EVALUATION SUBJECT:
Natural-Therm® Light Spray-Applied Polyurethane Foam Plastic Insulation

REPORT HOLDER:
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CSI Division: 07 THERMAL AND MOISTURE PROTECTION
CSI Section: 07 21 00 Thermal Insulation

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & 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)

1.2 Properties assessed:
- Physical Properties
- Thermal Resistance (R-Values)
- Surface Burning Characteristics
- Air Permeability
- Attic and crawl space installations

2.0 PRODUCT USE

Natural-Therm® Light spray-applied polyurethane foam plastic insulation complies with 2015, 2012, 2009 and 2006 IBC Section 2603, 2015, 2012 and 2009 IRC Section R316 (2006 IRC Section R314), 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, Natural-Therm® Light spray-applied polyurethane foam plastic insulation can be used in wall cavities, floor assemblies or ceiling assemblies, or in attic and crawl spaces as nonstructural thermal insulation material. The spray-applied foam plastic insulations are used in Type V-B construction under the IBC and in one- and two-family dwellings under the IRC.

3.0 PRODUCT DESCRIPTION

3.1 Properties: Natural-Therm® Light spray-applied foam plastic insulation is an open-cell, spray-applied, polyurethane foam plastic and complies as low-density insulation in accordance with Section 3.1.1 and Table 1 of AC377. The insulation is a two-component spray foam plastic with a nominal in-place density of 1.45 – 0.55 pcf (7-8 kg/m^3). The spray-applied insulation 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 45°F and 90°F (7°C and 32°C). When Component A and Component B are stored in factory-sealed containers at the recommended temperatures, the maximum shelf life is one year.

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

Table 1 – Thermal Resistance (R-Values) [1] Natural-Therm® Light

Thickness (inch)	R-Value (°f•ft^2•h/Btu)
1	3.7
2	7.5
3.5	13
4	15
5	19
5.5	20
6	22
7	26
7.5	28
8	30
9	33
9.5	35
10	37
11.5	43
12	44

For **SI:** 1 inch = 25.4 mm, 1°F·ft^2·h/Btu = 0.176 110 K·m^2/W.
[1]*R*-Values are calculated based on tested values at 1-inch and 4-inch thicknesses.

3.3 Surface Burning Characteristics: At a maximum thickness of 5$^5/_8$ inches (143 mm) and a nominal density of 0.5 pcf (8 kg/m^3), the Natural-Therm® Light spray-applied foam plastic 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.

3.4 Air Permeability: When tested in accordance with ASTM E283 at a minimum thickness of 1 inch (25.4 mm), Natural-Therm® Light spray-applied foam plastic insulations are classified as air-impermeable insulations in accordance with 2015 IBC Section 1203.3, 2015 and 2012 IRC Section R806.5 and 2009 and 2006 IRC Section R806.4.

3.5 DC315 Fireproof Paint: DC315 Fireproof Paint is a water-based latex intumescent coating manufactured by International Fireproof Technology, Inc. and is recognized in ER-499.

4.0 DESIGN AND INSTALLATION

4.1 Design: Natural-Therm® Light spray-applied foam plastic insulation shall comply with requirements in 2015 and 2012 IECC Sections C402.1 and R402, and 2009 and 2006 IECC Section 402. The manufacturer's published installation instructions for Natural-Therm® Light spray-applied foam plastic insulation and this report shall be available and strictly adhered to at all times on the jobsite during installation. Where conflicts occur, the most restrictive governs.

4.2 Installation: As referred to in the Natural Polymers, LLC's published installation instructions, the insulation is spray-applied on the jobsite using a volumetric positive displacement pump. The applied insulation is sprayed in multiple passes having a maximum thickness of 6 inches (152 mm) per pass up to the maximum insulation thickness specified in this report. The maximum in-service temperature for all areas shall not exceed 180°F (82°C). The spray-applied foam plastic insulation shall not be used in electrical outlets or junction boxes or in contact with rain, water, or soil. The spray-applied foam plastic insulation shall be sprayed onto a substrate that is protected and clean from any debris or weather-related conditions during and after application.

4.3 Installation With a Prescriptive Thermal Barrier: Natural-Therm® Light spray-applied foam plastic insulation shall be separated from the interior by an approved thermal barrier of minimum ½ inch thick (12.7 mm) gypsum wallboard or an equivalent 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 R314.4, as applicable. Based on testing in accordance with NFPA 286 (with the acceptance criteria of 2012 and 2009 IBC Section 803.1.2.1 and 2006 IBC Section 803.2.1), Natural-Therm® Light spray-applied foam plastic insulation at thicknesses up to 8 inches (203 mm) for wall cavities and 10 inches (254 mm) for floor/ceiling cavities are recognized for use with a thermal barrier complying with and installed in accordance with IBC or IRC. Within an attic or crawl space, installation shall be in accordance with Section 4.4 of this report.

4.4 Installation for Attics or Crawl Spaces

4.4.1 Installation With a Prescriptive Ignition Barrier: Where entry is made only for the service of utilities, Natural-Therm® Light spray-applied foam plastic insulation shall be installed within attics or crawl spaces with an 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. The ignition barrier shall be installed in a manner such that the foam plastic insulation is not exposed, and is consistent with the requirements of the type of construction required by the applicable code. Natural-Therm® Light insulation as described in this section may be installed in unvented attics and unvented enclosed rafter spaces in accordance with 2015 and 2012 IRC Section R806.5 or 2009 and 2006 IRC Section R806.4, as applicable.

4.4.2 Installation Without a Prescriptive Ignition Barrier

4.4.2.1 General: In accordance with Sections 4.4.2.2 and 4.4.3 or this report, when Natural-Therm® Light spray-applied foam plastic insulation is installed in attics or crawl spaces without a prescriptive ignition barrier, the following conditions apply:

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

   For Crawl Spaces:
   - 2015 IBC Section 1203.4
   - 2012, 2009 and 2006 IBC Section 1203.3
   - 2015, 2012, 2009 and 2006 IRC Section R408.1
e. In accordance with IBC Section 1203.2 or IRC Section R806, attic ventilation is provided, as applicable.
f. In accordance with IMC (International Mechanical Code®) Section 701 [2006 IMC Section 701 and 703], combustion air is provided.

4.4.2.2 Installation for the Application of DC315 Fireproof Paint: Natural-Therm® Light spray-applied foam plastic insulations may be spray-applied in attics to the underside of roof sheathing, roof rafters and/or vertical surfaces, and in crawl spaces to the underside of floors and/or vertical surfaces as described in this section. When applied to the underside of the top of the space, the thickness of the Natural-Therm® Light foam plastic shall not exceed 12 inches (305 mm), and when applied to vertical surfaces the thickness shall not exceed 8 inches (203 mm). The Natural-Therm® Light spray-applied foam insulations shall be separated from the interior of the building by a thermal barrier complying with and installed in accordance with IBC or IRC, or from the attic space with DC315 Fireproof Paint as described in Section 4.4.2.2.4 of this report. When installation complies with this section,

the ignition barrier specified in IBC Section 2603.4.1.6, 2012 or 2009 IRC Section R316.5.3 or 2006 IRC Section R314.5.3, as applicable, may be omitted.

4.4.2.2.1 DC315 Fireproof Paint Application and Curing: Natural-Therm® Light spray-applied foam plastic insulations shall be covered with a required minimum thickness of 21-mil (0.53 mm) wet film [14 mils (0.36 mm) dry film] of the DC315 Fireproof Paint as described in Section 3.5 of this report and applied over the insulation in accordance with the coating manufacturer's published installation instructions and this report. The coating shall be applied in one coat by an airless sprayer, brush or roller at a rate of 1 gallon (3.38 L) per 73 square feet (6.8 square meters), to obtain the required minimum thickness of 21-mil (0.53 mm) wet film [14 mils (0.36 mm) dry film]. The coating has a minimum 24-hour curing time, and shall be applied to surfaces that are dry, clean, and free of dirt or any loose debris that could interfere with adhesion of the coating, and when ambient and substrate temperatures are within a range of 50°F (10°C) to 90°F (32°C).

4.4.2.3 Application Without Intumescent Coating or Fireproof Paint: Natural-Therm® Light spray-applied foam plastic insulation may be spray-applied without an intumescent coating to the underside of roof sheathing or roof rafters and vertical surfaces of attics and in crawl spaces. When applied to the underside of the top of the space, the thickness of the Natural-Therm® Light foam plastic shall not exceed 10 inches (254 mm), and when applied to vertical surfaces the thickness shall not exceed 8 inches (203 mm). The insulations may be installed in unvented attics as described in this section in accordance with 2015 IBC Section 1203.3, 2015 or 2012 IRC Section R806.5 or 2009 or 2006 IRC Section R806.4, as applicable.

5.0 LIMITATIONS

The Natural-Therm® Light spray-applied foam insulation described in this report complies with those codes listed in Section 1.0 of this report or are considered suitable alternatives to what is specified, subject to the following conditions:

5.1 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 governs.

5.2 In accordance with Section 4.3 of this report, the insulation shall be separated from the interior of the building by a code complying thermal barrier.

5.3 As noted in Sections 3.2, 4.3 and 4.4 of this report, the insulation shall not exceed the nominal density and thickness.

5.4 During and after installation, the insulation shall be protected from exposure to weather and site conditions.

5.5 The contractors that will be installing the insulations shall be certified by Natural Polymers, LLC.

5.6 Use of the insulation in areas of "very heavy" termite infestation 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.

5.7 Evaluations for the insulation for use in Type V-B construction under the IBC and dwellings under the IRC have been approved.

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

5.9 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
- 2009 IRC Section N1101.4.1
- 2015 or 2012 IECC Section C303.1.1.1 or R303.1.1.1
- 2009 IECC Section 303.1.1.1

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

6.0 SUBSTANTIATING DATA

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

6.2 Natural-Therm® Light spray-applied foam plastic insulation reports of room corner tests in accordance with NFPA 286.

7.0 IDENTIFICATION

The spray foam insulations are identified with the following:

a. Manufacturer's name (Natural Polymers, LLC)
b. address and telephone number,
c. the product trade name (Natural-Therm®)
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-589)
i. the name or logo of the inspection agency (Quality Control Consultants, LLC)

Each container of the DC315 Fireproof paint is labeled in accordance with ER-499.

or

IAPMO ER 589

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