



# Technical Evaluation Report

TO ASSIST WITH CODE COMPLIANCE

**Rmax Thermasheath®-3, Thermasheath®-XP,  
TSX-8500, TSX-8510 & TSX-8520**

**TER No. 1309-03**

**Issue Date: May 19, 2014**

**Updated: May 2, 2016**

**Subject to Renewal: July 1, 2017**

## **Rmax Operating, LLC**

13524 Welch Road  
Dallas, TX 75244  
972-850-3652  
[Rmax.com](http://Rmax.com)

### **DIVISION: 06 00 00 – WOOD, PLASTICS AND COMPOSITES**

Section: 06 16 00 – Sheathing  
Section: 06 16 13 – Insulating 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 – Weather Barriers  
Section: 07 27 00 – Air Barriers

## **1. Products Evaluated:**

- 1.1. Rmax Thermasheath®-3
- 1.2. Rmax Thermasheath®-XP
- 1.3. Rmax TSX-8500
- 1.4. Rmax TSX-8510
- 1.5. Rmax TSX-8520
- 1.6. For the most recent version of this TER, visit [drjengineering.org](http://drjengineering.org). For more detailed state professional engineering and code compliance legal requirements and references, visit [drjengineering.org/statelaw](http://drjengineering.org/statelaw). DrJ is fully compliant with all state professional engineering and code compliance laws.

***DrJ is a Professional Engineering Approved Source***

 **Learn more about DrJ's Accreditation**

- DrJ is an ISO/IEC 17065 accredited product certification body through ANSI Accreditation Services.
- DrJ provides certified evaluations that are signed and sealed by a P.E.
- DrJ's work is backed up by professional liability insurance.
- DrJ is fully compliant with IBC Section 1703.



6300 Enterprise Lane • Madison WI 53719 • 608-310-6748 • [drjengineering.org](http://drjengineering.org)

## Technical Evaluation Report (TER)

### 2. Applicable Codes and Standards:<sup>1</sup>

- 2.1. 2009, 2012 and 2015 International Building Code (IBC)
- 2.2. 2009, 2012 and 2015 International Residential Code (IRC)
- 2.3. 2009, 2012 and 2015 International Energy Conservation Code (IECC)
- 2.4. AATCC Test Method 127 – Water Resistance: Hydrostatic Pressure Test
- 2.5. ASTM C209 – Standard Test Methods for Cellulosic Fiber Insulating Board
- 2.6. ASTM C518 – Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
- 2.7. ASTM C1289 – Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board
- 2.8. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- 2.9. ASTM E96 – Standard Test Methods for Water Vapor Transmission of Materials
- 2.10. ASTM E331 – Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- 2.11. ASTM E1354 – Standard Test Method for Heat and Visible Smoke Release Rates for Materials and Products Using an Oxygen Consumption Calorimeter
- 2.12. ASTM E2178 – Standard Test Method for Air Permeance of Building Materials
- 2.13. NFPA 259 – Standard Test Method for Potential Heat of Building Materials
- 2.14. NFPA 285 – Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components
- 2.15. NFPA 286 – Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
- 2.16. UL 1715 – Fire Test of Interior Finish Material

### 3. Performance Evaluation:

- 3.1. Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 were evaluated to determine:
  - 3.1.1. Performance in accordance with foam plastic requirements of [IRC Section R316](#) and [IBC Section 2603](#).
    - 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 [IRC Section R316.4](#), and [IBC Section 2603.4](#) and [Section 2603.5.2](#).
  - 3.1.2. Performance for use as insulating sheathing (R-value) in accordance with [IRC Section N1102](#) and [IECC Section 402](#).
  - 3.1.3. Performance for use as a water-resistive barrier (WRB) in accordance with [IRC Section R703.2](#) and [IBC Section 1404.2](#).
  - 3.1.4. Performance for use as a vapor retarder in accordance with [IRC Section R202](#) and [Section R702.7](#), and [IBC Section 202](#) and [Section 1405.3](#).
  - 3.1.5. Performance for use as an air barrier in accordance with [IECC Section 402](#).
- 3.2. TSX-8500, TSX-8510 and TSX-8520 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](#).

---

<sup>1</sup> Unless otherwise noted, all references in this code compliant technical evaluation report (TER) are from the 2012 version of the codes and the standards referenced therein, including, but not limited to, ASCE 7, SDPWS and WFCM. This product also complies with the 2000-2009 and 2015 versions of the IBC and IRC and the standards referenced therein. As required by law, where this TER is not approved, the building official shall respond in writing, stating the reasons this TER was not approved. For variations in state and local codes, if any, see [Section 8](#).

## Technical Evaluation Report (TER)

3.2.3. Ignition characteristics in accordance with [IBC Section 2603.5.7](#).

3.3. Use of Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 in structures where the exterior wall covering is unable to resist 100% of the transverse wind load is outside the scope of this Technical Evaluation Report (TER).

3.4. Any code compliance issues not specifically addressed in this section are outside the scope of this evaluation.

### 4. Product Description and Materials:

4.1. Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 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).



Figure 1a: Thermasheath®-3

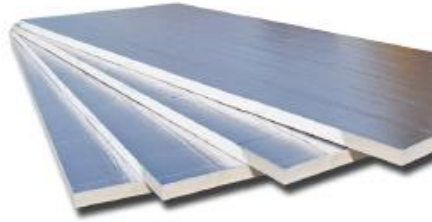


Figure 1b: TSX-8500



Figure 1c: TSX-8510

4.1.1. Thermasheath®-3 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. 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.)

4.1.5. TSX-8520 consists of a polyiso core bonded to glass fiber reinforced aluminum facers on both sides. Both sides may be exposed; one side has a white modified acrylic coating, and the other side has a reflective surface.

### 4.2. Material Availability

4.2.1. Thickness: 1/2" (12.7 mm) through 4.5" (114.3 mm)

4.2.2. Standard width: 48" (1219 mm)

4.2.3. Standard length: 96", 108" and 120" (2438 mm, 2743 mm and 3048 mm)

### 5. Applications:

#### 5.1. Thermal Insulation

5.1.1. Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 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®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 may be installed horizontally under foundations and vertically on the interior side of footings and foundation walls.

5.1.3. Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 meet the continuous insulating sheathing requirements complying with the provisions of [IECC Section 402](#).

## Technical Evaluation Report (TER)

- 5.1.4. Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 have the thermal properties shown in [Table 1](#).

| Product   | Nominal Thickness (in.) | Thermal R-Value <sup>1</sup> (°F·ft. <sup>2</sup> ·hr/Btu) |
|---|-------------------------|--|
| <b>Thermasheath®-3,<br/>Thermasheath®-XP,<br/>TSX-8500,<br/>TSX-8510 &amp;<br/>TSX-8520</b> | 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   |

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.

**Table 1:** Thermal Properties of Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 & TSX-8520

### 5.2. Air Barrier

- 5.2.1. Wall and ceiling assemblies constructed with Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 are used to meet air barrier requirements in accordance with [IECC Section 402](#).
- 5.2.2. When used as part of an air barrier assembly, all sheathing panel joints shall be taped with R-SEAL 3000 or R-SEAL Construction Tape, including the top and bottom of walls, in accordance with the manufacturer's installation instructions and this TER.
- 5.2.3. All penetrations shall be flashed and sealed in accordance with the flashing manufacturer's installation instructions.
- 5.2.4. Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 are defined as air barrier materials having air permeance of less than 0.02 L/s·m.<sup>2</sup>, when tested in accordance with *ASTM E2178*.

### 5.3. Water-Resistive Barrier

- 5.3.1. Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 may be used as a WRB as prescribed in [IBC Section 1404.2](#) and [IRC Section R703.2](#), when installed on exterior walls as described in this section.
- 5.3.2. Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 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®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 have the water-resistance properties shown in [Table 2](#).

| <b>Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 &amp; TSX-8520 Water-Resistance Properties</b> |                          |                  |               |
|---|--------------------------|------------------|---------------|
| Product   | Property Tested          | Test Standard    | Test Results  |
| <b>Thermasheath®-3, Thermasheath®-XP,<br/>TSX-8500, TSX-8510 &amp; TSX-8520</b>                         | Water Vapor Transmission | <i>ASTM E96</i>  | < 0.03 Perm   |
|   | Water Absorption         | <i>ASTM C209</i> | < 0.2% Volume |

**Table 2:** Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 & TSX-8520 Water-Resistance Properties

## Technical Evaluation Report (TER)

### 5.4. Fire Safety Performance

#### 5.4.1. Surface Burn Characteristics

5.4.1.1. Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 have the flame spread and smoke developed ratings shown in [Table 3](#), when tested in accordance with *ASTM E84* per [IRC Section R316.3](#) and [IBC Section 2603.3](#).

| Fire Performance – Surface Burn Characteristics <sup>1</sup> |              |                 |
|--|--------------|-----------------|
| Product  | Flame Spread | Smoke Developed |
| Thermasheath®-3 <sup>2</sup>                                 | < 75         | < 450           |
| Thermasheath®-XP, TSX-8500, TSX-8510 & TSX-8520              | < 25         | < 450           |

1. Tested in accordance with *ASTM E84*.  
2. Foam core.

Table 3: Surface Burn Characteristics of Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 & TSX-8520

#### 5.4.2. Thermal Barrier – Thermasheath®-3 (IRC and IBC Buildings)

5.4.2.1. Except as noted in [Section 5.4.2.2](#), Thermasheath®-3 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 [IRC Section R316.4](#)<sup>2</sup> and [IBC Section 2603.4](#).

5.4.2.2. Thermasheath®-3 has not been tested to *NFPA 285* for use in exterior walls of *IBC* Type I-IV construction in accordance with [IBC Section 2603.5.5](#)<sup>3</sup>.

5.4.2.3. Panels may be installed in single or multiple layers.

5.4.2.4. The thermal barrier required by [Section 5.4.2.1](#) is not required in the following applications:

5.4.2.4.1. Thermasheath®-3 is covered by a minimum 1" thickness of concrete or masonry on each face of the sheathing in accordance with [IRC Section 316.5.1](#) or [IBC Section 2603.4.1](#).

5.4.2.4.2. Walk-in coolers in accordance with [IBC Section 2603.4.1.3](#).

5.4.2.4.3. When used in a roof assembly where the Thermasheath®-3 is separated from the interior of the building by a minimum 15/32" wood structural panel (WSP) in accordance with [IRC Section 316.5.2](#) or [IBC Section 2603.4.1.5](#)<sup>4</sup>.

5.4.2.4.4. Attic, crawlspace or other uninhabitable space applications in accordance with [IRC Section R316.5.3](#) and [Section R316.5.4](#), and [IBC Section 2603.4.1.6](#).

5.4.2.4.4.1. When installed in an attic, crawlspace or other uninhabitable space, Thermasheath®-3, at a maximum of 1", is approved for use without an approved thermal barrier or ignition barrier. This includes, but is not limited to, knee and gable end walls.

5.4.2.4.4.2. Use without an approved thermal barrier or ignition barrier in this application is limited to areas where:

5.4.2.4.4.2.1. For *IRC* applications only, access to the space is required by [IRC Section R807.1](#) or [R408.4](#).

5.4.2.4.4.2.2. For both *IRC* and *IBC* applications, entry is made only for the purposes of repairs or maintenance.

<sup>2</sup> 2015 *IRC* also allows for 23/32" wood structural panel.

<sup>3</sup> 2015 *IBC* [Section 2603.5.5](#)

<sup>4</sup> 2015 *IBC* [Section 2603.4.1.5](#)

## Technical Evaluation Report (TER)

5.4.2.4.5. On the walking surface of a structural floor system, when Thermasheath®-3 is covered by a minimum ½" WSP or approved equivalent in accordance with [IRC Section 316.5.13](#) and [IBC Section 2603.4.1.14](#).

### 5.4.3. Thermal Barrier – Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 (IRC and IBC Buildings)

5.4.3.1. Except as provided in [Section 5.4.3.2](#), Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 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 [IRC Section R316.4](#) and [IBC Section 2603.4](#).

5.4.3.2. Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 are specifically approved for use without a thermal barrier or ignition barrier as prescribed by [IRC Section R316.4](#) through [R316.5.13](#) and [IBC Section 2603.4](#) through [2603.8](#), based on large-scale testing conducted in accordance with [UL 1715](#) per [IRC Section R316.6](#) and [IBC Section 2603.10](#)<sup>5</sup> 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 and TSX-8520 have been tested to assess their performance as shown in [Table 4](#) with regard to potential heat in accordance with [NFPA 259](#) and [IBC Section 2603.5.4](#).

| Fire Performance – Potential Heat <sup>1</sup>          |                          |
|---|--------------------------|
| Product   | Potential Heat (BTU/lb.) |
| TSX-8500, TSX-8510 & TSX-8520                           | 11,054                   |
| 1. Tested in accordance with <a href="#">NFPA 259</a> . |                          |

Table 4: Potential Heat of TSX-8500, TSX-8510 & TSX-8520

### 5.4.5. Ignition Properties

5.4.5.1. TSX-8500, TSX-8510 and TSX-8520 were evaluated to assess performance with regard to ignition in accordance with [IBC Section 2603.5.7](#).

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 ¾" (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.

<sup>5</sup> 2015 [IBC Section 2603.9](#)



## Technical Evaluation Report (TER)

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. TSX-8500 has been tested to assess its performance with regard to vertical and lateral fire propagation in accordance with *NFPA 285* and [IBC Section 2603.5.5](#).

5.4.6.2. 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 5](#) are approved for use in buildings of Type I-IV construction with a maximum 3" thickness of TSX-8500, TSX-8510 or TSX-8520.

| Fire Performance – Vertical and Lateral Fire Propagation <sup>1</sup>  |  |
|--|--|
| Wall Component   | Materials  |
| <b>Base Wall System</b><br>Select option 1, 2 or 3   | 1. Concrete wall<br>2. Concrete masonry wall<br>3. 1 layer – 5/8"-thick Type X or 1/2"-thick Type X gypsum wallboard on interior, installed over steel studs: minimum 3 3/8" depth, minimum 20 gauge at a maximum of 24" o.c. with lateral bracing every 4' vertically   |
| <b>Floorline Firestopping</b>  | 4 lb./cu ft. mineral wool (e.g., Thermafiber) in each stud cavity at each floorline – attached with Z-clips or equivalent  |
| <b>Cavity Insulation</b><br>Select option 1, 2, 3 or 4   | 1. None<br>2. Any noncombustible insulation<br>3. Fiberglass batt insulation (faced or unfaced)<br>4. Any Mineral Fiber (board type Class A, faced or un-faced meeting <i>ASTM E84</i> )   |
| <b>Exterior Sheathing</b><br>Select option 1 or 2  | 1. None<br>2. 1/2"-thick or thicker, exterior type gypsum board sheathing  |
| <b>Weather-Resistive Barrier Applied to Exterior Sheathing</b><br>Select option 1 or 2<br><br>Note: Where no exterior sheathing is used, (exterior sheathing, option 1) items 2a, 2b, and 2c may be applied directly to studs. | 1. None<br>2. Any WRB tested in accordance with <i>ASTM E1354</i> and shown to be less flammable (longer time to ignition and lower peak heat release rate) than the exterior insulation foam core: <ul style="list-style-type: none"> <li>a. Green Guard®Max Building Wrap – Pactiv</li> <li>b. Tyvek® CommercialWrap® – Dupont</li> <li>c. WeatherMate™ or WeatherMate™Plus – Dow Chemical</li> <li>d. Carlisle CCW-705FR-A</li> <li>e. BASF Enershield HP</li> <li>f. BASF Enershield I</li> <li>g. Carlisle CCW Fire Resist Barritech NP</li> <li>h. Carlisle CCW Fire Resist Barritech VP</li> <li>i. Henry Air Bloc 31 MR</li> <li>j. Henry EnviroCap</li> <li>k. Henry Air Bloc 33 MR</li> <li>l. Henry Air Bloc 21 FR</li> <li>m. Henry VP160</li> <li>n. Henry Air Bloc 17</li> <li>o. Henry BlueSkin SA</li> <li>p. Henry FoilSkin</li> <li>q. Prosoco R-Guard Spray Wrap</li> <li>r. Prosoco R-Guard MVP</li> <li>s. Prosoco R-Guard VB</li> <li>t. Prosoco R-Guard Cat 5</li> <li>u. Soprema Stick VP</li> <li>v. Vaproshield Revealshield SA</li> <li>w. Vaproshield Wrapshield SA</li> </ul> |
| Continued on next page   |  |

## Technical Evaluation Report (TER)

| Fire Performance – Vertical and Lateral Fire Propagation <sup>1</sup>  |   |
|--|---|
| Wall Component   | Materials   |
| <b>Exterior Insulation</b>   | Rmax TSX-8500, TSX-8510 or TSX-8520 Rigid Insulation – 3" max. thickness. Multiple layers are allowed to be used as required, but total thickness shall not exceed the 3" max. Panel joints shall be staggered.<br>Note: When used as a WRB, insulation joints shall be sealed with one of the following joint tapes: <ol style="list-style-type: none"> <li>a. Venture Tape CW – 6" width maximum</li> <li>b. Rmax R-SEAL 3000 – 6" width maximum</li> <li>c. Asphalt or butyl based tape – 6" width maximum</li> </ol>  |
| <b>Weather-Resistive Barrier Applied to Exterior Insulation</b><br>Select option 1 or 2  | <ol style="list-style-type: none"> <li>1. For use with exterior veneer options 1-4 when installed with non-open joint techniques (e.g. shiplap, etc.)               <ol style="list-style-type: none"> <li>a. None</li> <li>b. Green Guard®Max Building Wrap – Pactiv</li> <li>c. Tyvek® CommercialWrap® – Dupont</li> <li>d. WeatherMate™ or WeatherMate™Plus – Dow Chemical</li> </ol> </li> <li>2. For use with all exterior veneer options as shown below:               <ol style="list-style-type: none"> <li>a. None</li> <li>b. Henry FoilSkin</li> <li>c. Carlisle Fire Resist 705FR-A</li> </ol> </li> </ol>  |
| <b>Exterior Veneer</b><br>Select option 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10  | <ol style="list-style-type: none"> <li>1. Brick               <ol style="list-style-type: none"> <li>a. Standard nominal 4"-thick, clay brick</li> <li>b. Brick veneer anchors – standard types – installed maximum 24" o.c. vertically on each stud</li> <li>c. Maximum 2" air gap between exterior insulation and brick</li> </ol> </li> <li>2. Stucco – Minimum ¾"-thick, exterior cement plaster and lath. A secondary WRB shall be installed between the exterior insulation and the lath. The secondary WRB shall not be full-coverage asphalt or butyl-based self-adhered membranes.</li> <li>3. Minimum 2"-thick, limestone or natural stone veneer or minimum 1½"-thick cast artificial stone veneer. Any standard installation technique can be used.</li> <li>4. Terracotta cladding – Use any terracotta cladding system in which terracotta is min. 1¼"-thick. Any standard installation technique can be used.</li> <li>5. MCM System – Use any metal composite material system that has been successfully tested by the panel manufacturer via the <i>NFPA 285</i> test method. Any standard installation technique can be used.</li> <li>6. Uninsulated metal skin exterior wall coverings such as steel, aluminum, copper, etc. Any standard installation technique can be used.</li> <li>7. Uninsulated fiber-cement board siding – Any standard installation technique can be used.</li> <li>8. Stone/Aluminum honeycomb composite building panels that have passed <i>NFPA 285</i> or equivalent.</li> <li>9. Autoclaved-aerated- concrete (AAC) panels that have passed <i>NFPA 285</i> using any standard installation technique.</li> <li>10. Thin Set Brick-Glen-Gary Thin Tech™ Elite Series – installed per manufacturer's instructions.</li> </ol> |
| <p>1. All WRBs shall be installed at recommended application rates and per the manufacturer's installation instructions.</p> <p>2. Window headers for all wall assemblies shall incorporate minimum 0.078" 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 based flashing tape or R-SEAL 6000 polyethylene tape up to 12" maximum width.</p> |   |

**Table 5:** Vertical & Lateral Fire Propagation of TSX-8500, TSX-8510 & TSX-8520

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

**6. Installation:**

- 6.1.** Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 shall be installed in accordance with the manufacturer's published installation instructions and this TER.
- 6.2.** A copy of the manufacturer's published installation instructions shall be available at all times on the jobsite during installation.
- 6.3.** 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.



## Technical Evaluation Report (TER)

- 6.4. 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.
- 6.5. Other means of fastening may also be used, such as masonry fasteners or construction adhesives, which are compatible with the insulation.
- 6.6. Consult the manufacturer's installation instructions for further details.

### 7. Test and Engineering Substantiating Data:

- 7.1. Test reports and data supporting the following material and structural properties:
  - 7.1.1. Flame spread and smoke developed rating tests by Intertek.
  - 7.1.2. Room corner tests by Intertek.
  - 7.1.3. Vertical and lateral fire propagation tests by SwRI and Intertek with analysis by Priest and Associates Consulting, LLC and Hughes Associates.
  - 7.1.4. Heat propagation (potential heat) testing by SwRI.
  - 7.1.5. Water vapor permeance testing by Exova.
  - 7.1.6. Water-resistive barrier testing by PEI.
  - 7.1.7. Water-resistive barrier testing by ATI.
  - 7.1.8. Air permeance testing by Intertek.
  - 7.1.9. Thermal resistance properties testing by Exova.
  - 7.1.10. Thermal resistance properties testing by QAI Laboratories.
- 7.2. The product(s) evaluated by this TER falls within the scope of one or more of the model, state or local building codes for building construction. The testing and/or substantiating data used in this TER is limited to buildings, structures, building elements, construction materials and civil engineering related specifically to buildings.
- 7.3. The provisions of model, state or local building codes for building construction do not intend to prevent the installation of any material or to prohibit any design or method of construction. Alternatives shall use consensus standards, performance-based design methods or other engineered alternative means of compliance. This TER assesses compliance with defined standards, generally accepted engineering analysis, performance-based design methods, etc. in the context of the pertinent building code requirements.
- 7.4. Some information contained herein is the result of testing and/or data analysis by other sources, which DrJ relies on to be accurate as it undertakes its engineering analysis.
- 7.5. DrJ has reviewed and found the data provided by other professional sources are credible. This information has been approved in accordance with DrJ's procedure for acceptance of data from approved sources.
- 7.6. DrJ's responsibility for data provided by approved sources is in accordance with professional engineering law.
- 7.7. Where appropriate, DrJ relies on the derivation of design values, which have been codified into law through codes and standards (e.g., *IRC*, *WFCM*, *IBC*, *SDPWS*, etc.). This includes review of code provisions and any related test data that helps with comparative analysis or provides support for equivalency to an intended end-use application.

### 8. Findings:

- 8.1. When installed in accordance with the manufacturer's installation instructions and this TER, Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 comply with, or are suitable alternatives to, the applicable sections of the codes listed in [Section 2](#) for the following applications:
  - 8.1.1. Buildings constructed in accordance with the *IRC* and the *IBC*.
    - 8.1.1.1. TSX-8500, TSX-8510 and TSX-8520 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 [IRC Section R316](#) and [IBC Section 2603](#).

## Technical Evaluation Report (TER)

**8.1.3.** Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 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®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 may be installed horizontally under foundations and vertically on the interior side of footings and foundation walls.

**8.1.4.** Performance for use as insulating sheathing in accordance with [IRC Section N1102.1](#) and [N1102.2](#), and [IECC Section 402](#).

**8.1.5.** Performance for use as a WRB in accordance with [IRC Section R703.2](#) and [IBC Section 1404.2](#).

**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 [IRC Section R316.5.3](#) and [R316.5.4](#), and [IBC Section 2603.4.1.6](#).

**8.1.8.** Performance for use without a thermal barrier or ignition barrier in accordance with [IRC Section R316.6](#) and [IBC Section 2603.10](#) when installed in accordance with [Section 5.4.3](#).

**8.2.** [IBC Section 104.11](#) and [IRC Section R104.11](#) ([IFC Section 104.9](#) is similar) state:

**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, at least 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*.<sup>6</sup>

**8.3.** This product has been evaluated with 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 that are applicable to this evaluation, they are listed here:

**8.3.1.** No known variations

**8.4.** This TER uses professional engineering law, the building code, ANSI/ASTM consensus standards and generally accepted engineering practice as its criteria for all testing and engineering analysis. Dr.J's professional engineering work falls under the jurisdiction of each state Board of Professional Engineers, when signed and sealed.

## 9. Conditions of Use:

**9.1.** Where required by the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.

**9.2.** Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the code official for review and approval.

**9.3.** Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed.

**9.4.** Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 are subject to the following conditions:

**9.4.1.** 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.

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

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

---

<sup>6</sup> The last sentence is adopted language in the 2015 codes.

## Technical Evaluation Report (TER)

- 9.4.4. Walls shall be fully braced with other materials in accordance with [IRC Section R602.10](#) or [IBC Section 2308.9.3](#)<sup>7</sup>.
  - 9.4.5. Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 must not be used to resist horizontal loads from concrete or masonry walls.
  - 9.4.6. Thermasheath®-3 must be protected from the interior of the building by a thermal barrier in accordance with [IRC Section R316.4](#) and [IBC Section 2603.4](#), except as allowed in [Section 5.4.2](#).
  - 9.4.7. Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 are specifically approved for use without a thermal barrier as prescribed by [IRC Section R316.4](#) through [R316.5.13](#) and [IBC Section 2603.4](#) through [2603.8](#), subject to the conditions in [Section 5.4.3](#).
  - 9.4.8. When used as a WRB, all sheathing panel joints shall be taped with R-SEAL 3000 or R-SEAL Construction Tape. All penetrations shall be flashed in accordance with the manufacturer's installation instructions.
    - 9.4.8.1. When these products are not installed as a WRB, a separate WRB shall be installed in accordance with [IRC Section R703.2](#) and [IBC Section 1404.2](#).
  - 9.4.9. Use of these products shall be in accordance with the vapor barrier requirements of [IRC Section R702.7](#) and [IBC Section 1405.3](#).
  - 9.4.10. In areas where the probability of termite infestation is "very heavy" as indicated in [IRC Figure R301.2\(6\)](#), Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510 and TSX-8520 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:
    - 9.4.10.1. Buildings where the structural members of the walls, floors, ceilings and roofs are entirely of non-combustible materials or are pressure preservative treated wood.
    - 9.4.10.2. On the interior side of basement walls.
    - 9.4.10.3. When, in addition to the requirements of [IRC Section R318.1](#), an approved method of protecting Thermasheath®-3, Thermasheath®-XP, TSX-8500, TSX-8510, TSX-8520 and the structure from subterranean termite damage is used.
  - 9.4.11. These products are manufactured by Rmax Operating, LLC in Dallas, TX; Fernley, NV; and Greer, SC, under a quality control program with quality control inspections in accordance with [IRC Section R109.2](#), and [IBC Section 110.3.8](#) and [110.4](#).
- 9.5. Design
- 9.5.1. Building Designer Responsibility
    - 9.5.1.1. Unless the AHJ allows otherwise, the Construction Documents shall be prepared by a Building Designer (e.g., Owner, Registered Design Professional, etc.) for the Building and shall be in accordance with [IRC Section R106](#) and [IBC Section 107](#).
    - 9.5.1.2. The Construction Documents shall be accurate and reliable and shall provide the location, direction and magnitude of all applied loads and shall be in accordance with [IRC Section R301](#) and [IBC Section 1603](#).
  - 9.5.2. Construction Documents
    - 9.5.2.1. Construction Documents shall be submitted to the Building Official for approval and shall contain the plans, specifications and details needed for the Building Official to approve such documents.
- 9.6. Responsibilities
- 9.6.1. The information contained herein is a product, engineering or building code compliance technical evaluation report performed in accordance with the referenced building codes, testing and/or analysis through the use of accepted engineering procedures, experience and technical judgment.

---

<sup>7</sup> 2015 IBC [Section 2308.6](#)

## Technical Evaluation Report (TER)

- 9.6.2. DrJ technical evaluation reports provide an assessment of only those attributes specifically addressed in the Products Evaluated or Code Compliance Process Evaluated section.
- 9.6.3. The engineering evaluation was performed on the dates provided in this TER, within DrJ's professional scope of work.
- 9.6.4. This product is manufactured under a third-party quality control program in accordance with [/IRC Section R104.4](#) and [R109.2](#) and [IBC Section 104.4](#) and [110.4](#).
- 9.6.5. 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, and the TER shall be reviewed for code compliance by the Building Official.
- 9.6.6. The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party inspection process, proper installation per the manufacturer's instructions, the Building Official's inspection and any other code requirements that may apply to assure accurate compliance with the applicable building code.

### 10. Identification:

- 10.1. Each FPIS panel described in this TER is 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 [drjengineering.org](#).
- 11.2. For information on the current status of this TER, contact [DrJ Engineering](#).



- [Mission and Professional Responsibilities](#)
- [Product Evaluation Policies](#)
- [Product Approval – Building Code, Administrative Law and P.E. Law](#)