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### **THERMOSEAL ONE AND THERMOSEAL MAX CLOSED CELL SPRAY-APPLIED FOAM PLASTIC INSULATIONS**

#### **CSI Section:**

**07 21 00 Thermal Insulation**

#### **1.0 RECOGNITION**

Thermoseal ONE and Thermoseal Max recognized in this report have been evaluated for use as spray-applied polyurethane foam plastic (SPF) insulations and are used as a nonstructural thermal insulating material in Type V construction under the IBC and dwellings under the IRC. The surface-burning characteristics, physical properties, thermal resistance and water vapor transmission properties of Thermoseal ONE and Thermoseal Max comply with the intent of the provisions 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 Thermoseal ONE and Thermoseal Max recognized in this report is subject to the following limitations:

**2.1** The insulations and coating products shall be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. Where conflicts occur, the most restrictive requirements shall govern.

**2.2** Thermoseal ONE and Thermoseal Max closed-cell spray-applied polyurethane foam insulations shall be installed by contractors certified by Thermoseal, LLC.

**2.3** Use of Thermoseal ONE and Thermoseal Max closed-cell spray-applied polyurethane foam insulations in areas where the likelihood of termite infestation is “very heavy,” shall be installed in accordance with IBC Section 2603.8 (2012 IBC Section 2603.9) or IRC Section R318.4, as applicable.

**2.4** Jobsite labeling, and certification of the insulations shall comply with IBC Section 2603.2, 2021, 2018 and 2015 IRC Sections N1101.10 and N1101.10.1.1, 2012 IRC Sections N1101.12 and N1101.12.1, IRC Sections N1101.4 and N1101.4.1 and IECC Sections C303.1.1 and C303.1.2, as applicable.

**2.5** Where applicable, Thermoseal ONE and Thermoseal Max closed-cell spray-applied polyurethane foam insulations shall be installed with a vapor retarder in accordance with the applicable code. (See Section 3.3)

**2.6** Except as indicated in Section 3.3.3.2 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.

**2.7** During installation the insulations and the surfaces to which they are applied shall be protected from exposure to weather.

**2.8** The spray-foam insulations recognized in this report are produced in Norwalk, Connecticut.

#### **3.0 PRODUCT USE**

**3.1 General:** Thermoseal ONE and Thermoseal Max are spray-applied polyurethane foam plastic (SPF) insulations and are used as a nonstructural thermal insulating materials in Type V construction under the IBC and dwellings under the IRC. The insulation complies with IBC Section 2603, IRC Section R316 and IECC Sections C303, C402, R303; and R402.

#### **3.2 Design:**

**3.2.1 Surface Burning Characteristics:** The Thermoseal ONE closed-cell spray-applied polyurethane foam insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 2.45 pcf (32.0 kg/m<sup>3</sup>), 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.

The Thermoseal Max closed-cell spray-applied polyurethane foam insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 1.80 pcf (28.8 kg/m<sup>3</sup>), 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.

Thicknesses of Thermoseal ONE and Thermoseal Max are not limited for ceiling cavities and wall cavities when covered by a code complying prescriptive thermal barrier, such as minimum ½-inch thick (12.7 mm) gypsum board.

*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.*





**3.2.2 Thermal Resistance:** For uses in accordance with the IECC or other codes, Thermoseal ONE and Thermoseal Max closed-cell spray-applied polyurethane foam insulations have 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)<sup>1</sup>**

Thickness (inch)	R-Value (°F·ft <sup>2</sup> ·hr/Btu)	R-Value (°F·ft <sup>2</sup> ·hr/Btu)
	Thermoseal ONE	Thermoseal Max
1.0	7.1	7.1
3.5	25	24
4.0	28	27
5.5	39	37
7.5	53	51
9.5	67	64
11.5	81	78
14	99	95

SI: 1 inch = 25.4 mm; 1 °F·ft<sup>2</sup>·hr/Btu = 0.176 °K·m<sup>2</sup>·hr/W

<sup>1</sup> R-values are calculated based on tested k-factors at 1- and 3.5-inch thicknesses.

**3.2.3 Vapor Retarder:** Thermoseal ONE closed-cell spray-applied polyurethane foam insulation has a vapor permeance of 0.85 perm (48.5 ng/Pa·s·m<sup>2</sup>), when applied at a minimum thickness of 1.5 inches (38.1 mm) and qualifies as a Class II vapor retarder as defined in IRC Section R202.

Thermoseal Max closed-cell spray-applied polyurethane foam insulation has a vapor permeance of 0.99 perm (56.5 ng/Pa·s·m<sup>2</sup>), when applied at a minimum thickness of 1.65 inches (41.9 mm) and qualifies as a Class II vapor retarder as defined in IRC Section R202.

### 3.3 Installation:

**3.3.1 Installation General:** Thermoseal ONE and Thermoseal Max closed-cell spray-applied polyurethane foam insulations shall be installed in accordance with the manufacturer's published installation instructions and this report. A copy of these instructions and this evaluation report shall be available on the jobsite at all times during installation. Where conflicts occur, the more restrictive shall govern.

**3.3.2 Application:** Thermoseal ONE and Thermoseal Max closed-cell spray-applied polyurethane foam insulations shall be applied using spray equipment specified by Thermoseal, LLC.

### 3.3.3 Thermal Barrier:

**3.3.3.1 Application with a Prescriptive Thermal Barrier:** Thermoseal ONE and Thermoseal Max closed-cell spray-applied polyurethane foam insulation must be separated from the interior of the building by an approved thermal barrier of 1/2-inch-thick (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier complying with and installed in accordance with the applicable code.

**3.3.3.2 Application with an Alternative Thermal Barrier Assembly:** Thermoseal ONE closed-cell spray-applied polyurethane foam insulation when used with DC315 intumescent coating, as recognized in ER-499, as an alternative thermal barrier assembly as described in this section, may be spray-applied to the interior facing of walls and may be left exposed as an interior finish without a prescribed 15-minute prescriptive thermal barrier. The thickness of the foam plastic applied to the underside of the ceiling or other horizontal spaces shall not exceed 9.5 inches (241.3 mm). The thickness of the foam plastic applied to vertical wall surfaces shall not exceed 5.5 inches (139.7 mm). The foam plastic must be covered on all surfaces with DC315 Fireproof Paint at a minimum wet film thickness of 20 mils (13 mils dry film thickness), at a rate of 1.3 gallons (4.7 L) per 100 square feet (9.2 m<sup>2</sup>). The coating must be applied over the Thermoseal ONE closed-cell spray-applied polyurethane foam insulation in accordance with the coating manufacturer's installation instructions and this report. Surfaces to be coated shall be dry, clean and free of dirt, loose debris, and other substances that could interfere with adhesion of the coating.

### 3.3.4 Attics and Crawl Spaces:

**3.3.4.1 Application with a Prescriptive Ignition Barrier:** When Thermoseal ONE or Thermoseal Max closed-cell spray-applied polyurethane foam insulation is installed within attics or crawl spaces where entry is made only for service of utilities, an ignition barrier shall be installed 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 consistent with the requirements for the type of construction required by the applicable code and shall be installed in a manner so that the foam plastic insulation is not exposed.

Thermoseal ONE and Thermoseal Max closed-cell spray-applied polyurethane foam insulations, as described in this section, may be installed in unvented attics in accordance with IBC Section 2603.4 or IRC Section R806.4, as applicable. The attic or crawl space area must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 3.3.3 of this report.

**3.3.4.2 Application with an Alternative Ignition Barrier Assembly:** Where the spray-applied insulation is installed in accordance with the following conditions, the prescriptive ignition barrier as required in Section 3.3.4.1 is not required:

- a) Entry to the attic or crawl space is to service utilities, and no storage is permitted.
- b) There are no interconnected attic or crawl space areas.
- c) Air in the attic or crawl space is not circulated to other parts of the building.
- d) Attic ventilation is provided when required by the 2021 and 2018 IBC Section 1202.2, 2015 and 2012 IBC Section 1203.2 or IRC Section R806, except when air impermeable insulation is permitted in unvented attics



in accordance with Section 1202.3 of the 2018 IBC, Section 1203.3 of the 2015 IBC or the IRC Section R806.5, as applicable. Under-floor (crawl space) ventilation is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.

- e) Combustion air is provided in accordance with International Mechanical Code® Section 701.
- f) Thermoseal ONE closed-cell spray-applied polyurethane foam insulation shall be applied as required in Section 3.3.4.2.1 of this report.
- g) Thermoseal Max closed-cell spray-applied polyurethane foam insulation shall be applied as required in Section 3.3.4.2.2 of this report.

**3.3.4.2.1 Application of Thermoseal ONE for Alternative Ignition Barrier Assembly:** Thermoseal ONE closed-cell spray-applied polyurethane foam insulation may be spray-applied without a fire protective coating to the underside of roof rafters and vertical spaces in attics; and in crawl spaces, Thermoseal ONE closed-cell spray-applied polyurethane foam insulation may be applied to the underside of floors as described in this section. The thickness of the foam plastic applied to the underside of the top space shall not exceed 9 ½ inches (241.3 mm). The thickness of the foam plastic applied to vertical surfaces shall not exceed 5 ½ inches (139.7 mm). The attic and crawl space area must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 3.3.3.

**3.3.4.2.2 Application of Thermoseal Max for Alternative Ignition Barrier Assembly:** Thermoseal Max closed-cell spray-applied polyurethane foam insulation may be spray-applied without a fire protective coating to the underside of roof rafters and vertical spaces in attics; and in crawl spaces, Thermoseal Max closed-cell spray-applied polyurethane foam insulation may be applied to the underside of floors as described in this section. The thickness of the foam plastic applied to the underside of the top space shall not exceed 10 inches (254.0 mm). The thickness of the foam plastic applied to vertical surfaces shall not exceed 6 inches (152.4 mm). The attic and crawl space area must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 3.3.3.

**3.3.4.3 Use on Attic Floors:** The insulations shall have an ignition barrier applied on the surface meeting the requirements of Section 3.3.4.1 or an alternative ignition barrier assembly meeting 3.3.4.2 and shall be separated from the area beneath the attic by an approved thermal barrier. When installed to the requirements of Section 3.3.4.2, Thermoseal ONE closed-cell spray-applied polyurethane foam insulation may be installed at a maximum thickness of 5½ inches (139.7 mm) between joists of the attic floor and Thermoseal Max closed-cell spray-applied polyurethane foam insulation may be installed at a maximum thickness of 6 inches (152.4 mm) between joists of the attic floor.

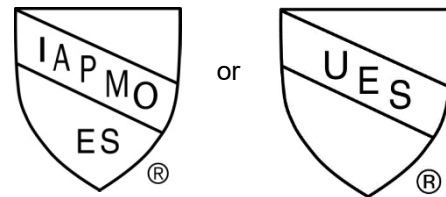
## 4.0 PRODUCT DESCRIPTION

**4.1 Thermoseal ONE:** Thermoseal ONE closed-cell spray-applied polyurethane foam insulation is a medium-density spray-applied, closed cell polyurethane foam plastic insulation having a nominal density of 2.45 pcf (39.2 kg/m³).

**4.2 Thermoseal Max:** Thermoseal Max closed-cell spray-applied polyurethane foam insulation is a medium-density spray-applied, closed cell polyurethane foam plastic insulation having a nominal density of 1.80 pcf (kg/m³).

## 5.0 IDENTIFICATION

Thermoseal ONE and Thermoseal Max are identified by the Thermoseal name and trademark, product name the lot number; the flame spread and smoke developed indices; mixing instructions; the shelf life; the expiration date; and evaluation report number (ER-602). The identification includes the IAPMO Uniform Evaluation Service Mark of Conformity. Either Mark of Conformity may be used as shown:



IAPMO UES ER-602

## 6.0 SUBSTANTIATING DATA

**6.1** Data in accordance with Acceptance Criteria for Spray applied Foam Plastic Insulation (AC377), Approved February 2020.

**6.2** Data in accordance with ICC1100-2019, Standard for Spray-applied Polyurethane Foam Plastic Insulation.

**6.3** Test reports of water vapor transmission tests in accordance with ASTM 96.

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

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

## 7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on Thermoseal ONE and Thermoseal Max to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification. Products are manufactured at the location noted in Section 2.8 of this report 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](http://www.uniform-es.org) or email us at [info@uniform-es.org](mailto:info@uniform-es.org)



## FLORIDA SUPPLEMENT

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#### **CSI Section:**

**07 21 00 Thermal Insulation**

#### **1.0 RECOGNITION**

The Thermoseal ONE and Thermoseal Max closed cell spray-applied foam plastic insulations as evaluated and represented in IAPMO UES Evaluation Report ER-602 and with changes as noted in this supplement is a satisfactory alternative for use in buildings built under the following codes (and regulations):

- 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 Thermoseal ONE and Thermoseal Max closed cell spray-applied foam plastic insulations 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 Section 2603.8 of the FBC, Building or Section 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).

**2.3** This supplement expires concurrently with ER-602.

For additional information about this evaluation report please visit [www.uniform-es.org](http://www.uniform-es.org) or email us at [info@uniform-es.org](mailto:info@uniform-es.org)