



NATURAL POLYMERS, LLC

NATURAL-THERM® ZERO SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

CSI Section:

072100 Thermal Insulation

1.0 RECOGNITION

Natural-Therm® Zero recognized in this report has been evaluated for use as spray-applied polyurethane foam plastic insulation. The physical properties, thermal resistance, surface burning characteristics, vapor permeance, attic and crawl space installations, and use in Type V-B construction of Natural-Therm® Zero complies with the intent of the provisions of the following codes and regulations:

- 2015, 2012, 2009, and 2006 International Building Code® (IBC)
- 2015, 2012, 2009, and 2006 International Residential Code® (IRC)
- 2015, 2012, 2009, and 2006 International Energy Conservation Code® (IECC)

2.0 LIMITATIONS

Use of Natural-Therm® Zero spray-applied polyurethane foam plastic insulation recognized in this report is subject to the following:

2.1 The insulation shall be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. If there are any conflicts between the manufacturer's published installation instructions and this report, the more restrictive shall govern.

2.2 In accordance with Sections 4.6.1 and 4.6.3 of this report, the insulation shall be separated from the interior of the building by a code-complying thermal barrier or ignition barrier as appropriate.

2.3 The insulation shall not exceed the nominal density and thickness for the installation conditions described in this report.

2.4 During application, the insulation shall be protected from exposure to weather.

2.5 The insulation shall be installed by professional spray polyurethane foam installers approved by Natural Polymers, LLC, or by the Spray Polyurethane Foam Alliance (SPFA).

2.6 Use of the insulation in areas of "very heavy" termite infestation probability shall be in accordance with 2015 IBC Section 2603.8, 2012 IBC Section 2603.9, 2009 or 2006 IBC Section 2603.8, or 2015, 2012 and 2009 IRC Section R318.4, or 2006 IRC Section R320.5, as applicable.

2.7 When required by the applicable code, a vapor retarder shall be installed.

2.8 Labeling and jobsite certification of the insulation and coatings shall comply with the following code sections as applicable:

- 2015, 2102 or 2009 IBC Section 2603.2
- 2015, 2012 or 2009 IRC Section R316.2
- 2015 IRC Section N1101.10.1.1
- 2012 IRC Section N1101.12.1.1
- 2009 IRC Section N1101.4.1
- 2015 or 2012 IECC Sections C303.1.1.1 or R303.1.1.1
- 2009 IECC Section 303.1.1.1

2.9 The insulation shall be produced by Natural Polymers, LLC in West Chicago, Illinois under a quality control program with inspections by Quality Control Consultants, LLC (AA-727).

3.0 PRODUCT USE

Natural-Therm® Zero spray-applied polyurethane foam plastic insulation complies with IBC Section 2603, IRC Section R316, 2015 and 2012 IECC Sections C303, C402, R303, and R402, 2009 IECC Sections 303 and 402, and 2006 IECC Section 402. When installed in accordance with Section 4.0 of this report, the foam plastic insulation may be used in wall cavities, floor assemblies or ceiling assemblies, and/or in attics and crawl spaces as nonstructural thermal insulation material. Natural-Therm® Zero insulation is used in Type V-B construction under the IBC and in one- and two-family dwellings under the IRC.

4.0 PRODUCT DESCRIPTION

4.1 Properties: Natural-Therm® Zero is a medium density, closed cell, spray-applied polyurethane foam plastic insulation in accordance with Section 3.1.1 and Table 1 of AC377. The insulation has a nominal in-place density of 1.9 pcf (30 kg/m³). The two-component spray foam plastic is produced in the field by combining a polymeric isocyanate (A component) and a polymeric resin (B component). The liquid components shall be stored in 55-gallon (208 L) drums at temperatures between 50°F and 90°F (10°C and 33°C). When Component A and Component B are stored in factory-sealed containers at the recommended temperatures, the maximum shelf life is one year.

The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provision of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11. This document shall only be reproduced in its entirety.

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4.2 Thermal Resistance (R-Values): Natural-Therm[®] Zero spray-applied polyurethane foam plastic insulation has thermal resistance (R-Value) at a mean temperature of 75°F (24°C) as shown in Table 1 of this report.

Thickness (inch)	Natural-Therm [™] Zero R-Value (°f·ft ² ·h/Btu)
1	6.3
2	13
3	20
3.5	24
4	27
5	33
5.5	37
6	40
7	47
7.5	50
8	53
9	60
9.5	63
10	67
11.5	77

For SI: 1 inch = 25.4 mm, 1°f·ft²·h/Btu = 0.176 110 K·m²/W.

¹R-Values are calculated based on tested K values at 1-inch and 4-inch thicknesses.

4.3 Surface Burning Characteristics: At a maximum thickness of 4 inches (102 mm) and a nominal density of 1.9 pcf (30 kg/m³), the Natural-Therm[®] Zero insulation yields a flame spread index of 25 or less and smoke-developed index of 450 or less when tested in accordance with ASTM E84. Greater thicknesses, depending on the end use, are recognized when installed in accordance with this report.

Thicknesses are not limited for ceiling cavities and wall cavities when covered by a code complying prescriptive thermal barrier, such as minimum ½ inch (12.7 mm) thick gypsum board. Thicknesses of up to 11½ inches (292 mm) for ceiling cavities and 7½ inches (191 mm) for wall cavities are recognized based on testing in accordance with Appendix X of AC308, when installed in accordance with Section 4.6.3 of this report.

4.4 Vapor Permeance: When tested in accordance with ASTM E96 Desiccant method (Procedure A), Natural-Therm[®] Zero spray-applied foam plastic insulation has a vapor Permeance of less than 1.7 perms [9.7 x 10⁻⁸ g/(Pa·s·m²)], at a minimum thickness of 2 inches (51 mm) and qualifies as Class III vapor retarder in accordance with IBC Section 202 and IRC Section R202.

4.5 Fire-Protective Coatings and Coverings: DC315 Fire Protective Coating is a water-based fire retardant coating, manufactured expressly for the thermal protection of polyurethane foam plastic insulation. DC315 is recognized in UES ER-499 as a fire-protective coating for foam plastic products. DC315 is manufactured by International

Fireproof Technology, Inc., and is supplied in 5-gallon (19 L) pails and 55-gallon drums (208 L). When DC315 Fire Protective Coating is stored in factory-sealed containers at temperatures between 50°F and 80°F (10°C and 27°C), the maximum shelf life is two years.

4.6 Installations: Natural-Therm[®] Zero spray-applied polyurethane foam plastic insulation shall comply with one of the following requirements:

- 2015, 2012 IECC Sections C402.1 (prescriptive)
- 2015, 2012 IECC Section R407 (performance)
- 2009 IECC Sections 402, 405, 502 or 506 as appropriate.

The manufacturer’s published installation instructions for Natural-Therm[®] Zero insulation and this report shall be available on the jobsite during installation. Where conflicts occur, the most restrictive governs.

Natural-Therm[®] Zero insulation shall be spray-applied on the jobsite using equipment specified in the manufacturer’s published installation instructions. The insulation is applied in multiple passes having a maximum thickness of 3 inches (76 mm) per pass up to the maximum insulation thickness specified in this report. The spray-applied foam plastic Insulation shall be allowed to fully expand and cure for a minimum of 15 minutes prior to application of additional passes. The maximum in-service temperature for all areas shall not exceed the maximum temperature stated in the manufacturer’s published installation instructions. The insulation shall be sprayed onto a substrate that is protected and clean from any debris or weather-related conditions during and after application, and shall not be used in electrical outlets or junction boxes or in contact with rain, water, or soil.

4.6.1 Application With a Prescriptive Thermal Barrier:

Natural-Therm[®] Zero spray-applied polyurethane foam plastic insulation in ceiling cavities and in wall cavities shall be separated from the interior by an approved thermal barrier of minimum ½ inch thick (12.7 mm) gypsum wallboard or equivalent 15-minute thermal barrier. The thermal barrier shall comply with, and be installed in accordance with IBC Section 2603.4, 2015, 2012 and 2009 IRC Section R316.4 or 2006 IRC Section 314.4, as applicable.

4.6.2 Installation in Attics or Crawl Spaces:

Natural-Therm[®] Zero spray-applied polyurethane foam plastic insulation may be installed in attics or crawl spaces when installed in accordance with this section.

When installed in attics or crawl spaces where entry is made only for the service of utilities, Natural-Therm[®] Zero insulation may be installed in accordance with this section. Natural-Therm[®] Zero insulation need not be surfaced with a thermal barrier; however, such attic and crawl space areas shall be separated from the interior of the building by a



thermal barrier in accordance with Section 4.6.1 of this report.

4.6.3 Installation Using a Prescriptive Ignition Barrier:

When installed within attics or crawl spaces where entry is made only for the service of utilities, Natural-Therm® Zero spray-applied polyurethane foam plastic insulation shall be covered with a prescriptive ignition barrier in accordance with IBC Section 2603.4.1.6, 2015, 2012 or 2009 IRC Sections R316.5.3 and R316.5.4 or 2006 IRC Sections R314.5.3 and R314.5.4, as applicable.

Exception: The prescriptive ignition barrier may be omitted when installed in accordance with Section 4.6.3.1 of this report.

4.6.3.1 Installation Using an Alternative Ignition Barrier Assembly:

Natural-Therm® Zero spray-applied polyurethane foam plastic insulation may be installed in attics and crawl spaces using an alternative ignition barrier assembly provided:

- a. Entry is only to service utilities in the attic or crawl space and no storage is permitted.
- b. Attic or crawl space areas cannot be interconnected.
- c. Air from the attic or crawl space cannot be circulated to other parts of the building.
- d. Attic ventilation is provided as required by IBC Section 1203.2 or IRC Section R806 except where air-impermeable insulation is permitted in unvented attics and shall comply with the following code sections as applicable:

For Unvented Attics:

- 2015 IBC Section 1203.3
- 2015 and 2012 IRC Section R806.5
- 2009 IRC Section R806.4

Crawl space ventilation is provided as required by the following code sections as applicable:

- 2015 IBC Section 1203.4
- 2012, 2009 and 2006 IBC Section 1203.3
- 2015, 2012, 2009 and 2006 IRC Section R408.1

- e. The foam plastic insulation is limited to the maximum thickness and density tested.
- f. In accordance with IMC (International Mechanical Code®) Section 701, [2006 IMC Sections 701 and 703], combustion air is provided.
- g. The installed coverage rate or thickness of coatings shall be equal to or greater than described in Section 4.6.3.1 of this report.

4.6.3.2 Installation for the Application of Fire-Protective Coatings:

Natural-Therm® Zero spray-applied polyurethane foam plastic insulation may be spray-applied in attics to the underside of roof sheathing or roof rafters, and vertical surfaces; and may be spray-applied in crawl spaces to the underside of floors and vertical surfaces as described in this section. When applied to the underside of the top of the space, the thickness of the Natural-Therm® Zero insulation shall not exceed 11½ inches (292 mm). When applied to vertical surfaces, the maximum thickness shall not exceed 7½ inches (191 mm). The foam plastic insulation shall be covered with DC315 Fire Protective Coating, as described in Sections 4.5.1 of this report with a 4.0 mils (0.1 mm) wet film thickness (3.0 mils dry film thickness [0.07 mm]).

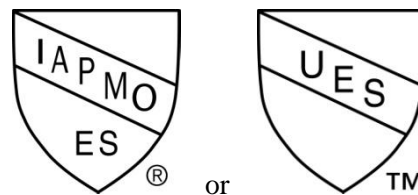
The coating shall be applied over the insulation using airless spray equipment, roller, or a brush in accordance with the coating manufacturer’s published installation instructions and this report. The ambient and substrate temperatures shall be minimum 50°F (10°C), and the surface shall be dry, clean, free of dirt and loose debris, and any other substance that could interfere with adhesion of the coating.

5.0 IDENTIFICATION

The spray foam insulation is identified with the following:

- a. Manufacturer’s name (Natural Polymers, LLC)
- b. address and telephone number,
- c. the product trade name (Natural-Therm® Zero)
- d. use instructions
- e. density, flame-spread and smoke-development indices
- f. date of manufacture or batch/run number
- g. thermal resistance values
- h. the evaluation report number (ER-527)
- i. the name or logo of the inspection agency (QCC, LLC)

Either mark of conformity may be used as shown below: Each container of DC315 Fire Protective Coating is labeled with the manufacturer’s name (International Fireproof Technology, Inc.), the product name, and use instructions.



IAPMO UES ER-527



6.0 SUBSTANTIATING DATA

Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation, AC377, dated April 2016, including Appendix X.

7.0 CONTACT INFORMATION

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8.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on Natural-Therm® Zero to assess its conformance to the codes and standards shown in Section 1.0 of this report and documents the product’s certification.

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For additional information about this evaluation report please visit www.uniform-es.org or email at info@uniform-es.org

TABLE 2
ALTERNATIVE IGNITION BARRIER ASSEMBLIES

FIRE-PROTECTIVE COATING/COVERING ¹ (APPLIED TO ALL SPF SURFACES)			MAXIMUM SPF THICKNESS	
TYPE	MINIMUM THICKNESS	THEORETICAL APPLICATION RATE (COATINGS ONLY)	WALLS AND VERTICAL SURFACES	CEILING AND OVERHEAD SURFACES
DC315	4 mils WFT	0.45 gal/100 ft ²	7.5 in.	11.5 in.

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm, 1 gal/ft² = 0.08 l/m²

¹ Fire-protective coatings and coverings shall be installed over the SPF surfaces in accordance with the coating/covering manufacturer’s instructions and this report.