



## EVALUATION SUBJECT: FOAMSULATE 50 AND FOAMSULATE 210 SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

### REPORT HOLDER:

Accella Polyurethane Systems  
100 Enterprise Drive  
Cartersville, GA 30120  
(770) 607-0755

CSI Division: 07 THERMAL AND MOISTURE  
PROTECTION

CSI Section: 07 21 00 Thermal Insulation

## 1.0 SCOPE OF EVALUATION

### 1.1 Compliance to the following codes & regulations:

- 2015, 2012, 2009, and 2006 International Building Code® (IBC)
- 2015, 2012, 2009, and 2006 International Residential Code® (IRC)
- 2015, 2012, 2009, and 2006 International Energy Conservation Code® (IECC)
- See Florida Supplement following this report for additional compliance statement

### 1.2 Evaluated in accordance with:

- ICC-ES AC377, approved April 2016

### 1.3 Properties assessed:

- Physical Properties
- Thermal Resistance (R-Values)
- Surface Burning Characteristics
- Air Permeability
- Attic and crawl space installations
- Construction Types I, II, III, and IV
- Fire-resistance Rating

## 2.0 PRODUCT USE

Foamsulate 50 and Foamsulate 210 Spray-applied Polyurethane Foam Plastic Insulation comply with IBC Section 2603; 2015, 2012 and 2009 IRC Section R316; 2006 IRC Section 314; 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, Foamsulate 50 and Foamsulate 210 Spray-applied Polyurethane Foam Plastic Insulations may be used in wall cavities, floor assemblies or ceiling assemblies, or in attic and crawl spaces as a thermal insulation material. The spray-applied foam plastic insulations are used in Type V-B construction under the IBC and in dwellings under the IRC.

Foamsulate 50 may be installed in Types I, II, III, and IV Construction when installed in accordance with Section 4.3 of this report.

Foamsulate 50 and Foamsulate 210 may be used as an air-impermeable insulation when installed in accordance with Section 3.4 of this report.

Foamsulate 50 may be used as part of a fire-resistance-rated assembly when installed in accordance with Section 4.4 of this report.

## 3.0 PRODUCT DESCRIPTION

**3.1 General:** Foamsulate 50 is an open-cell, spray-applied, polyurethane foam plastic meeting the requirements to qualify as low-density insulation in accordance with Section 3.1.1 of this report and Table 1 of AC377. The insulation is a two-component spray foam plastic with a nominal in-place density of 0.5 pounds per cubic foot (8 kg/m<sup>3</sup>).

Foamsulate 210 spray applied foam plastic insulation is a closed-cell, spray-applied, polyurethane foam plastic and complies as medium-density insulation in accordance with Section 3.1.1 of AC377. The insulation is a two-component spray foam plastic with a nominal in-place density of 2.4 pounds per cubic foot (39 kg/m<sup>3</sup>).

The spray-applied insulations are produced in the field by combining a polymeric isocyanate (A component) and a polymeric resin (B component). The liquid components are 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.

**3.2 Thermal Resistance (R-Values):** Foamsulate 50 and Foamsulate 210 Spray-applied Foam Plastic Insulations have thermal resistance as shown in Table 1 of this report.

**3.3 Surface Burning Characteristics:** Foamsulate 50 and Foamsulate 210 Spray-applied Foam Plastic Insulations have a flame spread index of 25 or less and smoke-developed index of 450 or less when tested in accordance with ASTM E84. The ASTM E84 testing was performed at a maximum thickness of 4 inches (102 mm) and density of 0.6 pcf (9.6 kg/m<sup>3</sup>) for Foamsulate 50 and 2.4 pcf (38.4 kg/m<sup>3</sup>) for Foamsulate 210. Greater thicknesses are recognized, depending on end use, when installed in accordance with this report.

**3.4 Air Permeability:** Foamsulate 50 and Foamsulate 210 Spray-applied Polyurethane Foam Plastic Insulations are classified as air-impermeable insulation as a result of testing in accordance with ASTM E283 at a minimum thickness of

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.

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3<sup>1</sup>/<sub>2</sub> inches (89 mm) for Foamsulate 50 and 1<sup>1</sup>/<sub>2</sub> inches (38 mm) for Foamsulate 210, for use as described in 2015 and 2012 IRC Section R806.5 and 2009 IRC Section R806.4.

## 4.0 INSTALLATION

### 4.1 General

Foamsulate 50 and Foamsulate 210 Spray-applied Polyurethane Foam Plastic Insulations shall comply with requirements in 2015 and 2012 IECC Sections C402.1 and R402, and 2009 and 2006 IECC Section 402. The manufacturer's published installation instructions for Foamsulate 50 and Foamsulate 210, as applicable, and this report shall be available on the jobsite during installation. Where conflicts occur, the most restrictive shall govern.

Foamsulate 50 and Foamsulate 210 shall be spray-applied on the jobsite using equipment specified in the manufacturer's published installation instructions. The insulations shall be sprayed onto a substrate that is protected and clean from any debris or weather-related conditions during and after application. The insulations shall be spray-applied in multiple passes having a maximum thickness of 3<sup>1</sup>/<sub>2</sub> inches (89 mm) per pass, up to the maximum insulation thickness of 11<sup>1</sup>/<sub>2</sub> inches (292 mm). Each pass shall be allowed to fully expand for a minimum of 10 minutes before being covered by additional passes. The maximum in-service temperature shall not exceed 180°F (82°C) as specified in the manufacturer's installation instructions. The foam plastic insulations shall not be used in electrical outlets or junction boxes or in contact with water or soil.

The Polyurethane Foam Plastic Insulations shall be separated from the interior of the building by a code-complying thermal barrier of minimum ½-inch-thick (12.7 mm) gypsum wallboard or equivalent. The thermal barrier shall comply with and be installed in accordance with IBC Section 2603.4; 2015, 2012 or 2009 IRC Section R316.4; or 2006 IRC Section 314.4; as applicable.

### 4.2 Installation in Attics or Crawl Spaces

Foamsulate 50 and Foamsulate 210 Spray-applied Polyurethane Foam Plastic Insulations may be installed in attics or crawl spaces when installed in accordance with this section (Section 4.2). Foamsulate 50 and Foamsulate 210 insulations may be installed in unvented attics and unvented enclosed rafter spaces for use as described in Section 3.4 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 4.2.4. When one of these fire-retardant coatings is installed as a thermal barrier, the ignition barrier specified in IBC Section 2603.4.1.6 and 2015, 2012 and 2009 IRC Section R316.5.3 or 2006 IRC Section R314.5.3, as applicable, may be omitted.

Foamsulate 210 spray-applied foam plastic insulation may be spray-applied without a prescriptive ignition barrier or intumescent coating to the underside of roof sheathing or roof rafters and vertical surfaces of attics and in crawl spaces. When applied to the underside of the top of the space, the thickness of the Foamsulate 210 foam plastic shall not exceed 11<sup>1</sup>/<sub>4</sub> inches (286 mm) and when applied to vertical surfaces, the thickness shall not exceed 7<sup>1</sup>/<sub>4</sub> inches (184 mm). Foamsulate 210 shall be separated from the interior of the building by a code prescribed thermal barrier or by DC315 fire-retardant coating as described in Section 4.2.4 of this report.

#### 4.2.1 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 shall be covered with an ignition barrier in accordance with IBC Section 2603.4.1.6; 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.

#### 4.2.2 Installation Not Using a Prescriptive Ignition Barrier:

Foamsulate 50 and Foamsulate 210 Spray-applied Polyurethane Foam Plastic Insulation may be installed in attics and crawl spaces not using a prescriptive ignition barrier provided:

- a. Entry to the attic or crawl space is only 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 2015 IBC Section 1203.3, 2012 IRC Section R806.5, 2009 IRC Section R806.4; and under-floor (crawl space) ventilation is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.
- e. The foam plastic insulation is limited to the maximum thickness and density tested.
- f. Combustion air is provided in accordance with IMC Section 701 [2006 IMC Sections 701 and 703].
- g. For Foamsulate 50, the installed coverage rate or thickness of coatings shall be equal to or greater than described in Section 4.2.4 of this report.

#### 4.2.3 Installation for the Application of Fire-retardant Coatings:

Foamsulate 50 and Foamsulate 210 Spray-applied Polyurethane Foam Plastic Insulations 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. When applied to the underside of the top of the space, the thickness of the Foamsulate 50 insulation shall not exceed 11<sup>1</sup>/<sub>2</sub> inches (292 mm) and Foamsulate 210 shall not exceed 12 inches. When applied to vertical surfaces, the maximum thickness of both insulations shall not exceed 8 inches (203 mm). The foam



plastic insulations shall be covered with a fire retardant intumescent coating described in Section 4.2.4 of this report. The coatings shall be applied over the foam insulation 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.

#### 4.2.4 Fire Retardant Coatings

**4.2.4.1 DC315 Fireproof Paint:** When used as a thermal barrier for Foamsulate 50 or Foamsulate 210, the DC315 Fireproof Paint, recognized in IAPMO UES ER-499, shall be applied at a required minimum thickness of 20-mil (0.51 mm) wet film [13 mils (0.33 mm) dry film] thickness. When used as an ignition barrier for Foamsulate 50, the DC315 Fireproof Paint shall be applied at a required minimum thickness of 4-mil wet film [3 mils dry film].

**4.2.4.2 Flame Seal TB Fire Retardant:** Flame Seal TB is a water based intumescent coating manufactured by Flame Seal Products, Inc. and is supplied in 5-gallon (19 L) and 50-gallon (189 L) kits. When stored in factory-sealed containers at temperatures between 40°F (4°C) and 90°F (32°C), the coating has a shelf life of one year from the date of manufacture. The coating has a minimum 24-hour curing time. When used as a thermal barrier for Foamsulate 50, the Flame Seal TB shall be applied at a required minimum thickness of 30-mil (0.76 mm) wet film [19 mils (0.48 mm) dry film]. When used as an ignition barrier for Foamsulate 50, the Flame Seal TB shall be applied at a required minimum thickness of 4-mil wet film [3 mils dry film].

#### 4.3 Exterior Walls of Types I, II, III and IV Construction (IBC)

**4.3.1 General:** When used on exterior walls of Types I, II, III or IV construction, the assembly shall comply with IBC Section 2603.5 and this section, and the Foamsulate 50 Spray-Applied Polyurethane Foam Plastic Insulation shall be installed at a maximum thickness of 3<sup>5</sup>/<sub>8</sub> inches (92 mm).

**4.3.2 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).

**4.3.3 Interior Face:** Type X gypsum board, 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.

**4.3.4 Exterior Face:** Georgia Pacific DensGlass® Sheathing, 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.

**4.4 Installation as Part of a Non-load-bearing Fire-resistance-rated Assembly:** Foamsulate 50 Spray-applied Polyurethane Foam Plastic Insulation may be used as part of a fire-resistance-rated assembly when installed in accordance with this section.

**4.4.1 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.

**4.4.2 Wallboard:** 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<sup>5</sup>/<sub>8</sub>-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.

**4.4.3 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 LIMITATIONS

The Foamsulate 50 and Foamsulate 210 Spray-applied Polyurethane Foam Plastic Insulations comply with the codes listed in Section 1.0 of this report or is considered a suitable alternative to the products specified therein. Use of the foam plastic insulation is restricted by the following limitations:

**5.1** The insulations shall be installed in accordance with the manufacturer's published installation instructions, this report and the applicable code. If there are conflicts between the manufacturer's published installation instructions and this report, the more restrictive shall govern.

**5.2** In accordance with Section 4.2 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.



5.3 The foam plastic insulations shall not exceed the nominal density and maximum or minimum thickness, as applicable, allowed by this report.

5.4 During and after installation, the insulation shall be protected from damage and exposure to weather.

5.5 Installers shall be approved by Accella Polyurethane Systems.

5.6 In areas of "very heavy" termite infestation probability, the foam plastic insulation shall be used in accordance with 2015 IBC Section 2603.8; 2012 IBC Section 2603.9; 2009 or 2006 IBC Section 2603.8; 2015, 2012 or 2009 IRC Section 318.4; or 2006 IRC Section 320.5; as applicable.

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

5.8 Labeling and jobsite certification of the insulation and coatings shall comply with IRC Sections N1101.4 and N1101.4.1; 2015, 2012 or 2009 IECC Sections C303.1.1 and C303.1.2; or 2006 IECC Sections 102.1.1 and 102.1.1.1; as applicable.

### 6.0 SUBSTANTIATING DATA

6.1 Data required by the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation, AC377, dated April 2016. The data includes that required by Appendix X of AC377 for use in attics and crawl spaces.

6.2 Reports of potential heat of building materials, flammability characteristics, and room corner fire testing in accordance with NFPA 259, 285, and 286, respectively.

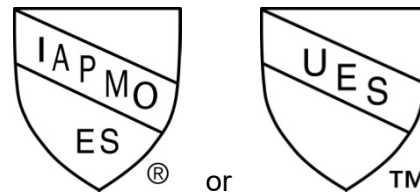
6.3 Reports of fire-resistance-rated assembly testing in accordance with ASTM E119.

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

### 7.0 IDENTIFICATION

The spray foam insulations are identified with the following:

- a. Report holder's name (Accella Polyurethane Systems)
- b. address and telephone number,
- c. the product trade name (Foamsulate 50 or Foamsulate 210)
- 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)
- i. the name or logo of the inspection agency (Quality Control Consultants, LLC).



IAPMO ER #351

**Brian Gerber, P.E., S.E.**  
Vice President, Technical Operations  
Uniform Evaluation Service

**Richard Beck, PE, CBO, MCP**  
Vice President, Uniform Evaluation Service

**GP Russ Chaney**  
CEO, The IAPMO Group

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)



**Table 1 – Thermal Resistance (R-Values)<sup>1</sup>**

Thickness (inch)	Foamsulate 50 (°f·ft <sup>2</sup> ·h/Btu)	Foamsulate 210 (°f·ft <sup>2</sup> ·h/Btu)
1	3.7	5.8
2	7.5	13
3.5	13	23
4	15	27
5	19	32
5.5	20	36
6	22	39
7	26	45
7.5	28	49
8	30	52
9	33	58
9.5	35	62
10	37	65
11.5	43	74

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 4-inch thicknesses for Foamsulate 50 and 1-inch and 3.5-inch thicknesses for Foamsulate 210.

<sup>2</sup>R-Values determined at a mean temperature of 75°F (24°C).





## FLORIDA SUPPLEMENT

### ACCELLA POLYURETHANE SYSTEMS FOAMSULATE 50 AND FOAMSULATE 210 SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATIONS

#### CSI: 07 21 00 THERMAL AND MOISTURE PROTECTION - Thermal Insulation

#### 1.0 SCOPE OF EVALUATION

- 2014 Florida Building Code (FBC)
- 2014 Florida Residential Code (FRC)

#### 2.0 FINDINGS

Foamsulate 50 and Foamsulate 210 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 FBC, Building, and the 2014 FRC, Residential. Installation of the foam plastic insulations shall be in accordance with the 2012 International Building Code and the 2012 International Residential Code as noted in ER-351.

Foamsulate 50 and Foamsulate 210 Insulations comply with the high-velocity hurricane zone provisions of the FBC, Building, and FBC, Residential.

#### 3.0 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.

#### 4.0 STATE PRODUCT APPROVAL

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 information, contact:

**Accella Polyurethane Systems**  
100 Enterprise Drive  
Cartersville, GA 30120  
[www.accellapolyurethane.com](http://www.accellapolyurethane.com)

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)