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Thermoseal TS 360, TS 500 and TS 800 Open Cell Spray-Applied Foam Plastic Insulations

CSI Section:
07 21 00 Thermal Insulation

1.0 RECOGNITION

Thermoseal TS 360, TS 500 and TS 800 open cell spray-applied polyurethane foam plastic insulation recognized in this report has been evaluated for use as a nonstructural thermal insulating material in Type V construction under the IBC and dwellings constructed under the IRC. The surface burning characteristics and physical and thermal properties comply with the intent of the provisions of the following codes and regulations:

- 2018, 2015 and 2012 International Building Code® (IBC)
- 2018, 2015 and 2012 International Residential Code® (IRC)
- 2018, 2015 and 2012 International Energy Conservation Code® (IECC)
- 2017 Florida Building Code, Building (FBC, Building) – Supplement attached
- 2017 Florida Building Code, Residential (FBC, Residential) – Supplement attached
- 2017 Florida Building Code, Energy Conservation (FBC, Energy Conservation) – Supplement attached

2.0 LIMITATIONS

Use of Thermoseal TS 360, TS 500 and TS 800 recognized in this report is subject to the following limitations:

2.1 The insulation shall be installed in accordance with the applicable code, the manufacturer’s published installation instructions, and this report. Where there is a conflict, the most restrictive requirements shall govern.

2.2 Thermoseal TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulation shall be installed by contractors certified by Thermoseal Inc.

2.3 When Thermoseal TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulations are used in areas where in the likelihood of termite infestation is “very heavy,” it 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 the 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 TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulation shall be installed with a vapor retarder in accordance with the applicable code.

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 insulation recognized in this report is produced in Norwalk, Connecticut.

3.0 PRODUCT USE

3.1 General: Thermoseal TS 360, Thermoseal TS 500, and Thermoseal TS 800 are open cell 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 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

3.2.1.1 Thermoseal TS 360: Thermoseal TS 500 open-cell polyurethane foam plastic insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 0.4 pcf (6.4 kg/m³), 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.

3.2.1.2 Thermoseal TS 500: Thermoseal TS 500 open-cell polyurethane foam plastic insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 0.5 pcf (8.0 kg/m³), 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.

3.2.1.3 Thermoseal TS 800: Thermoseal TS 800 open-cell polyurethane foam plastic insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 0.8 pcf (12.8 kg/m³), 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 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

3.2.2.1 Thermoseal TS 360: For uses in accordance with the IECC or other codes, Thermoseal TS 360 open-cell 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—TS 360 Thermal Resistance (R-Values)¹

Thickness (inch)	R-Value (°F•ft ² •hr/Btu)
1.0	3.9
3.5	13
4.0	14
5.5	20
7.5	27
9.5	34
11.5	41
14	50

SI: 1 inch = 25.4 mm; 1 °F•ft²•hr/Btu = 0.176 °K•m²•hr/W

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

3.2.2.2 Thermoseal TS 500: For uses in accordance with the IECC or other codes, Thermoseal TS 500 open-cell 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 2 of this report.

Table 2—TS 500 Thermal Resistance (R-Values)¹

Thickness (inch)	R-Value (°F•ft ² •hr/Btu)
1.0	4.1
3.5	13
4.0	14
5.5	20
7.5	27
9.5	34
11.5	42
14	51

SI: 1 inch = 25.4 mm; 1 °F•ft²•hr/Btu = 0.176 °K•m²•hr/W

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

3.2.2.3 Thermoseal TS 800: For uses in accordance with the IECC or other codes, Thermoseal TS 800 open-cell 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 3 of this report.

Table 3—TS 800 Thermal Resistance (R-Values)¹

Thickness (inch)	R-Value (°F•ft ² •hr/Btu)
1.0	4.2
4.0	15
5.5	21
7.5	29
9.5	36
11.5	44
14	53

SI: 1 inch = 25.4 mm; 1 °F•ft²•hr/Btu = 0.176 °K•m²•hr/W

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

3.3 Installation:

3.3.1 Installation General: Thermoseal TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic 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 TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulation shall be applied using spray equipment specified by Thermoseal Inc.

3.3.3 Thermal Barrier:

3.3.3.1 Application with a Prescriptive Thermal Barrier: Thermoseal TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulations shall 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 (TS500 and TS 800): Thermoseal TS 500 and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulation and coating may be spray-applied to the interior facing of walls and ceilings and may be left exposed as an interior finish without a prescribed 15-minute thermal barrier. The thickness of Thermoseal TS 500 and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulation applied to the ceiling or other horizontal assembly shall not exceed 14 inches (355.6 mm). The thickness of the foam plastic applied to vertical wall surfaces shall not exceed 8 inches (203.2 mm). The foam plastic shall be covered on all surfaces with DC315 intumescent coating at a minimum wet film thickness of 18 (12 mils dry film thickness), at a rate of 1.1 gallons (4.2 L) per 100 square feet (9.2 m²). The coating shall be applied over the Thermoseal TS 500 and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulation in accordance with the coating manufacturer's 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.

3.3.3.3 Application with an Alternative Thermal Barrier Assembly (TS360): Thermoseal TS 360 open-cell spray-applied polyurethane foam plastic insulation and coating may be spray-applied to the interior facing of walls and ceilings and may be left exposed as an interior finish without a prescribed 15-minute thermal barrier. The thickness of Thermoseal TS 360 open-cell spray-applied polyurethane foam plastic insulation applied to the ceiling or other horizontal assembly shall not exceed 14 inches (355.6 mm).



The thickness of the foam plastic applied to vertical wall surfaces shall not exceed 8 inches (203.2 mm). The foam plastic shall be covered on all surfaces with DC315. The foam plastic shall be covered on all surfaces with DC315 intumescent coating with a minimum wet film thickness of 20 mils (13 dry mils), at a rate of 1.3 gallons (4.9 L) per 100 square feet (9.2 m²). The coating shall be applied over the Thermoseal TS 360 open-cell spray-applied polyurethane foam plastic insulation in accordance with the coating manufacturer's 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 TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulations are 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 TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulation, as described in this section, may be installed in unvented attics in accordance with IRC Section R806.4. The attic or crawl space area shall 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 apply, 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 IBC Section 1203.2 or IRC Section R806, except when air impermeable insulation is permitted in unvented attics in accordance with the 2012 IRC Section R806.5 (2009 IRC Section R806.4). 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) DC315 Intumescent coating is applied as required in Section 3.3.4.2.1 or 3.3.4.2.2, as applicable.

3.3.4.2.1 Thermoseal TS 360: Thermoseal TS 360 open-cell spray-applied polyurethane foam insulation may be spray-applied to the underside of roof rafters; and in crawl spaces, Thermoseal TS 360 open-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 14 inches (355.6 mm). The thickness of the foam plastic applied to vertical surfaces shall not exceed 8 ½ inches (215.9 mm). All foam plastic surfaces shall be covered with DC315 Fireproof Paint described in Section 4.4. The intumescent coating shall be applied over the Thermoseal TS 360 open-cell spray-applied polyurethane foam insulation in accordance with the manufacturer's instructions and this report. The foam plastic insulation must be covered with a wet film thickness of 6 mils (4 dry mils) of DC315 Fireproof Paint coating applied in a single coat at a rate of 0.38 gallons (1.4 L) per 100 square feet (9.2 m²). Surfaces to be coated must be dry, clean and free of dirt, loose debris, and other substances that could interfere with adhesion of the coating. 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 Thermoseal TS 500 and Thermoseal TS 800: In attics, Thermoseal TS 500 and Thermoseal TS 800 open-cell spray-applied polyurethane foam insulation may be spray-applied to the underside of roof rafters; and in crawl spaces, Thermoseal TS 500 and Thermoseal TS 800 open-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 must not exceed 14 inches (355.6 mm). The thickness of the foam plastic applied to vertical surfaces must not exceed 8 inches (203.2 mm). All foam plastic surfaces must be covered with DC315 Fireproof Paint described in Section 4.4. The intumescent coating must be applied over the Thermoseal TS 500 and Thermoseal TS 800 open-cell spray-applied polyurethane foam insulation in accordance with the manufacturer's instructions and this report. The foam plastic insulation must be covered with 18 wet mils (12 dry mils) of DC315 Fireproof Paint coating applied in a single coat at a rate of 1.2 gallons (4.2 L) per 100 square feet (9.2 m²). Surfaces to be coated must be dry, clean and free of dirt, loose debris, and other substances that could interfere with adhesion of the coating. 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 of this report.

3.3.4.3 Use on Attic Floors: Thermoseal TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell spray-applied polyurethane foam insulation may be installed at a maximum thickness of 14 inches (355.6 mm) between joists of the attic floor. The insulation shall have an ignition barrier applied on the surface meeting the requirements of Section



3.3.4.1 or 3.3.4.2 and shall be separated from the area beneath the attic by an approved thermal barrier.

4.0 PRODUCT DESCRIPTION

4.1 Thermoseal TS 360 Insulation: Thermoseal TS 360 is a two-part low-density spray-applied, open-cell polyurethane foam plastic insulation having a nominal density of 0.4 pcf (6.4 kg/m³). The two components of the insulation are polymeric isocyanate (A-Component) and proprietary resin (B-Component, Thermoseal TS 360).

4.2 Thermoseal TS 500 Insulation: Thermoseal TS 500 is a two-part low-density spray-applied, open-cell polyurethane foam plastic insulation having a nominal density of 0.5 pcf (8.0 kg/m³). The two components of the insulation are polymeric isocyanate (A-Component) and proprietary resin (B-Component, Thermoseal TS 500).

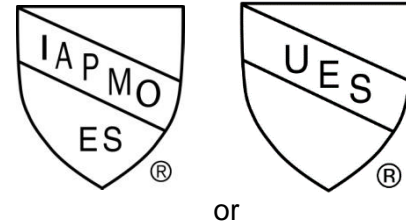
4.3 Thermoseal TS 800 Insulation: Thermoseal TS 800 is a two-part low-density spray-applied, open-cell polyurethane foam plastic insulation having a nominal density of 0.8 pcf (12.8 kg/m³). The two components of the insulation are polymeric isocyanate (A-Component) and proprietary resin (B-Component, Thermoseal TS 800).

4.4 DC315 Intumescent Coating: DC315 Fireproof Paint, recognized in ER-499, is manufactured by International Fireproof Technology, Inc. as a water-based coating supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums. The coating material has a shelf life of 24 months when stored in factory-sealed containers at temperatures between 50°F (10°C) and 90°F (32°C).

5.0 IDENTIFICATION

Thermoseal TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell spray-applied polyurethane foam plastic insulation components are identified by the Thermoseal name and trademark, product name address; the product trade name (Thermoseal TS 360, Thermoseal TS 500, Thermoseal TS 800); the lot number; the flame spread and smoke developed indices; mixing instructions; the shelf life; the expiration date; and the IAPMO Uniform ES Evaluation Report number (ER-603).

The identification includes the IAPMO Uniform Evaluation Service Mark of Conformity. Either Mark of Conformity may be used as shown below:



IAPMO UES ER-603

6.0 SUBSTANTIATING DATA

Data and test reports submitted are from laboratories in compliance with ISO/IEC 17025 and in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation, (AC377), Approved April 2016, (Editorially Revised in April 2018).

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on Thermoseal's Thermoseal TS 360, Thermoseal TS 500, and Thermoseal TS 800 open-cell 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. Products are manufactured at locations noted in Section 2.8 of this report under a quality control program with periodic inspection under the surveillance program by IAPMO UES.

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



FLORIDA SUPPLEMENT

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1.0 RECOGNITION

The Thermoseal TS 360, TS 500 and TS 800 open cell spray-applied foam plastic insulations as evaluated and represented in IAPMO UES Evaluation Report ER-603 and with changes as noted in this supplement is a satisfactory alternative for use in buildings built under the following codes (and regulations):

- 2017 Florida Building Code, Building, (FBC, Building)
- 2017 Florida Building Code, Residential (FBC, Residential)
- 2017 Florida Building Code, Energy Conservation (FBC, Energy Conservation)

2.0 LIMITATIONS

Use of Thermoseal TS 360, TS 500 and TS 800 open 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).

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