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HEATLOK® HFO EZ SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

CSI Section:
07 21 00 Thermal Insulation

1.0 RECOGNITION

Heatlok® HFO EZ 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 Sections C303, C402, R303, and R402. The physical properties, water vapor resistance, air permeance, thermal resistance, surface burning characteristics, fire-resistance, and attic and crawl space installations were evaluated to comply with the intent of the following codes and regulations:

- 2021, 2018, and 2015 International Building Code® (IBC)
- 2021, 2018, and 2015 International Residential Code® (IRC)
- 2021, 2018, and 2015 International Energy Conservation Code® (IECC)

2.0 LIMITATIONS

Use of Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation recognized in this report is subject to the following limitations:

2.1 The insulation and coating products 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 Except as permitted by the applicable building code, the insulation shall be separated from the interior of the building by a code-complying thermal barrier or shall be installed as an alternative thermal barrier assembly in accordance with Section 4.5.1 of this report.

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 authorized by Huntsman Building Solutions, Inc.

2.6 Use of the insulation in areas of "very heavy" termite infestation probability shall be in accordance with IBC Section 2603.8 or IRC Section R318.4, as applicable.

2.7 Heatlok® HFO EZ insulation qualifies as a vapor retarder when installed as required in Section 4.7 of this report.

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

- 2021, 2018, or 2015 IBC Section 2603.2
- 2021, 2018, or 2015 IRC Section R316.2
- 2021, 2018, and 2015 IRC Section N1101.10.1.1
- 2021, 2018, or 2015 IECC Sections C303.1.1.1 or R303.1.1.1.1

2.9 The insulation shall be produced by Huntsman Building Solutions, Inc. in Arlington, TX.

3.0 PRODUCT USE

Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation complies with IBC Section 2603, IRC Section R316, and 2021, 2018, and 2015 IECC Sections C303, C402, R303, and R402. When installed in accordance with Section 4.0 of this report, the foam plastic insulation is for use in wall cavities, floor assemblies or ceiling assemblies, exterior side of vertical foundations, or the underside of slabs. It may be used in attics and crawl spaces when installed with Section 4.5.1. Heatlok® HFO EZ insulation is used in Type V construction under the IBC and in one-and two-family dwellings under the IRC.

4.0 PRODUCT DESCRIPTION

4.1 Properties: Heatlok® HFO EZ is a medium density, closed cell, spray-applied polyurethane foam plastic insulation in accordance with Table 1 of AC377. The insulation has a nominal in-place density of 2.0 lb/ft^3 (32 kg/m^3). The two-component spray foam plastic is produced in the field by combining a polymeric isocyanate (A component) and the Heatlok® HFO EZ resin (B component). The liquid components shall be stored in 55-gallon (208 L) drums at temperatures between 50°F and 100°F (10°C and 38°C) for the polymeric isocyanate and 59°F and 77°F (15°C and 25°C) for the Heatlok® HFO EZ resin. When Component A and Component B are stored in

factory-sealed containers at the recommended temperatures, the maximum shelf life is twelve months for the polymeric isocyanate and six months for the Heatlok® HFO EZ resin.

4.2 Thermal Resistance (R-Values): Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation has a thermal resistance (R-Value) 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)	Heatlok® HFO EZ R-Value (°F•ft²•h/Btu)
1	7.0
1.5	10
2	14
3	21
3.5	24
4	27
5	34
5.5	38
6	41
7	48
7.5	51
8	55
9	62
10	68
11	75
11.5	79
12	82

For **SI:** 1 inch = 25.4 mm, 1°F·ft²·h/Btu = 0.176 110 K·m²/W.
[1]R-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 2.0 lb/ft³ (32 kg/m³), the Heatlok® HFO EZ insulation has 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.

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

4.5 Installations: Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation shall comply with one of the following requirements:

- IECC Section C402.1
- IECC Section R402.1

The manufacturer's published installation instructions for Heatlok® HFO EZ insulation and this report shall be available on the jobsite during installation. Where conflicts occur, the most restrictive governs.

Heatlok® HFO EZ insulation shall be spray-applied on the jobsite 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 clean, dry substrate that has been prepared in accordance with the manufacturer's installation instructions. The insulation shall not be used in electrical outlets or junction boxes or where the insulation will be in direct, continuous contact with water.

4.5.1 Thermal Barrier

4.5.1.1 Application with an Approved Thermal Barrier: Except as provided for in Section 4.5.1.2 of this report, Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation shall be separated from the interior by a thermal barrier in accordance with IBC Section 2603.4 or IRC Section R316 as applicable. When the insulation is separated from the interior by a prescriptive thermal barrier in accordance with IBC Section 2603.4 or IRC Section R316, the insulation thickness shall not be limited.

4.5.1.2 Alternative Thermal Barrier Assemblies: Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation may be installed without a thermal barrier as defined in Section 4.5.1.1 of this report when installed in accordance with Table 2 of this report and as referenced in IAPMO UES ER-499 or IAPMO UES ER-305, as applicable.

4.5.2 Installation in Attics or Crawl Spaces: Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation may be installed in attics or crawl spaces when installed in accordance with this section (Section 4.5).

When installed in attics or crawl spaces where entry is made only for the service of utilities, Heatlok® HFO EZ insulation may be installed in accordance with this section. Heatlok® HFO EZ 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 4.5.2 of this report.

4.5.2.1 Installation Using a Prescriptive Ignition Barrier: When installed within attics or crawl spaces where entry is made only for the service of utilities, Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation at a maximum thickness of 7.5 inches (191 mm) on walls and other vertical surfaces and 11.5 inches (292 mm) on ceilings and other overhead surfaces shall be covered with a prescriptive ignition barrier in accordance with IBC Section 2603.4.1.6 or IRC Sections R316.5.3 and R316.5.4, as applicable.

Exception: The prescriptive ignition barrier may be omitted when installed in accordance with Section 4.5.2.2 of this report.

4.5.2.2 Installation Using an Alternative Ignition Barrier Assembly: Heatlok® HFO EZ 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 2021 and 2018 IBC Section 1202.2, 2015 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
   - 2021 and 2018 and 2015 IRC Section R806.5

   Crawl space ventilation is provided as required by the following code sections as applicable:
   - 2021 and 2018 IBC Section 1202.4
   - 2015 IBC Section 1203.4
   - 2021 IRC R408.2
   - 2018 and 2015 IRC Section R408.1

e. The foam plastic insulation is limited to the maximum thickness and density tested as shown in Section 4.5.2.2.1 of this report.
f. In accordance with IMC (International Mechanical Code®) Section 701, combustion air is provided.

4.5.2.2.1 Alternative Ignition Barrier Assembly: Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation may be installed without a prescriptive ignition barrier on walls, floors, ceilings, and other vertical and horizontal surfaces as defined in Section 4.5.2.1 of this report when limited to a maximum thickness of 7.5 inches (191 mm) on walls and other vertical surfaces and 11.5 inches (292 mm) on ceilings and other overhead surfaces.

4.6 Air Permeability: When tested in accordance with ASTM E2178 at a minimum thickness of 1 inch (25.4 mm), Heatlok® HFO EZ spray foam insulation is classified as air-impermeable insulation in accordance with Sections 202 and 1202.3 of the 2021 and 2018 IBC; Sections 202 and 1203.3 of the 2015 IBC; Sections R202 and R806.5 of the 2021, 2018, and 2015 IRC; and Section C402.5 of the IECC, as applicable.

4.7 Vapor Permeance: Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation, when tested in accordance with the ASTM E96 desiccant method (Procedure A), has a permeance of less than 1.0 perms (57.4×10^9 g/Pa·s·m), at a minimum thickness of 1 inch (25 mm) and qualifies as a Class II vapor retarder in accordance with IBC Section 202 and IRC Section R202.

4.8 One-hour Fire-resistance Rated Assembly: The following load-bearing assembly, based on testing to ASTM E119, provides a one-hour fire-resistance rating.

4.8.1 Framing: $3^5/_8$-inch (92 mm) 20-gauge steel studs with a maximum height of 10 feet (3 m) spaced at 16 inches (406 mm) on center inserted in a 20-gauge top and bottom steel track with lateral bracing at mid-wall height.

4.8.2 Exterior Surface: Two layers of $^5/_8$-inch-thick (15.9 mm) glass mat gypsum substrate complying with ASTM C1177. The base layer is installed with the long edge parallel to the studs with #6 by $1^1/_2$-inch-long (38 mm) drywall screws spaced at 8 inches (203 mm) on center around the perimeter and 12 inches (305 mm) on center in the field. The face layer is installed with the long edge parallel to the studs with the base layer and face layer joints staggered by one stud space. The face wall is secured with #6 by $1^7/_8$-inch-long (48 mm) drywall screws spaced at 8 inches (203 mm) on center around the perimeter and 12 inches (305 mm) on center in the field.

4.8.3 Insulation: $3^5/_8$-inch-thick (92 mm) layer of Heatlok® HFO EZ spray-applied polyurethane foam plastic insulation applied in the cavities to the exterior gypsum completely filling the stud cavities.

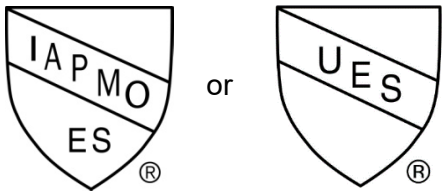
4.8.4 Interior Cladding: Two layers of $^5/_8$-inch-thick (15.9 mm) Type X gypsum board complying with ASTM C1396. The base layer shall be installed with the long edge parallel to the studs with #6 by $1^1/_2$-inch-long (38 mm) drywall screws spaced at 8 inches (203 mm) on center around the perimeter and 12 inches (305 mm) on center in the field. The face layer shall be installed with the long edge parallel to the studs with the base layer and face layer joints staggered by one stud space. The face wall is secured with #6 by $1^7/_8$-inch-long (48 mm) drywall screws spaced at 8 inches (203 mm) on center around the perimeter and 12 inches (305 mm) on center in the field.

5.0 IDENTIFICATION

The spray foam insulation is identified with the following:

a. Manufacturer's name (Huntsman Building Solutions), Inc.
b. manufacturer's address and telephone number,
c. the product trade name (Heatlok® HFO EZ)
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-871)
i. the name or logo of the inspection agency

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



IAPMO UES ER-871

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation, AC377, dated April 2020 (editorially revised July 2020) including Appendix X.

6.2 Flammability Testing to NFPA 286, Standard Methods of Fire Tests for Evaluation of Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.

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

6.4 Report of water vapor transmission performance in accordance with ASTM E96.

6.5 Fire-resistance testing to ASTM E119.

6.6 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 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 Heatlok® HFO EZ to assess conformance to the codes and standards shown in Section 1.0 of this report and documents the product's certification. The product is manufactured at a location 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 at info@uniform-es.org

TABLE 2 - ALTERNATIVE THERMAL BARRIER ASSEMBLY

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
Plus ThB[3]	16 mils WFT (11 mils DFT)	1.0 gal/100 ft^2	6.5	9.5

For **SI:** 1 inch = 25.4 mm, 1 gallon = 3.785 L, 1 ft^2 = 0.0929 m^2

[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.
[3] No Burn recognized in IAPMO UES ER-305.