (3.4" max.). Use with 5 ⁸ / ₈ " exterior sheathing 13. Bayer Bayseal (3" max.) Use with 5 ⁸ / ₈ " exterior sheathing 14. Lapolla FoamLok FL 2000 (3" max.) Use with 5 ⁸ / ₈ " exterior sheathing 15. BASF SprayTite 81206 or WallTite (US & US-N) (3 ⁵ / ₈ " max.). Use with 5 ⁸ / ₈ " exterior sheathing
Exterior Sheathing- Use either 1, 2, or 3 Note – Exterior FRTW sheathing or gypsum board is optional for Base Walls 1 and 2. When SPF is used, 5 ⁸ / ₈ " exterior gypsum sheathing must be used	1. 1/2" thick or thicker, exterior type gypsum board sheathing 2. 1/2" (min.) FRTW structural panels complying with <i>IBC Section 2303.2</i> and installed in accordance with code allowances for Types I, II, III or IV construction 3. None (Only when Exterior Insulation FRT Plywood is on interior side attached directly to studs)
Weather-Resistive Barrier Installed over Exterior Sheathing Use either option 1 or 2 installed per the manufacturer's installation instructions Note: 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.	1. None 2. Any WRB tested in accordance with <i>ASTM E1354</i> (at a minimum of 20 kW/m ² 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: a. Carlisle CCW Fire Resist 705FR-A b. Carlisle CCW Fire Resist Barritech NP™ c. Carlisle CCW Fire Resist Barritech VP d. Dörken Systems Inc. Delta Stratus SA e. Dörken Systems Inc. Delta®-Maxx/Plus f. Dörken Systems Inc. Delta®-Fassade S g. Dörken Systems Inc. Delta®Foxx/Plus h. Dörken Systems Inc. Delta®-Vent S/Plus



Wall Component	Materials
	<ul style="list-style-type: none"> i. Dörken Systems Inc. Delta®-Vent SA j. Dow Corning DOWSIL™ DefendAir 200 (or LT version) or DefendAir 200C (Charcoal) k. Dryvit Backstop® NT™ l. DuPont™ Tyvek® (Various per ESR 2375) m. DuPont™ WeatherMate™ Housewrap n. DuPont™ WeatherMate™ Plus Housewrap o. GCP PERM-A-BARRIER® Aluminum Wall Membrane p. GCP PERM-A-BARRIER® NPL 10 q. GCP PERM-A-BARRIER® VPL r. GCP PERM-A-BARRIER® VPL 50 Membrane s. GCP PERM-A-BARRIER® VPL Low Temperature t. GCP PERM-A-BARRIER® VPS u. Henry® Air-Bloc® (17, 21 FR, 31 MR, 32 MR and 33 MR) v. Henry® Air-Bloc® 21 FR w. Henry® Air-Bloc® 31 MR x. Henry® Air-Bloc® 32 MR y. Henry® Air-Bloc® 33 MR z. Henry® Blueskin® Metal Clad® aa. Henry® Blueskin® SA bb. Henry® Blueskin® VP160 cc. Henry® EnviroCap dd. Henry® FoilSkin ee. Henry® Super Jumbo Tex 60 Minute® (Fortifiber) ff. Henry® WeatherSmart® Drainable Housewrap (Fortifiber) gg. Kingspan (Pactiv) Green Guard® Max™ Building Wrap hh. MasterSeal® AWB 660 (Formerly BASF Enershield® HP) ii. MasterSeal® AWB 660 I (Formerly BASF Enershield® I) jj. NaturaSeal AIRSEAL NS-A250-HP™ kk. NaturaSeal AIRSEAL NS-A250-LP™ ll. Parex WeatherSeal Spray & Roll-On mm. Pecora ProPerm VP nn. Pecora XL-Perm^{ULTRA} NP oo. Pecora XL-Perm^{ULTRA} VP (10 mil DFT) pp. Prosoco R-Guard MVP (NLA) qq. Prosoco R-Guard Spray Wrap (NLA) rr. Prosoco R-Guard Cat 5™ ss. Prosoco R-Guard Spray Wrap MVP tt. Prosoco R-Guard® VB uu. Siga Majvest 500 SA vv. Sika SikaGard®-530 ww. Sika SikaGard®-535 xx. Soprema Sopraseal® LM 204 VP yy. Soprema Sopraseal® Stick 1100T zz. Soprema Sopraseal® Stick VP aaa. Soprema Sopraseal® Xpress G bbb. Soprema Soprasolin® HD ccc. Vaproshield RevealShield SA® ddd. Vaproshield WrapShield SA® eee. W.R. Meadows® AIR-SHIELD™ LMP (Black) fff. W.R. Meadows® AIR-SHIELD™ LMP (Gray) ggg. W.R. Meadows® AIR-SHIELD™ LSR hhh. W.R. Meadows® AIR-SHIELD™ SMP iii. W.R. Meadows® AIR-SHIELD™ TMP





Wall Component	Materials
Exterior Insulation	4-½ in. (max. consisting of a single panel or multiple thinner panels) Rmax Thermasheath
<p>Weather-Resistive Barrier Installed over Exterior Insulation (or FRTW) Use any of items 1 or items 2</p> <p>Note: Item 1, b-d are not traditional WRB products, but are insulation panel joint tapes. The insulation panel joints shall be staggered. These tapes are listed to allow use with all claddings.</p>	<ol style="list-style-type: none"> 1. For use with all cladding options <ol style="list-style-type: none"> a. None b. 6" (max.) Venture Tape CW over insulation joints c. 6" (max.) RMAX R-SEAL 3000, R-SEAL 6000 or R-SEAL 2000 LF over insulation joints d. 6" (max.) asphalt or butyl based tape or liquid flashing over insulation joints e. Kingspan (Pactiv) GreenGuard® Max Building Wrap f. DuPont™ Tyvek® (Various per ESR 2375) g. DuPont™ WeatherMate™ Housewrap 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) <ol style="list-style-type: none"> a. Henry® Air-Bloc® 31MR b. Henry® Envirocap c. Henry® Air-Bloc® 33MR d. Henry® Air-Bloc® 21 FR e. Henry® Air-Bloc® 17 f. Henry® Blueskin® VP160 g. Soprema Sopraseal® Stick VP h. Carlisle CCW Fire Resist Barritech NP™ i. Carlisle CCW Fire Resist Barritech VP j. Prosoco R-Guard® Spray Wrap (NLA) k. Prosoco R-Guard® MVP (NLA) l. Prosoco R-Guard® VB m. Prosoco R-Guard® Cat 5™ n. Vaproshield Revealshield SA® o. Vaproshield Wrapshield SA® p. Pecora XL-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 Corning DOWSIL DefendAir 200 (or LT version) or DefendAir 200C (Charcoal) ee. Dörken Systems Inc. Delta®-Vent S/Plus ff. Dörken Systems Inc. Delta®-Fassade S gg. Dörken Systems Inc. Delta®-Foxx/Plus hh. Dörken Systems Inc. Delta®-Maxx/Plus ii. Fortifiber WeatherSmart Drainable





Wall Component	Materials
	jj. Fortifiber Super Jumbo Tex 60 Minute (only with ¾" stucco cladding) kk. Parex WeatherSeal Spray & Roll-On
Exterior Cladding Use either 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13 or 14	<ol 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 ¾" 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 – Minimum 1½" thick complying with ICC-ES AC 51 using any standard installation technique 6. Terracotta cladding – Minimum 1¼" thick using any standard installation technique 7. Uninsulated fiber-cement panel siding using any standard installation technique 8. Any MCM or ACM (aluminum, steel copper, zinc) (w/ 2½" max air gap) that has successfully passed <i>NFPA 285</i> using any standard installation technique 9. Uninsulated sheet metal building panels including aluminum, steel or copper using any standard installation technique 10. Stone/ Aluminum honeycomb composite building panels that have passed <i>NFPA 285</i> or equivalent such as Stone Panels Inc., Stone Lite Panel System 11. Autoclaved Aerated Concrete (AAC) panels that have successfully passed <i>NFPA 285</i> using any standard installation technique 12. Thin set brick such as Glen Gery ThinTech Elite 13. Natural Stone Veneer – minimum 1¼ inch (adhered with mortar or concrete/cement based adhesive). 14. FunderMax M.Look using the manufacturer standard installation technique. The air gap between cladding and insulation or WRB must not exceed 1 ½ inches.
SI: 1 in = 25.4 mm <ol style="list-style-type: none"> 1. All WRBs shall be installed at recommended application rates and per the manufacturer's installation instructions. 2. Window headers for all 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. 	





5.4.7 Fire Resistance Ratings:

5.4.7.1 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR White have been tested and meet the requirements of *UL 263* in accordance with [IBC Section 2603.5.1](#) for use in the following assembly designs when installed in accordance with the manufacturer's installation instructions and this TER:

5.4.7.1.1 45 Minutes: [V321](#)

5.4.7.1.2 1-hour: [U026](#), [U326](#), [U330](#), [U349](#), [U354](#), [U355](#), [U364](#), [U424](#), [U425](#), [U460](#), [V454](#), [W417](#), [W429](#), [W448](#), [W451](#), [W452](#), [W456](#)

5.4.7.1.3 2-hour: [U905](#), [U906](#), [U939](#), [V332](#), [V499](#), [W449](#), [W456](#)

5.4.7.1.4 3-hour: [U904](#), [U912](#), [U939](#), [W429](#), [W451](#)

5.4.7.1.5 4-hour: [U904](#), [U912](#), [U939](#), [W429](#), [W451](#)

5.5 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

6 INSTALLATION

6.1 Installation shall comply with the manufacturer's installation instructions and this TER. In the event of a conflict between the manufacturer's installation instructions and this TER, the more restrictive shall govern.

6.2 Installation Procedure

6.2.1 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE shall be installed in accordance with the manufacturer's published installation instructions and this TER. In the event of a conflict between the manufacturer's installation instructions and this TER, the more restrictive shall govern.

6.2.2 A copy of the manufacturer's published installation instructions shall be available at all times on the jobsite during installation.

6.2.3 Fasteners include, but are not limited to, roofing nails, bugle head screws, cap nails or self-taping screws with washers. Fasteners should penetrate wood framing at least 1" and steel framing at least four (4) threads. All fasteners shall be corrosion resistant.

6.2.4 Other means of fastening may also be used, such as masonry fasteners or construction adhesives, that are compatible with the insulation.

6.2.5 Consult the manufacturer's installation instructions for further details.

7 TEST ENGINEERING SUBSTANTIATING DATA

7.1 Flame spread and smoke developed rating tests by Intertek

7.2 Room corner tests by Intertek

7.3 Vertical and lateral fire propagation tests by SwRI and Intertek with analysis by Priest and Associates Consulting, LLC and Hughes Associates

7.4 Heat propagation (potential heat) testing by SwRI

7.5 Water vapor permeance testing by Exova

7.6 Water-resistive barrier testing by PEI

7.7 Water-resistive barrier testing by ATI

7.8 Air permeance testing by Intertek

7.9 Thermal resistance properties testing by Exova

7.10 Thermal resistance properties testing by QAI Laboratories



- 7.11 UL Fire Resistance Directory Listing
- 7.12 Some information contained herein is the result of testing and/or data analysis by other sources which conform to [IBC Section 1703](#) and relevant [professional engineering law](#). DrJ relies on accurate data from these sources to perform engineering analysis. DrJ has reviewed and found the data provided by other professional sources to be credible.
- 7.13 Where appropriate, DrJ's analysis is based on design values that have been codified into law through codes and standards (e.g., *IBC*, *IRC*, *NDS®*, and *SDPWS*). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g., lumber, steel, and concrete), DrJ relies upon the grade mark, stamp, and/or design values provided by raw material suppliers to be accurate and conforming to the mechanical properties defined in the relevant material standard.

8 FINDINGS

- 8.1 When used and installed in accordance with this TER and the manufacturer's installation instructions, the product(s) listed in Section 1.1 are approved for the following:
 - 8.1.1 Buildings constructed in accordance with the *IBC* and the *IRC*.
 - 8.1.1.1 Thermasheath, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE are approved for use in exterior walls of buildings when installed in accordance with the *IBC* for Type I-IV construction.
 - 8.1.2 Performance of foam plastics in accordance with [IBC Section 2603](#) and [IRC Section R316](#).
 - 8.1.3 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE are approved for use within the building envelope, including, but not limited to, attic, crawlspace, wall, roof, ceiling, floor, and foundation assemblies.
 - 8.1.3.1 For use below grade, Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE may be installed horizontally under foundations and vertically on the exterior side of foundation walls or interior side of footings.
 - 8.1.4 Performance for use as insulating sheathing in accordance with [IRC Section N1102.1](#) and [Section N1102.2](#) and [IECC Section C402](#).
 - 8.1.5 Performance for use as a WRB in accordance with [IBC Section 1403.2⁹](#) and [IRC Section R703.2](#).
 - 8.1.6 Performance for use as an air barrier in accordance with [IRC Section N1102.4](#) and [IECC Section 402](#).
 - 8.1.7 Performance for use without a thermal barrier in accordance with [IBC Section 2603.4.1.6](#) and [IRC Section R316.5.3](#) and [Section R316.5.4](#).
 - 8.1.8 Performance for use without a thermal barrier or ignition barrier in accordance with [IBC Section 2603.10](#) and [IRC Section R316.6](#) when installed in accordance with Section 5.4.3.
- 8.2 [IBC Section 104.11](#) ([IRC Section R104.11](#) and [IFC Section 104.9](#) are similar) states:

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

⁹ [2015 IBC Section 1404.2](#)





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

8.3.1 No known variations

9 CONDITIONS OF USE

9.1 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE are subject to the following conditions:

9.1.1 Installation shall comply with this TER and the manufacturer's installation instructions. In the event of a conflict between this TER and the manufacturer's installation instructions, the more restrictive shall govern.

9.1.2 These products shall not be used as a structural nailing base for claddings.

9.1.3 Exterior wall coverings capable of resisting the full design wind pressure shall be installed over these products.

9.1.4 Walls shall be fully braced with other materials in accordance with IBC Section 2308.6.4 or IRC Section R602.10.

9.1.5 Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE must not be used to resist horizontal loads from concrete or masonry walls.

9.1.6 Thermasheath must be protected from the interior of the building by a thermal barrier in accordance with IBC Section 2603.4 and IRC Section R316.4 except as allowed in Section 5.4.2.

9.1.7 Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE are specifically approved for use without a thermal barrier as prescribed by IBC Section 2603.4 through Section 2603.8 and IRC Section R316.4 through Section R316.5.13 subject to the conditions in Section 5.4.3.

9.1.8 When used as a WRB, all sheathing panel joints shall be sealed with R-SEAL 3000 or R-SEAL Construction Tape. All penetrations shall be flashed in accordance with the manufacturer's installation instructions.

9.1.8.1 When these products are not installed as a WRB, a separate WRB shall be installed in accordance with IBC Section 1403.2¹⁰ and IRC Section R703.2

9.1.9 Use of these products shall be in accordance with the vapor barrier requirements of IBC Section 1404.3¹¹ and IRC Section R702.7.

9.1.10 In areas where the probability of termite infestation is "very heavy" as indicated in IRC Figure R301.2(6), Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, and ECOMAXci FR WHITE shall not be installed on the exterior face of foundation walls, under interior or exterior foundation walls or under slab foundations located below grade. The clearance between the products installed above grade and exposed earth shall be at least 6". Exceptions:

9.1.10.1 Buildings where the structural members of the walls, floors, ceilings, and roofs are entirely of non-combustible materials or are pressure preservative treated wood.

9.1.10.2 On the interior side of basement walls.

9.1.10.3 When, in addition to the requirements of IRC Section R318.1, an approved method of protecting Thermasheath, Thermasheath-XP, TSX-8500, TSX-8510, ECOMAXci FR, ECOMAXci FR WHITE and the structure from subterranean termite damage is used.

9.2 Where required by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.

¹⁰ 2015 IBC Section 1404.2

¹¹ 2015 IBC Section 1405.3



- 9.3 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.4 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the Building Designer (e.g., owner or registered design professional).
- 9.5 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.6 This product is manufactured under a third-party quality control program in accordance with IBC Section 104.4 and 110.4 and IRC Section R104.4 and R109.2.
- 9.7 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent. Therefore, the TER shall be reviewed for code compliance by the building official for acceptance.
- 9.8 The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer's instructions, the building official's inspection, and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

10 IDENTIFICATION

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

11 REVIEW SCHEDULE

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

