



DrJ Research Report

DRR 1410-06

Foam Plastic Insulating Sheathing Used
as an Air Barrier Material in an Air
Barrier Assembly

Foam Sheathing Committee (FSC) Members

Products:

**Foam plastic insulating
sheathing (FPIS) products**

Issue Date:

December 2, 2014

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October 14, 2021



REPORT HOLDER
INFORMATION:

Foam Sheathing Committee (FSC) Members

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

continuousinsulation.org

DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

SECTION: 07 21 00 - Thermal Insulation

SECTION: 07 27 00 - Air Barriers

1 PRODUCTS EVALUATED¹

1.1 Foam plastic insulating sheathing (FPIS) products from the following manufacturers are recognized in this report.

- 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®*
- 2.1.3 *IECC—15, 18, 21: International Energy Conservation 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 C578: Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation*
- 2.2.3 *ASTM E1677: Standard Specification for Air Barrier (AB) Material or Assemblies for Low-Rise Framed Building Walls*
- 2.2.4 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*
- 2.2.5 *ASTM E2357: Standard Test Method for Determining Air Leakage Rate of Air Barrier Assemblies*
- 2.2.6 *ASTM E283: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen*

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 an air barrier material in an air barrier assembly.
 - 3.1.1 The products listed in this report have been identified in the individual code evaluation reports held by the manufacturers of the products as approved for use as an air barrier material or as a component of an air barrier assembly.
- 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. For the purposes of this report, DrJ is not certifying the products, but rather is providing the user with direction on where to obtain specific information for the products shown. For details on the products found in Table 1, see a 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 an Air Barrier Material*
 - 4.1.1 Requirements for the use of foam plastic insulation as an air barrier material are given in IECC Section R402.4 (IRC Section N1102.4) and IECC Section C402.5⁴.
 - 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 have met the requirements for use as continuous air barriers for the opaque building envelope, provided they are installed as air barriers, in accordance with the manufacturer's installation instructions as required in IECC Section C402.5.1.3⁵.
 - 4.2.1.1 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 an air barrier assembly.
 - 4.2.2 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.

⁴ 2012 IECC Section C402.4

⁵ 2018 IECC Section C402.5.1.2.1, 2012 IECC Section C402.4.1.2.1



TABLE 1. FOAM SHEATHING PRODUCT CODE COMPLIANCE AS AN AIR BARRIER MATERIAL

Manufacturer	Report Number	Product(s)	Type of Application	
			IECC C402.5	IECC R402.4 / IRC N1102.4
Atlas Roofing Corporation	Footnote 1	EnergyShield®, EnergyShield® Pro, EnergyShield® Pro2, EnergyShield® CGF, EnergyShield® CGF Pro, Stucco-Shield®	Y	Y
	UL ER16529-01	ThermalStar LWi	Y	Y
	TER 1905-02	ThermalStar SWi	Y	Y
BASF Corporation	ESR-4431	Neopor® ThermaPlus WRB ^{ci}	Y	Y
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
	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
	ESR-3089	Tuff-R™, Tuff-R™ C, Super Tuff-R™, Super Tuff-R™ C, ISOCAST™ R	Y	Y
Hunter Panels	TER 1402-01	Xci Foil (Class A), Xci 286	Y	Y
Kingspan	TER 1011-01	GreenGuard® Insulation Board CM, GreenGuard® Insulation Board SL, GreenGuard® Insulation Board SLX, GreenGuard® PLYGOOD	Y	Y
Rmax	TER 1212-03	ECOMAXci® Wall Solution	Y	Y
	TER 1207-01	Thermasheath®-SI, Thermasheath®	Y	Y
	TER 1309-03	Thermasheath®, Thermasheath®-XP, ECOMAXci® FR, ECOMAXci® FR White, TSX-8500, TSX-8510	Y	Y
	TER 1504-04	ECOMAXci® Ply	Y	Y
	TER 1811-02	ECOMAXci® FR Ply	Y	Y
	Footnote 1	Durasheath®, ThermaBase-CI™, R-Matte® Plus-3	Y	Y

1. 1/2" minimum thickness XPS or Polyiso are deemed to comply as air barrier materials in accordance with [IECC Section C402.5.1.3](#),⁶ provided joints are sealed and materials are installed as air barriers in accordance with the manufacturer's instructions.
2. Products listed qualify based on Footnote 1 or are tested as air barrier materials in accordance with [ASTM E2178](#) or are tested as part of an air barrier assembly in accordance with [ASTM E2357](#), [ASTM E1677](#), or [ASTM E283](#).
3. The *IRC* and residential sections of the *IECC* do not provide specific requirements for air barrier materials. Blower door tests on the completed building are required. The products listed as compliant here are based on their approval as continuous air barriers in accordance with deemed to comply provisions of [IECC Section C402.5](#)⁷ or testing completed in accordance with [ASTM E2178](#), [ASTM E2357](#), [ASTM E1677](#), or [ASTM E283](#).

⁶ 2018 *IECC* Section C402.5.1.2.1, 2012 *IECC* Section C402.4.1.2.1

⁷ 2012 *IECC* Section C402.4



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 air barrier 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.
- 5.3 Installation shall comply with the manufacturer's installation instructions and this DRR. In the event of a conflict between the manufacturer's installation instructions and this DRR, the more restrictive shall govern.

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 comply with the requirements of IECC Section C402.5 and Section R402.4 and IRC Section N1102.4, as described in the individual research reports listed in Table 1.
- 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.



7.4 IBC Section 104.11 (IRC Section R104.11 and IFC Section 104.10⁸ 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.

9 CONDITIONS OF USE

- 9.1 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.
- 9.2 Any generally accepted engineering calculations needed to show compliance with this DRR shall be submitted to the AHJ 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 and/or by the building designer (e.g., *owner* or RDP).
- 9.4 At a minimum, this product shall be installed per Section 5 of this DRR.
- 9.5 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.
- 9.6 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 product listed in Section 1.1 are 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.

11 REVIEW SCHEDULE

11.1 For the most recent version or current status of this DRR, visit drjengineering.org or contact DrJ Engineering.

⁸ 2018 IFC Section 104.9