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NATURAL-THERM® 2.0 HFO IBW/IBS SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

CSI Section:
 07 21 00 Thermal Insulation

1.0 RECOGNITION

Natural-Therm® 2.0 HFO IBW/IBS spray-applied polyurethane foam plastic insulation has been evaluated for use as spray foam insulation complying with IBC Section 2603, IRC Section R316, and IECC Section C303, C402, R303, and R402. The surface burning, physical characteristics, thermal resistance, air permeability, vapor permeance, construction type, attic and crawl space installations, and application in Type V construction and exterior walls of Types I-IV construction of Natural-Therm® 2.0 HFO IBW/IBS were evaluated for compliance with the intent of the following codes and regulations:

- 2021, 2018, 2015 and 2012 International Building Code® (IBC)
- 2021, 2018, 2015 and 2012 International Residential Code® (IRC)
- 2021, 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

2.0 LIMITATIONS

Use of the Natural-Therm® 2.0 HFO IBW/IBS spray-applied foam plastic insulation recognized in this report is subject to the following limitations:

2.1 The insulation shall be installed in accordance with the manufacturer’s published installation instructions, this evaluation report and the applicable code. This report and installation instruction shall be available and strictly adhered to at all times on the jobsite during installation. 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 Section 3.4 and 3.5 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 and after installation, the insulation shall be protected from exposure to weather and site conditions.

2.5 The installation shall be performed by contractors that are certified by Natural Polymers, LLC.

2.6 Use of the insulation in areas of “very heavy” termite infestation probability shall be in accordance with 2021, 2018 and 2015 IBC Section 2603.8, 2012 IBC Section 2603.9, or IRC Section R318.4, 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:

- 2021, 2018, 2015 or 2012 IBC Section 2603.2
- 2021, 2018, 2015 or 2012 IRC Section R316.2
- 2021, 2018 and 2015 IRC Section N1101.10.1.1
- 2012 IRC Section N1101.12.1
- 2021, 2018, 2015 or 2012 IECC Section C303.1.1.1 or R303.1.1.1

2.9 The insulation is produced by Natural Polymers, LLC in Cortland, Illinois.

3.0 PRODUCT USE

3.1 General: Natural-Therm® 2.0 HFO IBW/IBS closed-cell 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, Natural-Therm® 2.0 HFO IBW/IBS 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 insulation is used in Type V-B construction under the IBC and in one- and two-family dwellings under the IRC.

3.2 Design: Natural-Therm® 2.0 HFO IBW/IBS spray-applied foam plastic insulation shall comply with requirements in IECC Sections C402.1 and R402, as applicable. Natural-Therm® 2.0 HFO IBW/IBS may be used as air impermeable insulation when installed in accordance with Section 4.4 of this report.





3.3 Installation: As referred to in 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 for Natural-Therm® 2.0 HFO IBW/IBS spray-applied foam plastic insulation, 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.

3.4 Thermal Barrier

3.4.1 Installation with an Approved Thermal Barrier: Natural-Therm® 2.0 HFO IBW/IBS spray-applied foam plastic insulation in ceiling cavities and in wall cavities shall be separated from the interior by an approved thermal barrier. The thermal barrier shall comply with, and be installed in accordance with IBC Section 2603.4, and IRC Section R316.4, as applicable. Within an attic or crawl space, installation shall be in accordance with Section 3.4 or Section 3.5 of this report, as applicable.

3.4.2 Alternative Thermal Barrier Assemblies: Natural-Therm® 2.0 HFO IBW/IBS spray-applied foam plastic insulation may be installed without a thermal barrier when installed with a fire-protective coating in accordance with Table 2 of this report as part of an alternative thermal barrier assembly.

3.5 Installation for Attics or Crawl Spaces

3.5.1 Installation with a Prescriptive Ignition Barrier: Where entry is made only for the service of utilities, Natural-Therm® 2.0 HFO IBW/IBS at a maximum thickness of 4.0 inches (102 mm), 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 and 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® 2.0 HFO IBW/IBS insulation as described in this section may be installed in unvented attics and unvented enclosed rafter spaces in accordance with IRC Section R806.5.

3.5.2 Installation Without a Prescriptive Ignition Barrier

3.5.2.1 General: In accordance with Sections 3.5.2.2 of this report, when Natural-Therm® 2.0 HFO IBW/IBS 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 shall not be interconnected.
- c. Air from the attic or crawl space shall not be circulated to other parts of the building.
- d. Attic ventilation is provided as required by IBC 2021 and 2018 Section 1202.2, IBC 2015 and 2012 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:

- 2021 and 2018 IBC Section 1202.3
- 2015 IBC Section 1203.3
- 2021, 2018, 2015 and 2012 IRC Section R806.5

For Crawl Spaces:

- 2021 and 2018 IBC Section 1202.4
- 2015 IBC Section 1203.4
- 2012 IBC Section 1203.3
- 2021, 2018, 2015, and 2012 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 combustion air is provided.
- g. The foam plastic insulation is limited to the maximum thickness and density tested as noted in Section 3.5.2.2 or Section 3.4 of this report, as applicable.

3.5.2.2 Application Without Intumescent Coating or Fireproof Paint: Natural-Therm® 2.0 HFO IBW/IBS 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® 2.0 HFO IBW/IBS foam plastic shall not exceed 11.5 inches (292 mm), and when applied to vertical surfaces the thickness shall not exceed 12 inches (305 mm). The insulation may be installed in unvented attics as described in this section in accordance with 2021 and 2018 IBC Section 1202.3, 2015 and 2012 IBC Section 1203.3, or IRC Section R806.5, as applicable.

3.6 Installation for Use in Exterior Walls of Type I, II, III, or IV Construction (IBC)

3.6.1 General: When used on non-loadbearing exterior walls of Types I, II, III or IV construction, the assembly shall comply with IBC Section 2603.5 and this section. Walls required to be fire-resistance rated construction are beyond



the scope of this report and shall comply with IBC Section 2603.5.1.

3.6.2 Base Wall: Studs shall be 3⁵/₈ inch-deep (92 mm), No. 18 gage, C-channel steel studs spaced at maximum 24 inches (610 mm) on center. The studs shall be fastened in accordance with the requirements of the IBC. Nominal 4 pcf (64 kg/m³) mineral wool safing complying with ASTM C665-17 shall be placed at floor lines, filling the cavities the full floor depth. The stud cavity shall be filled with Natural-Therm[®] 2.0 HFO IBW/IBS foam plastic insulation to a maximum thickness of 3⁵/₈ inches (92 mm).

3.6.3 Interior Face: Type X gypsum board, 5/8 inch (15.9 mm) thick, complying with ASTM C1396 shall be installed with the long dimension parallel to the studs, with the sheathing joints backed by framing. The wallboard shall be fastened with #6 x 1-1/4-inch-long flat head self-drilling screws with a nominal spacing of 8 inches on the perimeter and 12 inches in the field. The gypsum board joints shall be treated with joint compound complying with ASTM C475 using a minimum 2-inch-wide (51 mm) tape.

3.6.4 Exterior Face: Georgia Pacific DensGlass[®] Sheathing, 1/2 inch (12.7 mm) thick complying with ASTM C1177 shall be installed horizontally with joints staggered over the exterior side of the steel studs in accordance with the sheathing manufacturer’s published installation instructions. The sheathing joints shall be backed by framing. The exterior cladding shall be 4-inch (102 mm) nominal cored face brick meeting ASTM C216 Grade SW installed with Type S Mortar.

3.6.5 Window Opening: For exterior insulations listed in Section 3.6.6 of this report with no coating over the foam use 18-gauge minimum sheet steel perimeter flashing. Windows and doors shall be framed as the base wall in Section 3.6.2 of this report. The window opening header, sill and jambs covered by 1 1/2 inch x 4 1/8 inch Hoover Pyro-Guard fire-retardant lumber.

3.6.6 Exterior Insulation: A maximum of 4-inch-thick Natural-Therm[®] 2.0 HFO IBW/IBS.

3.6.7 Insulation: The cavities shall be filled with Natural-Therm[®] 2.0 HFO IBW/IBS spray-applied polyurethane foam plastic insulation installed in accordance with the manufacturer’s published installation instructions.

4.0 PRODUCT DESCRIPTION

4.1 Properties: Natural-Therm[®] 2.0 HFO IBW/IBS spray-applied foam plastic insulation is a closed-cell, spray-applied, polyurethane foam plastic and complies as medium-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 2.0 pcf (32 kg/m³).

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 50°F and 90°F (10°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.

4.2 Thermal Resistance (R-Values): Natural-Therm[®] 2.0 HFO IBW/IBS 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

Thickness (inch)	Natural-Therm 2.0 HFO IBW/IBS R-Value (°F·ft ² ·h/Btu)
1	7.2
2	14
3.5	25
4	28
5	35
5.5	39
6	42
7	49
7.5	53
8	56
9	63
9.5	67
10	70
11.5	81
12	84

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 3.5-inch thicknesses for Natural-Therm[®] 2.0 HFO IBW/IBS..

4.3 Surface Burning Characteristics:

At a maximum thickness of 4.0 inches (102 mm) and a nominal density of 2.0 PCF (32 kg/m³), the Natural-Therm[®] 2.0 HFO IBW/IBS 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.

4.4 Air Permeability: When tested in accordance with ASTM E2178 at a minimum thickness of 1 inch (25.4 mm), Natural-Therm[®] 2.0 HFO IBW/IBS spray-applied foam plastic insulation is classified as air-impermeable insulation in accordance with 2021 and 2018 IBC Section 1202.3 and 2015 IBC Section 1203.3 and IRC Section R806.5, as applicable.

4.5 Fire-Protective Coatings: Fire protective coatings for use as part of alternative thermal barrier assemblies or alternative ignition barrier assemblies, shall be as described in Table 2 of this report and installed in accordance with Section 3.5 of this report.

4.6 Vapor Permeance: When tested in accordance with the ASTM E96 desiccant method (Procedure A), Natural-



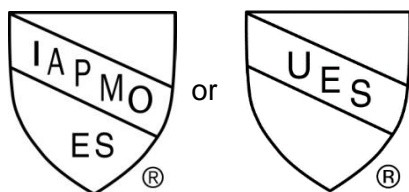
Therm® 2.0 HFO IBW/IBS spray-applied foam plastic insulation has a vapor permeance of 1.03 perms [5.89×10^{-9} kg/(PA-s-m²)] or less, at a minimum thickness of 1.0 inch (25.4 mm) and qualifies as Class III vapor retarder in accordance with IBC Section 202 and IRC Section R202.

4.7 DC-315 Fireproof Paint: DC-315 Fireproof Paint is a water based latex intumescent coating manufactured by International Fireproof Technology, Inc. is described in IAPMO UES ER-499. The coating is supplied in 5-gallon (19L) pails and 55-gallon (208L) drums.

5.0 IDENTIFICATION

The spray foam insulation is identified with the following:

- Manufacturer's name (Natural Polymers, LLC)
- address and telephone number,
- the product trade names (Natural-Therm®)
- use instructions
- density, flame-spread and smoke-development indices
- date of manufacture or batch/run number
- thermal resistance values
- the evaluation report number (ER-714)
- the name or logo of the inspection agency (Quality Control Consultants, LLC)



IAPMO UES ER-714

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 Appendix X.

6.2 Reports of water vapor transmission tests in accordance with ASTM E96.

6.3 Reports of room corner fire testing in accordance with NFPA 286.

6.4 Report of fire propagation in accordance with NFPA 285.

6.5 Data in accordance with ICC 1100-2019, Standard for Spray-applied Polyurethane Foam Plastic Insulation.

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

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on Natural-Therm® 2.0 HFO IBW/IBS spray-applied polyurethane foam plastic insulation to assess conformance to the codes shown in Section 1.0 of this report, and serves as documentation of the product certification. The product is manufactured at locations noted in Section 2.9 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 us at info@uniform-es.org



TABLE 2 - ALTERNATIVE THERMAL BARRIER ASSEMBLIES

FIRE-PROTECTIVE COATING/COVERING ¹			MAXIMUM SPF THICKNESS (inch)	
TYPE	MINIMUM THICKNESS	THEORETICAL APPLICATION RATE (COATINGS ONLY)	WALLS AND VERTICAL SURFACES	CEILING AND OVERHEAD SURFACES
DC315 ²	18 mils WFT (12 mils DFT)	1.1 gal/100 ft ²	7.5	11.5
DC315 ²	14 mils WFT (9 mils DFT)	0.87 gal/100 ft ²	5.5	14

For **SI**: 1 inch = 25.4 mm, 1 gallon = 3.785 L, 1 ft² = 0.0929 m²

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

² International Fireproof Technology, Inc, recognized in [IAPMO UES ER-499](#) and tested to the requirements of [NFPA 286](#).



FLORIDA SUPPLEMENT

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NATURAL-THERM® 2.0 HFO IBW IBS SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

CSI Section:

07 21 00 Thermal Insulation

1.0 RECOGNITION

Natural-Therm® 2.0 HFO IBW/IBS spray-applied foam plastic insulation as evaluated and represented in IAPMO UES Evaluation Report ER-714 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® 2.0 HFO IBW/IBS cell 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).

This supplement expires concurrently with ER-714.

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