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### FOAMSULATE™ 50 SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

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

#### 1.0 RECOGNITION

Foamsulate™ 50 spray-applied polyurethane foam plastic insulation described in this report has been evaluated for use as thermal insulation and for use in Types I through V construction. The physical properties, thermal resistance, surface burning characteristics, air permeability, fire-resistance-rating, construction type, attic and crawl space installations were evaluated for compliance with the following codes and regulations:

- 2018, 2015, 2012 2009, and 2006 International Building Code® (IBC)
- 2018, 2015, 2012 2009, and 2006 International Residential Code® (IRC)
- 2018, 2015, 2012 2009, and 2006 International Energy Conservation Code® (IECC)
- 2017 and 2014 Florida Building Code, Building (FBC, Building) – Supplement attached
- 2017 and 2014 Florida Building Code, Residential (FBC, Residential) – Supplement attached

#### 2.0 LIMITATIONS

Use of Foamsulate™ 50 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 Sections 4.6.1 and 4.6.2 of this report, the insulation shall be separated from the interior of the building by a code-complying thermal barrier or ignition barrier as appropriate.
- 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 insulations shall be installed by professional spray polyurethane foam installers approved by Carlisle Spray Foam Insulation, Accella Polyurethane Systems, LLC, 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 2018 and 2015 IBC Section 2603.8, 2012 IBC Section 2603.9, 2009 or 2006 IBC Section 2603.8, or 2018, 2015, 2012 and 2009 IRC Section R318.4, or 2006 IRC Section R320.5, as applicable.

**2.7** When required by the applicable code, a vapor retarder shall be installed.

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

- 2018, 2015, 2012 or 2009 IBC Section 2603.2
- 2018, 2015, 2012 or 2009 IRC Section R316.2
- 2018, 2015 IRC Section N1101.10.1.1
- 2012 IRC Section N1101.12.1.1
- 2009 IRC Section N1101.4.1
- 2018, 2015 or 2012 IECC Sections C303.1.1.1 or R303.1.1.1
- 2009 IECC Section 303.1.1.1

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

**2.10** The insulation recognized in this report is produced in Cartersville, Georgia.

#### 3.0 PRODUCT USE

Foamsulate™ 50 spray-applied polyurethane foam plastic insulation complies with IBC Section 2603, IRC Section R316 (2006 IRC Section R314), 2015 and 2012 IECC Sections C303, C402, R303, and R402, 2009 IECC Sections 303 and 402, and 2006 IECC Section 402. When installed in accordance with Section 4.0 of this report, the foam plastic insulation may be used in wall cavities, floor assemblies or ceiling assemblies, and/or in attics and crawl spaces as nonstructural thermal insulation material. Foamsulate™ 50 spray-applied polyurethane foam plastic insulation is used in Type V-B construction under the IBC and in one- and two-family dwellings under the IRC.

Foamsulate™ 50 insulation may also be used in Types I, II, III or IV construction when installed in accordance with Section 4.6.3 of this report. Foamsulate™ 50 Spray-applied Foam Plastic insulation may be used as air impermeable insulation when installed in accordance with Section 4.4 of this report.

#### 4.0 PRODUCT DESCRIPTION

**4.1 Properties:** Foamsulate™ 50 is an open cell, low-density, 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 0.5 pcf (8 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 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.





The liquid components shall be stored in 55-gallon (208 L) drums at temperatures between 65°F and 85°F (18°C and 29°C). When Component A and Component B are stored in factory-sealed containers at the recommended temperatures, the maximum shelf life is six months.

**4.2 Thermal Resistance (R-Values):** Foamsulate™ 50 spray-applied polyurethane foam plastic insulation have 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> ·h/Btu)
1	3.7
2	7.3
3.5	13
4	15
5	19
5.5	20
6	22
7	26
7.5	28
8	30
9	33
9.5	35
10	37
11.5	43

For SI: 1 inch = 25.4 mm, 1°F·ft<sup>2</sup>·h/Btu = 0.176 110 K·m<sup>2</sup>/W.  
<sup>1</sup>R-Values are calculated based on tested K values at 1-inch and 3.5-inch thicknesses for Foamsulate™ 50.

**4.3 Surface Burning Characteristics:** At a maximum thickness of 4 inches (102 mm) and a nominal density of 0.5 pcf (8.0 kg/m<sup>3</sup>) for Foamsulate™ 50 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.

**4.4 Air Permeability:** Foamsulate™ 50 is classified as air-impermeable insulation when tested in accordance with ASTM E283 at a minimum thickness of 3½ inches (89 mm) for Foamsulate 50 in accordance with 2018 IBC 1202.3, 2015 IBC Section 1203.3, 2018, 2015 and 2012 IRC Section R806.5 and 2009 and 2006 IRC Section R806.4.

**4.5 Fire-Protective Coatings and Coverings:** Fire protective coatings for use as part of alternative thermal barrier assemblies or alternative ignition barrier assemblies, shall be as described in Tables 2 or 3 of this report, as applicable, and installed in accordance with Section 4.6 of this report.

**4.6 Installation:** Foamsulate™ 50 spray-applied polyurethane foam plastic insulation shall comply with one of the following requirements:

- 2018, 2015, 2012 IECC Sections C402.1 (prescriptive)
- 2018, 2015, 2012 IECC Section R407 (performance)
- 2009 IECC Sections 402, 405, 502 or 506 as appropriate.

The manufacturer’s published installation instructions for Foamsulate™ 50 insulation, as applicable, and this report shall be available on the jobsite during installation..

Foamsulate™ 50 spray-applied polyurethane foam plastic insulation shall be spray-applied on the jobsite using equipment specified in the manufacturer’s published installation instructions. The insulation is applied in multiple passes having a maximum thickness of 6 inches (152 mm) per pass up to the maximum insulation thickness specified in this report. The spray-applied foam plastic insulation shall be allowed to fully expand and cure for a minimum of 10 minutes prior to application of additional passes. The maximum in-service temperature for all areas shall not exceed 180°F (82°C) as specified 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, water, or soil.

### 4.6.1 Thermal Barrier

**4.6.1.1 Application with a Prescriptive Thermal Barrier:** Foamsulate™ 50 Spray-Applied Polyurethane Foam Plastic Insulation, at any thickness, in ceiling cavities and in wall cavities shall be separated from the interior by an approved thermal barrier of minimum ½ inch thick (12.7 mm) gypsum wallboard or equivalent 15-minute thermal barrier. The thermal barrier shall comply with and be installed in accordance with the 2018 and 2015 editions IBC Section 2603.4, or the 2018, 2015, 2012 and 2009 IRC Section R316.4 or 2006 IRC Section R314.4, as applicable.

**4.6.1.2 Alternative Thermal Barrier Assemblies:** Foamsulate™ 50 spray applied foam plastic insulation may be installed without a prescriptive thermal barrier as defined in Section 4.6.1.1 of this report when installed using a coating in accordance with Section 4.5 of this report as part of an alternative thermal barrier assembly.

**4.6.2 Installation in Attics or Crawl Spaces:** Foamsulate™ 50 spray-applied polyurethane foam plastic insulation may be installed in attics or crawl spaces when installed in accordance with this section (Section 4.6.2). The insulation may be installed in unvented attics and unvented enclosed rafter spaces for use as air-impermeable insulation described in Section 4.4 of this report.

When installed in attics or crawl spaces, Foamsulate™ 50 insulation shall be separated from the interior of the



building by a code prescribed thermal barrier or ignition barrier, as applicable, or by one of the non-prescriptive fire-retardant coatings described in Section 4.5. When one of these fire-retardant coatings is installed as a thermal barrier, the ignition barrier specified in 2018 or 2015 IBC Section 2603.4.1.6, or 2018, 2015, 2012 or 2009 IRC Sections R316.5.3 and R316.5.4 or 2006 IRC Sections R314.5.3 and R314.5.4, as applicable, may be omitted.

When installed in attics or crawl spaces where entry is made only for the service of utilities, Foamsulate™ 50 insulation may be installed in accordance with this section. Foamsulate™ 50 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 4.6.1.1 or Section 4.6.1.2 of this report.

**4.6.2.1 Installation Using a Prescriptive Ignition Barrier:** When installed within attics or crawl spaces where entry is made only for the service of utilities, Foamsulate™ 50 spray-applied polyurethane foam plastic insulation, at a maximum of 4 inches (102 mm) thick shall be covered with a prescriptive ignition barrier in accordance with 2018 or 2015 IBC Section 2603.4.1.6, 2018, 2015, 2012 or 2009 IRC Sections R316.5.3 and R316.5.4 or 2006 IRC Sections R314.5.3 and R314.5.4, as applicable.

Exception: The prescriptive ignition barrier may be omitted when installed in accordance with Section 4.6.2.2 or Section 4.6.2.3 of this report.

**4.6.2.2 Installation Using an Alternative Ignition Barrier Assembly:** Foamsulate™ 50 Spray-applied Polyurethane Foam Plastic Insulation may be installed in attics and crawl spaces using an alternative ignition barrier assembly 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 2018 IBC Section 1202 or 2018 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:

- 2018 IBC Section 1202.3
- 2015 IBC Section 1203.3
- 2018, 2015 and 2012 IRC Section R806.5
- 2009 IRC Section R806.4

Crawl space ventilation is provided as required by the following code sections as applicable:

- 2018 IBC Section 1202.4
- 2015 IBC Section 1203.4
- 2012, 2009 and 2006 IBC Section 1203.3
- 2018, 2015, 2012, 2009 and 2006 IRC Section R408.1

- The foam plastic insulation is limited to the maximum thickness and density tested as noted in Table 3
- In accordance with the Uniform Mechanical Code (UMC) Section 701.1 or IMC (International Mechanical Code®) Section 701, [2006 IMC Sections 701 and 703], combustion air is provided.
- The installed coverage rate or thickness of coatings shall be as described in Section 4.6.2.3 of this report.

**4.6.2.3 Installation Using an Alternative Ignition Barrier with Application of Fire-Protective Coatings:** Foamsulate™ 50 spray-applied polyurethane foam plastic insulation may be spray-applied in attics to the underside of roof sheathing or roof rafters, and vertical surfaces; and may be spray-applied in crawl spaces to the underside of floors and vertical surfaces as described in this section.

Foamsulate™ 50 foam plastic insulation shall be covered with a fire-retardant intumescent coating described in Table 3 of this report. The coating shall be applied over the insulation using airless spray equipment, roller, or a brush in accordance with the coating manufacturer's published installation instructions and this report. The ambient and substrate temperatures shall be within a range of 50°F (10°C) to 90°F (32°C), and the surface shall be dry, clean, free of dirt and loose debris, and any other substance that could interfere with adhesion of the coating.

**4.6.3 Exterior Walls of Types I, II, III or IV Construction (IBC)**

**4.6.3.1 General:** When used on non-loadbearing exterior walls of Types I, II, III or IV construction, the assembly shall comply with IBC Section 2603.5 and this section. Walls required to be fire-resistance rated construction are beyond the scope of this report and shall comply with IBC Section 2603.5.1.

**4.6.3.2 Base Wall:** Studs shall be 3<sup>5</sup>/<sub>8</sub>-inch-deep (92 mm), No. 25 gage, C-channel steel studs spaced at maximum 24 inches (610 mm) on center, laterally braced at 4 feet (1220 mm) on center maximum. The studs shall be fastened in accordance with the requirements of the IBC. Nominal 4 pcf (64 kg/m<sup>3</sup>) mineral wool safing complying with ASTM C665 shall be placed at floor lines, filling the cavities the full floor depth. The stud cavity shall be filled with Foamsulate™ 50 spray-applied polyurethane foam plastic insulation to a maximum thickness of 3<sup>5</sup>/<sub>8</sub> inches (92 mm).



**4.6.3.3 Interior Face:** Type X gypsum board,  $\frac{5}{8}$  inch (15.9 mm) thick, complying with ASTM C1396 shall be installed with the long dimension parallel to the studs, with the sheathing joints backed by framing. The wallboard shall be fastened in accordance with the requirements of the IBC. The gypsum board joints shall be treated with joint compound complying with ASTM C475 using a minimum 2-inch-wide (51 mm) tape.

**4.6.3.4 Exterior Face:** Georgia Pacific DensGlass® Sheathing,  $\frac{5}{8}$  inch (15.9 mm) thick complying with ASTM C1177 shall be installed horizontally with joints staggered over the exterior side of the steel studs in accordance with the sheathing manufacturer's published installation instructions. The sheathing joints shall be backed by framing.

**4.7 One-Hour, Fire-Resistance-Rated, Non-load-bearing Wall Assembly:** Foamsulate™ 50 spray-applied polyurethane foam plastic insulation may be used as part of a non-load-bearing, 1-hour, fire-resistance-rated wall assembly when installed in accordance with this section.

**4.7.1 Framing:** The framing shall be 2 by 6 No. 1 SYP lumber spaced at maximum 16 inches (406 mm) on center, secured to single top and bottom plates using two 16d framing nails at each location.

**4.7.2 Wallboard:**  $\frac{5}{8}$ -inch-thick (15.9 mm) Type X gypsum wallboard shall be installed perpendicular to the studs on the interior and exterior faces of the framing. The wall board shall be installed using  $1\frac{5}{8}$ -inch-long coarse-thread drywall screws at 8 inches (203 mm) on center at the panel edges and 12 inches (305 mm) on center in the field. The seams and fasteners shall be brought to a GA-214 Level 2 finish.

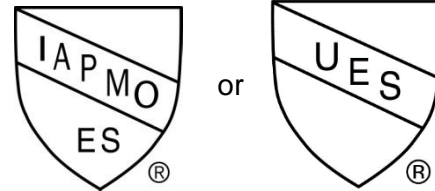
**4.7.3 Insulation:** The cavities shall be filled with Foamsulate™ 50 spray-applied polyurethane foam plastic insulation installed in accordance with the manufacturer's published installation instructions.

## 5.0 IDENTIFICATION

The spray foam insulation is identified with the following:

- a. Manufacturer's name (Carlisle Spray Foam Insulation)
- b. address and telephone number,
- c. the product trade name (Foamsulate™ 50 )
- 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-351)

Either mark of conformity may be used as shown below:



## IAPMO UES ER-351

## 6.0 SUBSTANTIATING DATA

**6.1** Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation, AC377, dated April 2016 (Editorially Revised April 2018), including Appendix X. Test results are from laboratories in compliance with ISO/IEC 17025.

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

**6.3** Reports of Fire Tests of Building Construction in accordance with ASTM E119.

**6.4** Reports of air permeance testing in accordance with ASTM E283.

**6.5** Reports of potential heat of building materials and flammability characteristics in accordance with NFPA 259.

**6.6** Report of fire propagation in accordance with NFPA 285.

**6.7** Report of room corner fire testing in accordance with UL 1715.



## 7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research carried out by IAPMO Uniform Evaluation Service on Foamsulate™ 50 to assess their conformance to the codes and standards shown in Section 1.0 of this report and documents the products' certification. Products are manufactured at locations noted in Section 2.10 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

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<b>TABLE 2 - ALTERNATIVE THERMAL BARRIER ASSEMBLIES</b>				
<b>FIRE-PROTECTIVE COATING/COVERING<sup>1</sup></b>			<b>MAXIMUM SPF THICKNESS (inch)</b>	
<b>TYPE</b>	<b>MINIMUM THICKNESS (mils)</b>	<b>THEORETICAL APPLICATION RATE</b>	<b>WALLS AND VERTICAL SURFACES</b>	<b>CEILING AND OVERHEAD SURFACES</b>
DC315 <sup>2</sup>	14 WFT (9 DFT)	115 ft <sup>2</sup> /gal.	8.5	11.5
PlusThB <sup>3</sup>	14 WFT (9 DFT)	115 ft <sup>2</sup> /gal.	8.5	14

For SI: 1 inch = 25.4 mm, 1 gallon = 3.785 L, 1 ft<sup>2</sup> = 0.0929 m<sup>2</sup>

<sup>1</sup> 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.

<sup>2</sup> International Fireproof Technology, Inc, recognized in [IAPMO UES ER-499](#).

<sup>3</sup> No-Burn, Inc., recognized in [IAPMO UES ER-305](#) and tested to the requirements of UL1715.

<b>TABLE 3 - ALTERNATIVE IGNITION BARRIER ASSEMBLIES</b>				
<b>FIRE-PROTECTIVE COATING/COVERAGE<sup>1</sup></b>			<b>MAXIMUM SPF THICKNESS (inch)</b>	
<b>TYPE</b>	<b>MINIMUM THICKNESS (mils)</b>	<b>THEORETICAL APPLICATION RATE</b>	<b>WALLS AND VERTICAL SURFACES</b>	<b>CEILING AND OVERHEAD SURFACES</b>
DC315 <sup>2</sup>	4 WFT (3 DFT)	400 ft <sup>2</sup> /gal.	8	11.5
Plus XD or Plus ThB <sup>3</sup>	6 WFT (4 DFT)	267 ft <sup>2</sup> /gal.	11.25	16

For SI: 1 inch = 25.4 mm, 1 gallon = 3.785 L, 1 ft<sup>2</sup> = 0.0929 m<sup>2</sup>

<sup>1</sup> Fire-protective coatings and coverings must be applied over all exposed SPF surfaces in accordance with the coating/covering manufacturer's instructions and this report.

<sup>2</sup> International Fireproof Technology, Inc, recognized in [IAPMO UES ER-499](#).

<sup>3</sup> No-Burn, Inc., recognized in [IAPMO UES ER-305](#).



## FLORIDA SUPPLEMENT

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**POLYURETHANE FOAM PLASTIC**  
**INSULATIONS**

CSI Section:  
07 21 00 Thermal Insulation

### 1.0 SCOPE OF EVALUATION

- 2017 and 2014 Florida Building Code, Building (FBC, Building)
- 2017 and 2014 Florida Building Code, Residential (FBC, Residential)

### 2.0 FINDINGS

Foamsulate™ 50 Spray-applied Polyurethane Foam Plastic Insulations reported in IAPMO UES Evaluation Report ER-351 are satisfactory building product alternatives to those prescribed in the 2014 and 2017 FBC, Building, and the 2014 and 2017 FRC, Residential. Installation of the foam plastic insulations shall be in accordance with the 2012 or 2015 International Building Code and the 2012 or 2015 International Residential Code as noted in ER-351.

Foamsulate™ 50 Insulations comply with the high-velocity hurricane zone provisions of the FBC, Building, and FBC, Residential.

### 3.0 LIMITATIONS

Use of Foamsulate™ 50 Spray-applied Polyurethane Foam Plastic Insulation recognized in this report supplement is subject to the following limitations:

**3.1** In order to provide for inspection for termite infestation, clearance between exterior wall coverings and final earth grade on the exterior of a building shall not be less than 6 inches (152 mm) in accordance with Section 1403.7 of the FBC, Building or Section R704 of the FRC, Residential.

**3.2** For products falling under Florida Rule 61G20-3.001, 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](http://www.uniform-es.org) or email us at [info@uniform-es.org](mailto:info@uniform-es.org)