



NSF POLYMERS
17598 N IH-35
West, Texas 76691
www.NSFPolymers.com

NSF POLYMERS R-MAX

CSI Section:
07 21 00 Thermal Insulation

1.0 RECOGNITION

NSF Polymers R-Max spray foam insulation has been evaluated for use as spray foam insulation complying with IBC Section 2603, IRC Section R316, IECC Sections C303, C402, R303 and R402. The surface burning, physical properties, and thermal resistance of NSF Polymers R-MAX spray foam insulation was evaluated to comply to 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 NSF Polymers R-MAX spray foam 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. The insulation shall also be installed in accordance with this evaluation report and the applicable code, and if there are any conflicts between the manufacturer’s published installation instructions and this report, the more restrictive governs.

2.2 Except as indicated in Section 3.3.3 of this report or by the applicable code, the insulations shall be separated from the interior of the building by a code-approved thermal barrier.

2.3 As noted in Section 3.2.2 of this report, the insulations shall not exceed the nominal density and thickness.

2.4 During installation, the insulation and the surfaces to which they are applied shall be protected from exposure to weather.

2.5 The contractors that will be installing the insulation shall be approved by NSF Polymers or by the Spray Polyurethane Foam Alliance.

2.6 Use of the insulation in areas of “very heavy” termite infestation shall be in accordance with the IBC Section 2603.8 or IRC Section 318.4, as applicable.

2.7 Labeling and jobsite certification of the insulation and coatings shall comply with IBC Section 2603.2, IRC Sections N1101.10 and N1101.10.1.1, and IECC Sections C303.1.1 and C303.1.2, as applicable.

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

3.0 PRODUCT USE

3.1 General: When installed in accordance with Section 3.3 of this report, NSF Polymers R-MAX spray foam insulation can be used in wall cavities, floor assemblies or ceiling assemblies, and 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 dwellings under the IRC.

3.2 Design: NSF Polymers R-MAX spray foam insulation shall comply with requirements in IECC Sections C402.1 and R402.

3.2.1 Thermal Resistance (R-Values): NSF Polymers R-MAX spray foam 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) ^{1,2}	
Thickness (inch)	NSF Polymers R-MAX R-Value (°F·ft ² ·h/Btu)
1	7.5
2	14
2.5	17
3	21
3.5	24
4	27
5	34
6	41
7	48
7.25	49
8	54
9	61
10	68
11	75
12	81

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 3.5-inch thicknesses.

² R-Values greater than 10 are rounded to the nearest whole number.



UNIFORM EVALUATION SERVICES



PRODUCT CERTIFICATION BODY



3.2.2 Surface Burning Characteristics: At a maximum thickness of 3¹/₂ inches (89 mm) and a nominal density of 2.1 pcf (16 kg/m³), the NSF Polymers R-MAX Spray Foam Insulation has a flame spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84.

3.2.3 Water Vapor Transmission: When tested to the requirements of ASTM E96, desiccant method (Procedure A), NSF Polymers R-MAX has a permeance of less than 1.0 perm (57.4 x 10⁹ g/Pa·s·m) at a minimum thickness of 1.4 inches (35.6 mm) and qualifies as a Class II vapor retarder in accordance with IBC Section 202 and IRC Section R202.

3.3 Installation:

3.3.1 Installation General: The manufacturer's published installation instructions for NSF Polymers R-MAX spray foam insulation and this report shall be available and strictly adhered to at all times on the jobsite during installation.

The spray foam insulation shall be spray-applied on the jobsite using a volumetric positive displacement pump in accordance with the manufacturer's published installation instructions. NSF Polymers R-MAX shall be sprayed in multiple passes having a maximum thickness of 3.5 inches (89 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 continuous contact with rain or water. The spray-applied foam plastic insulations shall be sprayed onto a substrate that is protected and clean from any debris or weather-related conditions during application.

After the application of the spray foam, a minimum of a 1-hour ventilation period at 10 air changes per hour is required before re-entry of the space for unprotected workers. An additional 1-hour ventilation period is required for re-occupancy by the general population.

3.3.2 Thermal Barrier

3.3.2.1 Installation with a Prescriptive Thermal Barrier: NSF Polymers R-MAX spray foam insulation, up to a maximum thickness of 3¹/₂ inches (89 mm), 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 barrier shall comply with and be installed in accordance with IBC Section 2603.4 or IRC Section R316.4, as applicable.

3.3.2.2 Alternative Thermal Barrier Assemblies: NSF Polymers R-MAX spray-applied polyurethane foam plastic insulation may be installed without a prescriptive thermal barrier as defined in Section 3.3.2.1 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.

3.3.3 Installation for Attics and Crawl Spaces: When used in an attic or crawl space where entry is made only for service of utilities, NSF Polymers R-MAX spray foam insulation shall be installed in accordance with this section. The insulation shall be separated from the interior of the building by an approved thermal barrier as described in Section 3.3.2 of this report, as applicable, except as noted in Section 3.3.5 of this report.

3.3.4 Installation with a Prescriptive Ignition Barrier: Where entry is made only for the service of utilities, NSF Polymers R-MAX spray foam insulation may 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.

3.3.4.1 Installation in Attics and Crawl Spaces without an Ignition Barrier: NSF Polymers R-MAX spray-applied polyurethane foam plastic insulation may be installed in attics and crawl spaces without a prescriptive ignition barrier or fire-protective coating 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, and 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
- IRC Section R806.5

Unvented crawl spaces shall meet the requirements of Section 3.3.5 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
- IRC Section R408.1

- e. NSF Polymers R-MAX spray-applied polyurethane foam plastic insulation may be applied at a nominal density of 2.2 pcf to the underside of roof sheathing or



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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 NSF Polymers R-MAX spray-applied polyurethane foam plastic insulation shall not exceed 10 inches (254 mm), and when applied to vertical surfaces or floor, the maximum thickness shall not exceed 8 inches (203 mm).

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

3.3.5 Unvented Attics: NSF Polymers R-MAX spray foam insulation may be installed in unvented attic assemblies and unvented enclosed rafter assemblies in accordance with Section 1202.3 of the 2021 or 2018 IBC, Section 1203.3 of the 2015 IBC, or Section R806.5 of the IRC, as applicable.

4.0 PRODUCT DESCRIPTION

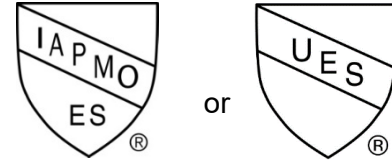
NSF Polymers R-MAX spray foam insulation is a spray-applied, polyurethane closed cell foam plastic and complies as a medium-density insulation in accordance with Section 3.1.1 and Table 1 of AC377. The insulation is a two-component spray foam plastic with a nominal in-place density of 2.1 pcf (67 kg/m³).

The spray-applied insulation is mixed in the field by combining a polymeric isocyanate (A component) and a resin blend (B component). The liquid components shall be stored in 55-gallon (208 L) drums at temperatures between 60°F and 90°F (16°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 six months.

5.0 IDENTIFICATION

NSF Polymers R-MAX spray foam insulation’s containers are identified by the manufacturer’s name (NSF Polymers) address and telephone number, product name, use instructions, density, flame-spread and smoke-development indices, date of manufacture, and evaluation report number (ER-868).

The identification may also include either of the IAPMO Uniform Evaluation Service Marks of Conformity as shown below:



IAPMO UES ER-868

6.0 SUBSTANTIATING DATA

6.1 Manufacturer’s descriptive literature and installation instructions.

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

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

6.4 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 NSF Polymers R-MAX spray foam insulations to assess its conformance to the codes shown in Section 1.0 of this report and documents the product’s certification. Products are manufactured 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 ASSEMBLIES^{1,5}**

FIRE-PROTECTIVE COATING/COVERING			MAXIMUM SPF THICKNESS (inch)	
TYPE	MINIMUM THICKNESS (mils)	THEORETICAL APPLICATION RATE	WALLS AND VERTICAL SURFACES	CEILING AND OVERHEAD SURFACES
60-60A ²	14 WFT (9 DFT)	0.87 gal/100 ft ²	7.5	9.5
DC315 ³	14 WFT (9 DFT)	0.87 gal/100 ft ²	7.5	9.5
Plus ThB ⁴	14 WFT (9 DFT)	0.87 gal/100 ft ²	7.5	9.5

For SI: 1 inch = 25.4 mm, 1 mil = 0.0254 mm, 1 gal = 3.79 L

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 Flame Control Coatings, recognized in IAPMO UES ER-596.

³ International Fireproof Technology Inc., recognized in IAPMO UES ER-499.

⁴ No-Burn, Inc., recognized in IAPMO UES ER-305.

⁵ Assemblies were tested to the requirements of NFPA 286.