EVALUATION REPORT Number: 589

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

CSI Section: 07 21 00 Thermal Insulation

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & regulations:

- 2018, 2015 and 2012, International Building Code® (IBC)
- 2018, 2015 and 2012 International Residential Code® (IRC)
- 2018, 2015 and 2012 International Energy Conservation Code® (IECC)
- 2020 Florida Building Code, Building, (FBC, Building) -supplement attached
- 2020 Florida Building Code, Residential (FBC, Residential)- supplement attached
- 2020 Florida Building Code, Energy Conservation (FBC, Energy Conservation)- supplement attached

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 IBC Section 2603, IRC Section R316, and IECC Sections C303, C402, R303, and R402.When installed in accordance with Section 4.0 of this report, Natural-Therm® Light spray-applied polyurethane foam plastic insulation may 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 0.5 pcf (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 2018 IBC Section 1202.3, 2015 and 2012 IBC Section 1203.3 and IRC Section R806.5.

3.5 DC315 Intumescent Coating: DC315 Fireproof coating is an intumescent coating manufactured by International Fireproof Technology, Inc. Additional details are provided in ER-499.

4.0 DESIGN AND INSTALLATION

4.1 Design: Natural-Therm® Light spray-applied foam plastic insulation shall comply with requirements in Sections C402.1 and R402. 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 Thermal Barrier: Natural-Therm® Light spray-applied foam plastic insulation shall be separated from the interior by an approved thermal barrier in accordance with IBC Section 2603.4, and IRC Section R316.4, as applicable. When installed in accordance with this section, the spray foam may be any thickness when installed behind a prescriptive thermal barrier. 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 an Ignition Barrier: Where entry is made only for the service of utilities, Natural-Therm® Light spray-applied foam plastic insulation at a maximum thickness of $5^{5}/_{8}$ inches (143 mm) shall be installed within attics or crawl spaces with an ignition barrier in accordance with IBC Section 2603.4.1.6, or IRC Sections R316.5.3 and R316.5.4, 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 IRC Section R806.5.

4.4.2 Installation With an Alternative Ignition Barrier Assembly

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 an 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 2018 IBC Section 1202.2.1 or 2015 and 2012 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:
- 2018 IBC Section 1202.3
- 2015 IBC Section 1203.3
- 2015 and 2012 IRC Section R806.5
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For Crawl Spaces:
- 2018 IBC Section 1202.4
- 2015 IBC Section 1203.4
- 2012IBC Section 1203.3
- 2015 and 2012 IRC Section R408.1

e. In accordance with 2018 IBC Section 1202.2.1 or 2015 and 2012 IBC Section 1203.2 or IRC Section R806, attic ventilation is provided, as applicable.
f. In accordance with IMC (International Mechanical Code®) Section 701, combustion air is provided.

4.4.2.2 Installation for the Application of DC315 Intumescent Coating: 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 Intumescent Coating 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, or 2012 IRC Section R316.5.3, as applicable, may be omitted.

4.4.2.2.1 DC315 Intumescent Coating 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 Intumescent Coating 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 2018 IBC Section 1202.2, 2015 and 2012 IBC Section 1203.3, or 2018, 2015 and 2012 IRC Section R806.5, 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 limitations:

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 2018 and 2015 IBC Section 2603.8, or 2012 IBC Section 2603.9 IRC Section R318.4, 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:

- 2018, 2015 or 2012 IBC Section 2603.2
- 2018, 2015 or 2012 IRC Section R316.2
- 2018 or 2015 IRC Section N1101.10.1
- 2012 IRC Section N1101.12.1
- 2015 or 2012 IECC Section C303.1.1.1 or R303.1.1.1

5.10 The insulation produced at Natural Polymers, LLC located in Cortland, 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 February 2020, 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.

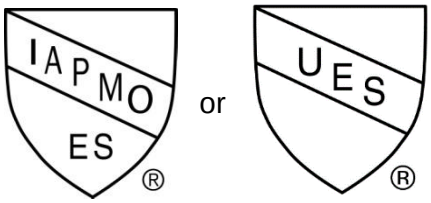
6.3 Test reports are from laboratories in compliance with ISO/IEC 17025.

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. one of the IAPMO Uniform ES Marks of Conformity
j. the name or logo of the inspection agency (Quality Control Consultants, LLC)

Each container of the DC315 Intumescent Coating is labeled in accordance with ER-499. Either Mark of Conformity may be used as shown below:



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8.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on Natural-Therm® Light spray-applied foam plastic insulation to assess its conformance to the codes and standards shown in Section 1.0 of this report and serves as documentation of the product certification. Products are manufactured at locations noted in section 5.10 of this report under a quality control program with periodic inspections under the supervision of IAPMO UES.

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

FLORIDA SUPPLEMENT

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CSI Section: 07 21 00 Thermal Insulation

1.0 RECOGNITION

Natural-Therm® Light spray-applied foam plastic insulation as evaluated and represented in IAPMO UES Evaluation Report ER-589 and with changes as noted in this supplement is a satisfactory alternative for use in buildings built under the following codes (and regulations) including locations in the High-Velocity Hurricane Zone:

- 2020 Florida Building Code, Building, (FBC, Building)
- 2020 Florida Building Code, Residential (FBC, Residential)
- 2020 Florida Building Code, Energy Conservation (FBC, Energy Conservation)

2.0 LIMITATIONS

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

2.1 The clearance between the foam insulation installed above grade and exposed earth shall be in accordance with Sections 1403.8 and 2603.8 of the FBC, Building or Sections R318.7 and R318.8 of the FBC, Residential.

2.2 Verification shall be provided that a quality assurance agency audits the manufacturers quality assurance program and audits the production quality of products in accordance with Section (5)(d) of Florida Rule 61G20-3.008. The quality assurance agency shall be approved by the Commission (or the building official when the report holder does not possess an approval by the Commission).