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ECOPOLYSEAL ECO2000 HFO SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

CSI Section:
07 21 00 Thermal Insulation

1.0 RECOGNITION

ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation described in this report has been evaluated for use as thermal insulation. The physical properties, thermal resistance, surface burning characteristics, air permeability, water vapor transmission, and attic and crawl space installations were evaluated for compliance with the following codes and regulations:

- 2021, 2018, 2015, 2012 International Building Code® (IBC)
- 2021, 2018, 2015, 2012 International Residential Code® (IRC)
- 2021, 2018, 2015, 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 ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane 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. 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 4.6.1 of this report, the insulation shall be separated from the interior of the building by a code-complying thermal barrier.
- 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 North American Spray Foam Polymers 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 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 Class I vapor retarder shall be installed.

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

- IBC Section 2603.2
- IRC Section R316.2
- 2021, 2018 and 2015 IRC Section N1101.10.1.1
- 2012 IRC Section N1101.12.1.1
- IECC Sections C303.1.1.1 or R303.1.1.1

2.9 Foam plastic insulation used in plenums as interior finish or interior trim shall comply with Section 2603.7 of the IBC.

2.10 Fire-resistance ratings are beyond the scope of this review. Where fire-resistance rated assemblies are required by the IBC or IRC, documentation shall be provided to the building official showing compliance.

3.0 PRODUCT USE

ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation complies with IBC Sections 2603 and 1202.3, IRC Sections R316, R408.3, and R806.5, and IECC Sections C303, C402, R303, and R402. When installed in accordance with Section 4.0 of this report, the foam plastic insulation may be used in wall cavities, floor or ceiling assemblies, interior or exterior sides of below-grade vertical foundations, the underside of on-grade slabs, and in attics and crawl spaces as nonstructural thermal insulation material. ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation may be used in Type V construction under the IBC and in one- and two-family dwellings under the IRC.

ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation may be used as air impermeable insulation when installed in accordance with Section 4.4 of this report.

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.





4.0 PRODUCT DESCRIPTION

4.1 Properties: ECOPOLYSEAL ECO2000 HFO 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 2.0 pcf (32 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 80°F (10°C and 27°C). When Component A and Component B are stored in factory-sealed containers at the recommended temperatures, the shelf life is six months.

4.2 Thermal Resistance (R-Values): ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation has thermal resistance (R-Value) at a mean temperature of 75°F±5°F (23.8°C ±2.8°C) as shown in Table 1 of this report. For thicknesses above 3.5 inches (89 mm) not listed in Table 1, a multiplier of 7.24/inch shall be used to calculate installed R-value.

TABLE 1 - Thermal Resistance (R-Values)	
Thickness (inch)	ECOPOLYSEAL ECO2000 HFO R-Value (°F·ft ² ·h/Btu)
1	7.2
2	14
3	22
3.5	25
4	29
5	36
5.5	40
6	43
7	51
7.5	54
8	58
9	65
10	72
11	80
11.5	83
12	87

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

4.3 Surface Burning Characteristics: At a maximum thickness of 4 inches (102 mm) and a nominal density of 2.0 pcf (32 kg/m³), the ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane 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. Greater thicknesses, depending on the end use, are recognized when installed in accordance with this report.

Foam insulation thicknesses are not limited when covered by a code complying thermal barrier and installed in accordance with Section 4.6.1.1 of this report.

4.4 Air Permeability: ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation is classified as an air-impermeable insulation when tested in accordance with ASTM E2178 at a minimum thickness of 1 inch (25.4 mm), in accordance with 2021 and 2018 IBC Section 1202.3, and 2015 and 2012 IBC Section 1203.3, and IRC Section R806.5.

4.5 Fire-Protective Coatings and Coverings: Fire protective coatings, for use as part of an alternative thermal barrier assembly, shall be in accordance with Table 2 of this report and installed in accordance with Section 4.6 of this report.

4.6 Installation: ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation shall comply with Sections C402.1 or R402.1 of the IECC, as applicable.

The manufacturer’s published installation instructions for ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation and this report shall be available on the job site during installation. Where conflicts occur, the most restrictive governs.

ECOPOLYSEAL ECO2000 HFO shall be spray-applied on the job site using equipment specified in the manufacturer’s published installation instructions. 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 or water.

4.6.1 Thermal Barrier

4.6.1.1 Application with a Prescriptive Thermal Barrier: ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation, in any thickness, in ceiling cavities and in wall cavities, shall be separated from the interior by a prescriptive thermal barrier. The thermal barrier shall comply with and be installed in accordance with IBC Section 2603.4 and IRC Section R316.4.

Exception: The thermal barrier is not required when the insulation is installed in attics or crawlspaces as described in Section 4.6.2 but shall be installed between the insulation and the interior of the building.

4.6.1.2 Alternative Thermal Barrier Assemblies: ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation may be installed without a thermal barrier as defined in Section 4.6.1.1 of this report when installed with a fire-protective coating as described in Table 2 of this report based on testing in accordance with NFPA 286 or UL 1715.



4.6.2 Installation in Attics or Crawl Spaces: ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation may be installed in attics or crawl spaces when installed in accordance with this section. The insulation may be installed in unvented attics and unvented enclosed rafter spaces for use as air-impermeable insulation as described in Section 4.4 of this report.

When installed in attics or crawl spaces where entry is made only for the service of utilities, ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation may be installed in accordance with this section. ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic 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.

4.6.2.1 Installation in Attics and Crawl Spaces without an Ignition Barrier: ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation may be installed in attics and crawl spaces without a prescriptive ignition barrier or fire-protective coating provided:

- Entry is only to service utilities in the attic or crawl space and no storage is permitted.
- Attic or crawl space areas cannot be interconnected.
- Air from the attic or crawl space cannot be circulated to other parts of the building.
- Attic ventilation is provided as required by 2021 and 2018 IBC Section 1202.2, 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:

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

Unvented crawl spaces shall meet the requirements of Section 4.6.2.2 of this report.

Ventilated crawl spaces shall be provided with ventilation as required by the following code sections as applicable:

- 2021 and 2018 IBC Section 1202.4
- 2015 IBC Section 1203.4
- 2012 IBC Section 1203.3
- 2021, 2018, 2015, 2012 IRC Section R408.1

- ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation may be applied at a nominal density of 2.0 pcf to the underside of roof sheathing or roof rafters and vertical surfaces of attics and in crawl spaces without a prescriptive ignition

barrier or fire-protective coating. When applied to the underside of the top of the space, the thickness of the ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation shall not exceed 11½ inches (292 mm), and when applied to vertical surfaces or floor, the maximum thickness shall not exceed 7½ inches (191 mm).

- In accordance with IMC (International Mechanical Code®) Section 701, combustion air is provided.

4.6.2.2 Installation in Unvented Crawl Spaces: ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation may be installed in unvented crawl spaces. When using an alternative thermal barrier assembly meeting Section 4.6.1.2 of this report when complying with IRC Section R408.3.

Exception: The alternative thermal barrier assembly may be eliminated in Item 2.4 of IRC Section R408.3 when installed in accordance with Section 4.6.2.1 of this report and when the crawl space does not include an air pathway to the common area.

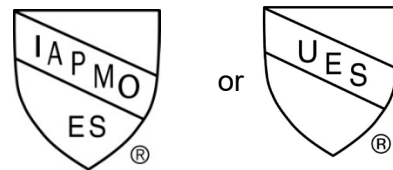
4.7 Water Vapor Transmission: When tested to the requirements of ASTM E96, desiccant method, at a thickness of one inch, ECOPOLYSEAL ECO2000 HFO has a Vapor Retarder Classification of Class II.

5.0 IDENTIFICATION

The spray foam insulation is identified with the following:

- Manufacturer's name (North American Spray Foam Polymers)
- address and telephone number,
- the product trade name (ECOPOLYSEAL ECO2000 HFO)
- use instructions
- density, flame-spread and smoke-development indices
- date of manufacture or batch/run number
- thermal resistance values
- the evaluation report number (ER-845)
- the name or logo of the inspection agency

Either IAPMO UES Mark of Conformity may also be used as shown below:



IAPMO UES ER-845



6.0 SUBSTANTIATING DATA

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

6.2 Report of room corner fire testing in accordance with NFPA 286.

6.3 Report of fire test of interior finish material in accordance with UL 1715.

6.4 Report of testing of air permeance in accordance with ASTM E2178.

6.5 Report of testing of water vapor transmission in accordance with ASTM E96.

6.6 Data in accordance with IAPMO/ANSI ES1000-2020, Standard for Building Code Compliance of Spray-Applied Polyurethane Foam.

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

6.8 Test Reports are from Laboratories in conformance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation to assess conformance to the codes and standards shown in Section 1.0 of this report and documents the product’s certification. This spray foam is produced under a quality control program with periodic inspection 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 (mils)	THEORETICAL APPLICATION RATE (COATINGS ONLY)	WALLS AND VERTICAL SURFACES	CEILING AND OVERHEAD SURFACES
DC315 ²	14 WFT (9 DFT)	0.87 gal/100 ft ²	7.5	11.5
Flame Control 60-60A ³	14 WFT (9 DFT)	0.87 gal/100 ft ²	6	12
Fireshell F10E ⁴	14 WFT (9 DFT)	0.87 gal/100 ft ²	6	10
No-Burn, Inc. ⁵	14 WFT (9 DFT)	0.87 gal/100 ft ²	7.25	11.25

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](#).

³ Flame Control Coatings, recognized in [IAPMO UES ER-596](#) and tested to the requirements of NFPA 286.

⁴ ICP Construction, tested to the requirements of NFPA 286.

⁵No-Burn, Inc., recognized in IAPMO UES ER-305 and tested to the requirements of UL 1715.



FLORIDA SUPPLEMENT

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APPLIED POLYURETHANE FOAM
PLASTIC INSULATION**

**CSI Section:
07 21 00 Thermal Insulation**

1.0 RECOGNITION

The ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation as evaluated and represented in IAPMO UES Evaluation Report ER-845 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 ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation recognized in this report is subject to the following limitations:

2.1 The ECOPOLYSEAL ECO2000 HFO spray-applied polyurethane foam plastic insulation shall comply with the provisions in IAPMO UES ER-845 applicable to the 2018 IBC, 2018 IRC, or 2018 IECC for use under the 2020 FBC, Building, 2020 FBC, Residential, or FBC, Energy Conservation.

2.2 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.

2.3 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).

2.4 This supplement expires concurrently with ER-845.

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