



DrJ Research Report

DRR 1410-05

Foam Plastic Insulating Sheathing
Products & Accessories Used as a
Code Compliant Water-Resistive Barrier
(WRB) System

Foam Sheathing Committee (FSC) Members

Product:

**Foam Plastic Insulating
Sheathing (FPIS) Products
approved for use as a water-
resistive barrier (WRB)**

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April 27, 2022

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REPORT HOLDER
INFORMATION:

Foam Sheathing Committee (FSC) Members

americanchemistry.com/industry-groups/foam-sheathing-committee-fsc

continuousinsulation.org

DIVISION: 06 00 00 - WOOD, PLASTICS AND COMPOSITES

SECTION: 06 16 00 - Sheathing

SECTION: 06 16 13 - Insulated Sheathing

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

SECTION: 07 21 00 - Thermal Insulation

1 PRODUCTS EVALUATED¹

1.1 Foam Plastic Insulating Sheathing (FPIS) Products approved for use as a water-resistive barrier (WRB)

- 1.1.1 Atlas Roofing Corporation
- 1.1.2 BASF Corporation
- 1.1.3 DuPont de Nemours, Inc.
- 1.1.4 Hunter Panels
- 1.1.5 Kingspan Insulation, LLC
- 1.1.6 Rmax

2 APPLICABLE CODES AND STANDARDS^{2,3}

2.1 Codes

- 2.1.1 *IBC—15, 18, 21: International Building Code®*
- 2.1.2 *IRC—15, 18, 21: International Residential Code®*

2.2 Standards and Referenced Documents

- 2.2.1 *ASTM C1289: Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*
- 2.2.2 *ASTM C209: Standard Test Methods for Cellulosic Fiber Insulating Board*
- 2.2.3 *ASTM C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*
- 2.2.4 *ASTM D226: Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing*
- 2.2.5 *ASTM E2556: Standard Specification for Vapor Permeable Flexible Sheet Water-Resistive Barriers Intended for Mechanical Attachment*
- 2.2.6 *ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*

¹ For more information, visit drjengineering.org or call us at 608-310-6748.

² Unless otherwise noted, all references in this DRR are from the 2021 version of the codes and the standards referenced therein. This material, design, or method of construction also complies with the 2000-2018 versions of the referenced codes and the standards referenced therein.

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



3 EVALUATION SCOPE

- 3.1 This research report provides a central location for the identification of products that have been approved for use as a WRB.
 - 3.1.1 The products listed in this report are those that have been identified in the individual code evaluation reports held by the manufacturers of the products as approved for use as a WRB.
- 3.2 This research report is a code compliance evaluation report that is intended to supplement existing product certifications and is intended only to provide information on the products approved for the manufacturers listed in Section 1.1. For the purposes of this report, DrJ is not certifying the products, but rather is providing the user with direction on where they can obtain specific information for the products shown. For specific details on the products found in Table 1, see the manufacturer's code evaluation reports or listings.
- 3.3 Any code compliance issues not specifically addressed in this section are outside the scope of this DRR.
- 3.4 Any engineering evaluation conducted for this DRR was performed within DrJ's professional scope of work on the dates provided herein.

4 APPLICATIONS

- 4.1 *Code Requirements for the Use of Foam Plastic Insulation as a WRB.*
 - 4.1.1 Requirements for the use of foam plastic insulation as a WRB are given in IBC Section 1403.2⁴ and Section 2510.6. For the *IRC*, the provisions are found in IRC Section R703.2 and Section R703.7.3.
 - 4.1.2 It is the responsibility of the user to apply the requirements of the specific edition of the building code used in the jurisdiction where the structure is to be built.
 - 4.1.3 It is also the responsibility of the user to verify the certifications listed in code evaluation reports along with the details found therein for compliance with that listing.
- 4.2 *Product Code Compliance*
 - 4.2.1 Table 1 shows the FPIS products from the manufacturers listed in Section 1 that indicate they have met the requirements for use as a WRB.
 - 4.2.1.1 Consult the manufacturer's installation instructions and associated evaluation report for details specific to the intended application.
 - 4.2.1.1.1 The code evaluation reports or manufacturer installation instructions generally provide details on the use of joint sealing tapes, flashing materials and sealants that are approved for use with the product to achieve performance as a WRB.
 - 4.2.1.1.2 See Section 0 for general industry good practice for the installation of FPIS used as a WRB.
- 4.3 FPIS products are not required to be detailed for use as a WRB in the following applications:
 - 4.3.1 Not required for detached accessory buildings per 2012 and 2015 IRC Section R703.2⁵
 - 4.3.2 Not required when installed over concrete or masonry in accordance with IBC Section 1402.2 Exception 1⁶ and IRC Section R703.1.1 Exception 1
 - 4.3.3 Not required for EIFS complying with IBC Section 1407.4.1⁷ in accordance with IBC Section 1402.2 Exception 3⁸
- 4.4 Test methods shall be as specified in this code or by other recognized test standards. In the absence of recognized and accepted test methods, the building official shall approve the testing procedures. Tests shall be

⁴ 2015 IBC Section 1404.2

⁵ This exception has been removed from the 2021 and 2018 IRC.

⁶ 2015 IBC Section 1403.2

⁷ 2015 IBC Section 1408.4.1

⁸ 2015 IBC Section 1403.2



performed by an approved agency. Reports of such tests shall be retained by the building official for the period required for retention of public records.

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



TABLE 1. FOAM SHEATHING PRODUCT CODE COMPLIANCE

Manufacturer	Research Report Number	Product(s)	Type of Application			
			IBC 1403.2 ⁵	IBC 2510.6	IRC R703.2	IRC R703.7.3
Atlas Roofing Corporation	ESR-1375	EnergyShield®, EnergyShield® Pro, EnergyShield® Pro2, EnergyShield® CGF, EnergyShield® CGF Pro, Stucco-Shield®	Y	Y	Y	Y
	UL ER16529-01	ThermalStar LWi	Y	Y	Y	Y
	TER 1905-02	ThermalStar SWi	Y	Y	Y	Y
BASF Corporation	ESR-4431 ESR-2784	Neopor® ThermaPlus™	Y	N	Y	N
DuPont de Nemours, Inc.	ESR-1659	Thermax™ Sheathing, Thermax™ Light Duty, Thermax™ Heavy Duty, Thermax™ Heavy Duty Plus, Thermax™ Metal Building, Thermax™ White Finish, Thermax™ ci Exterior Board	Y	Y	Y	Y
	ESR-2142	Styrofoam™ Duramate™ Plus, Styrofoam™ Residential Sheathing, Styrofoam™ Residing Board, Styrofoam™ Utilityfit, Styrofoam™ SCOREBOARD, Styrofoam™ Sheathing Material, Styrofoam™ Ship Lap, Styrofoam™ Square Edge, Styrofoam™ Tongue and Groove, Styrofoam™ Cavitymate™ Ultra, Styrofoam™ Ultra SL, Styrofoam™ XPS Insulation, DuPont High Performance, Underlayment, BLUECOR™, DuPont Protection Board III	Y	Y	Y	Y
	ESR-3089	Tuff-R™, Tuff-R™ C, Super Tuff-R™, Super Tuff-R™ C, ISOCAS™ R	Y	Y	Y	Y
Hunter Panels	TER 1402-01	Xci Foil (Class A)	Y	Y	Y	Y
Kingspan	TER 1011-01	GreenGuard® Insulation Board CM, GreenGuard® Insulation Board SL, GreenGuard® Insulation Board SLX, GreenGuard® PLYGOOD	Y	Y	Y	Y
Rmax	TER 1212-03	ECOMAXci® Wall Solution	Y	Y	Y	Y
	TER 1207-01	Thermasheath®-SI, Thermasheath®	Y	Y	Y	Y
	TER 1309-03	Thermasheath®, Thermasheath®-XP, ECOMAXci® FR, ECOMAXci® FR White, TSX-8500, TSX-8510	Y	Y	Y	Y
<ol style="list-style-type: none"> IBC Section 1403.2 applies to use of an FPIS WRB, as required, with all claddings and wall assemblies in accordance with IBC Chapter 14 and also IBC Section 2510 (Portland cement stucco) where the stucco and WRB are not installed over wood-based sheathing (refer to note 2 below). The basis of equivalency for WRB performance is "No. 15 asphalt felt, complying with ASTM D226 for Type 1 felt or other approved materials" attached to studs or sheathing. Where indicated under "type of application" the listed research report provides test documentation for code approval purposes. IBC Section 2510.6 applies to use with Portland cement stucco installed over wood-based sheathing. The basis of equivalency for the FPIS WRB performance is "a water resistance equal to or greater than that of a water-resistive barrier complying with ASTM E2556, Type II" (see exception statement in 2510.6, which applies to non-vapor-permeable WRB materials). Furthermore, the FPIS WRB material "is separated from the stucco by an intervening substantially non-water-absorbing layer or drainage space" intended to provide a bond break and interstitial drainage plane at least equal to that of a traditional double-layer Grade D paper installation used with Portland cement stucco. Refer to note 1 above for IBC (similar basis for equivalency). Refer to note 2 above for IBC (similar, but IRC does not refer to ASTM E2556 and instead still retains the reference to 60-minute grade D paper in the exception statement, which is applicable to foam sheathing (a non-vapor permeable WRB). 2015 IBC Section 1404.2 						



5 INSTALLATION

- 5.1 The products listed in this research report shall be used in accordance with the manufacturer's installation instructions and the referenced research reports in Table 1. Areas of consideration required for a complete WRB system include but are not limited to the following:
 - 5.1.1 Board orientation
 - 5.1.2 Fastener selection and spacing
 - 5.1.3 Joint and corner treatment (tapes, flashings, etc.)
 - 5.1.4 Penetrations
 - 5.1.5 Integration of fenestration products
 - 5.1.6 General flashing
- 5.2 For applications outside the scope of this research report or the referenced research reports, an alternate means of code compliance is required.

6 SUBSTANTIATING DATA

- 6.1 Manufacturer research reports as listed in Table 1.
- 6.2 Information contained herein is the result of testing and/or data analysis by sources which conform to IBC Section 1703 and relevant professional engineering regulations. DrJ relies on accurate data from these sources to perform engineering analysis.
- 6.3 Where appropriate, DrJ's analysis is based on provisions that have been codified into law through state or local adoption of codes and standards. The providers of the codes and standards are legally responsible for their content. DrJ analysis may use code-adopted provisions as a control sample. A control sample versus a test sample establishes a product as being equivalent to that prescribed in this code in quality, strength, effectiveness, fire resistance, durability, and safety. Where the accuracy of the provisions provided herein is reliant upon the published properties of materials, DrJ relies upon the grade mark, grade stamp, mill certificate, and/or test data provided by material suppliers to be minimum properties. DrJ analysis relies upon these properties to be accurate.

7 FINDINGS

- 7.1 When used in accordance with this research report and the manufacturer's installation instructions, the products listed in this report are a suitable alternative to the requirements of IBC Section 1403.2⁹ and Section 2510.6 and IRC Section R703.2 and Section R703.7.3.
- 7.2 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 evaluation, they are listed here.
 - 7.2.1 No known variations
- 7.3 Building codes require data from valid research reports be obtained from approved sources (i.e., licensed registered design professionals [RDPs]).
 - 7.3.1 Building official approval of a licensed RDP is performed by verifying the RDP and/or their business entity is listed by the licensing board of the relevant jurisdiction.

⁹ 2015 IBC Section 1404.2



7.4 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10¹⁰ 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...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.

8 REFERENCES

8.1 The Foam Sheathing Committee (FSC) of the American Chemistry Council sponsors research and tools to support the reliable, efficient, and economic design and installation of foam sheathing. This report is developed by DrJ from a grant provided by FSC. Learn more about foam sheathing at [continuousinsulation.org](https://www.continuousinsulation.org).

9 CONDITIONS OF USE

- 9.1 The products covered by this research report shall be installed in accordance with this report and the manufacturer's installation instructions.
- 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 DRR and the installation instructions shall be submitted at the time of permit application.
- 9.3 Any generally accepted engineering calculations needed to show compliance with this DRR 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 RDP).
- 9.5 At a minimum, this product shall be installed per Section 0 of this DRR.
- 9.6 This product is manufactured under a third-party quality control program in accordance with IBC Section 104.4 and Section 110.4 and IRC Section R104.4 and Section R109.2.
- 9.7 The implementation of this DRR for this product is dependent on the design, quality control, third-party quality assurance, proper implementation of installation instructions, inspections required by IBC Section 110.3, and any other code or regulatory requirements that may apply.

10 IDENTIFICATION

- 10.1 The foam sheathing described in this research report is identified by a label on the board or packaging material bearing the manufacturer's name, product name, label of the third-party inspection agency, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at the respective FSC member websites found at [fsc.americanchemistry.com/Members](https://www.fsc.americanchemistry.com/Members).

11 REVIEW SCHEDULE

- 11.1 For the most recent version or current status of this DRR, visit [drjengineering.org](https://www.drjengineering.org) or contact [DrJ Engineering](https://www.drjengineering.org).

¹⁰ 2018 IFC Section 104.9