EVALUATION SUBJECT:
FOAMSULATE™ 220 SPRAY-APPLIED POLYURETHANE FOAM PLASTIC INSULATION

REPORT HOLDER:
Premium Spray Products, Inc.
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CSI Division: 07 THERMAL AND MOISTURE PROTECTION
CSI Section: 072100 Thermal Insulation

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & regulations:
- 2012, 2009, and 2006 International Building Code® (IBC)
- 2012, 2009, and 2006 International Residential Code® (IRC)
- 2012, 2009, and 2006 International Energy Conservation Code® (IECC)

1.2 Evaluated in accordance with:
- ICC-ES AC377, approved May 2015, including reports of testing in accordance with Appendix X of AC377

1.3 Properties assessed:
- Physical Properties
- Thermal Resistance (R-Values)
- Surface Burning Characteristics
- Air Permeability
- Attic and crawl space installations

2.0 PRODUCT USE

Foamsulate™ 220 Spray-Applied Polyurethane Foam Plastic Insulation complies with IBC Section 2603, IRC Section R316, 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™ 220 insulation may be used in wall cavities, floor assemblies or ceiling assemblies, or in attics and crawl spaces as nonstructural thermal insulation material.

Foamsulate™ 220 insulation is used in Type V-B construction under the IBC and in one- and two-family dwellings under the IRC. The insulation may be used in Construction Types I, II, III or IV when installed in accordance with Section 4.5 of this report.

Foamsulate™ 220 Spray-Applied Polyurethane Foam Plastic Insulation may be used as air impermeable insulation when installed in accordance with Section 3.4 of this report.

3.0 PRODUCT DESCRIPTION

3.1 Properties: Foamsulate™ 220 is a medium density, closed cell, polyurethane foam plastic insulation in accordance with Section 3.1.1 of AC377. The insulation has a nominal in-place density of 2.2 PCF (35 kg/m^3). The two-component spray foam plastic is mixed in the field by combining a polymeric isocyanate (A component) and a polymeric resin (B component). 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.

3.2 Thermal Resistance (R-Values): Foamsulate™ 220 Spray-Applied Polyurethane Foam Plastic Insulation has thermal resistance (R-Value) at a mean temperature of 75°F (24°C) as shown in Table 1 of this report.

3.3 Surface Burning Characteristics: At a maximum thickness of 4 inches (102 mm) and a nominal density of 2.4 PCF (38 kg/m^3), the Foamsulate™ 220 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.

3.4 Air Permeability: When tested in accordance with ASTM E283 at a minimum thickness of 1 inch (25.4 mm), Foamsulate™ 220 insulation is classified as air-impermeable insulation in accordance with 2012 IRC Section 806.5 and 2009 and 2006 IRC Section R806.4.

3.5 Premicote IB Fire-retardant Acrylic Coating: Premicote IB Fire-retardant Acrylic Coating is a water-based intumescent fire retardant coating, manufactured expressly for the thermal protection of polyurethane foam plastic insulation. Premicote IB Fire-retardant Acrylic Coating is manufactured by Premium Spray Products, Inc., and is supplied in 5-gallon (19 L) pails and 55-gallon drums (208 L). When Premicote IB Fire-retardant Acrylic Coating is stored in factory-sealed containers at temperatures between 45°F and 75°F (8°C and 24°C), the maximum shelf life is six months.

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 safely, as applicable, in accordance with IBC Section 104.11.

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3.6 DC 315 Fire Protective Coating: DC 315 Fire Protective Coating is a water-based fire retardant coating, manufactured expressly for the thermal protection of polyurethane foam plastic insulation. DC 315 is manufactured by International Fireproof Technology, Inc., and is supplied in 5-gallon (19 L) pails and 55-gallon drums (208 L). When DC 315 Fire Protective Coating is stored in factory-sealed containers at temperatures between 50°F and 80°F (10°C and 27°C), the maximum shelf life is one year.

4.0 DESIGN AND INSTALLATION

4.1 General: Foamsulate™ 220 Spray-Applied Polyurethane Foam Plastic Insulation shall comply with requirements in 2012 IECC Sections C402.1 and R402, and 2009 and 2006 IECC Section 402. The manufacturer's published installation instructions for Foamsulate™ 220 insulation and this report shall be available on the jobsite during installation. Where conflicts occur, the more restrictive governs.

4.2 Installation: Foamsulate™ 220 insulation is 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 3 inches (76 mm) per pass up to the maximum insulation thickness specified in this report. Foamsulate™ 220 Spray-Applied Polyurethane Foam Plastic Insulation shall be allowed to fully expand and cure for a minimum of 15 minutes prior to application of additional passes. The maximum in-service temperature for all areas shall not exceed the maximum temperature stated 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.

4.3 Installation with a Prescriptive Thermal Barrier: Foamsulate™ 220 Spray-Applied Polyurethane Foam Plastic Insulation 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 thermal barrier shall comply with, and be installed in accordance with IBC Section 2603.4, 2012 and 2009 IRC Section R316.4 or 2006 IRC Section 314.4, as applicable. Based on testing in accordance with NFPA 286 (with the acceptance criteria of 2012 and 2009 IBC Section 803.1.2.1 and 2006 IBC Section 803.2.1), Foamsulate™ 220 insulation, at thicknesses up to $7^1/_2$ inches (191 mm) for wall cavities and $11^1/_2$ inches (292 mm) for floor/ceiling cavities is recognized for use with a thermal barrier complying with and installed in accordance with the IBC or IRC. Within an attic or crawl space, installation shall be in accordance with Section 4.4 of this report.

4.4 Installation for Attics and Crawl Spaces

4.4.1 Installation With a Prescriptive Ignition Barrier: Where entry is made only for the service of utilities, Foamsulate™ 220 Spray-Applied Polyurethane Foam Plastic Insulation shall be installed within attics or crawl spaces with an ignition barrier in accordance with IBC Section 2603.4.1.6, 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. 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. Foamsulate™ 220 insulation as described in this section may be installed in unvented attics and unvented enclosed rafter spaces in accordance with 2012 IRC Section R806.5 or 2009 and 2006 IRC Section R806.4, as applicable.

4.4.2 Installation without a Prescriptive Ignition Barrier

4.4.2.1 General: In accordance with Sections 4.4.2.2 and 4.4.2.3 when Foamsulate™ 220 Spray-Applied Polyurethane Foam Plastic Insulation is installed in attics and crawl spaces without a prescriptive ignition barrier, the following conditions apply:

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. In accordance with IBC Section 1203.3 or IRC Section R408.1, under-floor (crawl-space) ventilation is provided, as applicable.
e. In accordance with IBC Section 1203.2 or IRC Section R806, attic ventilation is provided, as applicable, except air impermeable insulation is permitted in attics in accordance with 2012 IRC Section R806.5, or 2009 and 2006 IRC Section R806.4.
f. In accordance with 2012 and 2009 IMC (International Mechanical Code®) Section 701, or 2006 IMC Sections 701 and 703, combustion air is provided.

4.4.2.2 Installation for the Application of Fire-retardant or Fire Protective Coatings: Foamsulate™ 220 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. When applied to the underside of the top of the space, the thickness of the Foamsulate™ 220 insulation shall not exceed $11^1/_2$ inches (292 mm). When applied to vertical surfaces, the maximum thickness shall not exceed $7^1/_2$ inches (191 mm). The foam plastic insulation shall be covered with Premicote IB Fire Retardant Acrylic Coating described in Section 3.5 of this

report, or DC 315 Fire Protective Coating described in Section 3.6 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 minimum 50°F (10°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.

The Premicote IB Fire Retardant Acrylic Coating shall be applied to a minimum thickness of 9.12 mils (0.24 mm) Dry Film Thickness or approximately 1 gallon per 100 square feet (0.41 L/m^2). The DC 315 Fire Protective Coating shall be applied to a minimum thickness of 18 wet film thickness or approximately 1 gallon per 89 square feet (0.46 L/m^2).

Foamsulate™ 220 insulation shall be separated from the interior of the building by a thermal barrier complying with and installed in accordance with IBC or IRC, and from the attic space with Premicote IB or DC 315 coating as described in this section (Section 4.4.2.2). When installations comply with this section, the ignition barrier specified in IBC Section 2603.4.1.6 and 2012 and 2009 IRC Section R316.5.3 or 2006 IRC Section R314.5.3, as applicable, may be omitted.

4.4.2.3 Application without Fire-retardant or Fire Protective Coating: Foamsulate™ 220 Spray-Applied Polyurethane Foam Plastic Insulation may be applied without a fire-retardant or fire protective 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™ 220 insulation shall not exceed 7$^1/_2$ inches (191 mm), and when applied to vertical surfaces maximum thickness shall not exceed 5$^1/_2$ inches (140 mm). The insulation may be installed in unvented attics as described in this section in accordance with 2012 IRC Section R806.5 or 2009 or 2006 IRC Section R806.4, as applicable.

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

4.5.1 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™ 220 Spray-Applied Polyurethane Foam Plastic Insulation shall be installed at a maximum thickness of 3$^5/_8$ inches (91 mm).

4.5.2 Base Wall: Studs shall be 3$^5/_8$ inch deep (91 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. Openings shall be framed with the same C-channel framing. The studs shall be fastened in accordance with the requirements of the IBC. Nominal 4 pcf (64 kg/m^3) 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™ 220 Spray-Applied Polyurethane Foam Plastic Insulation to a maximum thickness of 3$^5/_8$ inches (91 mm).

4.5.3 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 wall board 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.

4.5.4 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. Fasteners shall be 1$^1/_4$-inch-long (32 mm) bugle head fine thread, corrosion-resistant sharp point drywall screws installed at 8 inches (203 mm) on center along the edges and 12 inches (305 mm) in the field.

5.0 LIMITATIONS

The Foamsulate™ 220 Spray-Applied Polyurethane Foam Plastic Insulation described in this report complies with those codes listed in Section 1.0 of this report or are considered suitable alternatives to what is specified in the code, subject to the following conditions:

5.1 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.

5.2 In accordance with Section 4.3 of this report, the insulation shall be separated from the interior of the building by a code-complying thermal barrier.

5.3 The insulation shall not exceed the nominal density and thickness for the installation conditions described in this report.

5.4 During and after application, the insulation shall be protected from exposure to weather and site conditions.

5.5 The insulation shall be installed by professional spray polyurethane foam installers approved by Premium Spray Products, Inc., or by the Spray Polyurethane Foam Alliance (SPFA).

5.6 Use of the insulation in areas of "very heavy" termite

infestation probability shall be in accordance with 2012 IBC Section 2603.9, 2009 or 2006 IBC Section 2603.8, or 2012 and 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 2012 IRC Sections N1101.4 and N1101.4.1, 2012 IECC Sections R303.1.3, R303.3, and R402.4.3 [2009 IECC Sections 303.1 or 2006 IECC Sections 102.1.1 and 102.1.11], as applicable.

5.9 The insulation shall be produced by Premium Spray Products in Marietta, Georgia under a quality control program with inspections by Quality Control Consultants, LLC (AA-727).

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation, AC377, dated May 2015, including reports of testing in accordance with Appendix X of AC377.

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

7.0 IDENTIFICATION

The spray foam insulation is identified with the following:

a. Manufacturer's name (Premium Spray Products, Inc.)
b. address and telephone number,
c. the product trade name (Foamsulate™ 220)
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-352)
i. the name or logo of the inspection agency (Quality Control Consultants, LLC)

Each container of the Premicote IB intumescent coating is labeled with the manufacturer's name (Premium Spray Products, Inc.), the product name, and use instructions.

Each container of DC 315 Fire Protective Coating is labeled with the manufacturer's name (International Fireproof Technology, Inc.), the product name, and use instructions.

or

IAPMO ER #352

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

Table 1 –Thermal Resistance (R-Values) [1]	
Thickness (inch)	**Foamsulate™ 220 Insulation R-Value (°f•ft²•h/Btu)**
1	6.6
2	14
3	21
3.5	24
4	28
5	34
5.5	38
6	41
7	48
7.5	52
8	55
9	62
9.5	65
10	69
11.5	79

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 values at 1-inch and 4-inch thicknesses for Foamsulate™ 220