ICC EVALUATION SERVICE®

ICC-ES Evaluation Report

ESR-4411

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 21 00—Thermal Insulation

REPORT HOLDER:

SOPREMA CORPORATION

EVALUATION SUBJECT:

SOPRA-SPF 500, SOPRA-SPF 201, AND SOPRA-SPF 202 SPRAY-APPLIED POLYURETHANE INSULATIONS

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2015, 2012 and 2009 *International Energy Conservation Code*® (IECC)

Properties evaluated:

- Surface-burning characteristics
- Physical properties
- Thermal resistance (*R*-values)
- Air permeance (SOPRA-SPF 202 only)
- Vapor permeance (SOPRA-SPF 201 and SOPRA-SPF 202 only)
- Attic and crawl space installation

1.2 Evaluation to the following green standard:

2008 ICC 700 *National Green Building Standard*™ (ICC 700-2008)

Attribute verified:

See Section 3.4.

2.0 USES

SOPRA-SPF 500, SOPRA-SPF 201 and SOPRA-SPF 202 insulations are used as nonstructural thermal insulating materials in buildings of Type VB construction under the IBC and dwellings under the IRC. The insulation is for use in wall cavities, floor assemblies or ceiling assemblies when installed in accordance with Section 4.0.

3.0 DESCRIPTION

3.1 General:

3.1.1 SOPRA-SPF 500: SOPRA-SPF 500 insulation is a two-component, open-cell, spray-applied polyurethane foam plastic with a nominal density of 0.5 pcf (8 kg/m^3). The polyurethane foam is produced by combining a polymeric isocyanate (the A component) and a polymeric resin (the B component). The components have a shelf life of six months when stored in factory-sealed containers at temperatures between 65°F and 85°F (18°C and 29°C).

3.1.2 SOPRA-SPF 202: SOPRA-SPF 202 insulation is a two-component, closed-cell, spray-applied polyurethane foam plastic with a nominal density of 2.1 pcf (33.7 kg/m^3). The polyurethane foam is produced by combining a polymeric isocyanate (the A component) and a polymeric resin (the B component). The components have a shelf life of six months when stored in factory-sealed containers at temperatures between 65°F and 85°F (18°C and 29°C).

3.1.3 SOPRA-SPF 201: SOPRA-SPF 201 insulation is a two-component, closed-cell, spray-applied polyurethane foam plastic with a nominal density of 2.2 pcf (35.2 kg/m^3). The polyurethane foam is produced by combining a polymeric isocyanate (the A component) and a polymeric resin (the B component). The components have a shelf life of six months when stored in factory-sealed containers at temperatures between 65°F and 85°F (18°C and 29°C).

3.2 Surface-Burning Characteristics:

3.2.1 SOPRA-SPF 500: SOPRA-SPF 500 insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 0.5 pounds per cubic foot (8 kg/m^3), 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 (UL 723). There is no thickness limit when installation is behind a code-prescribed 15-minute thermal barrier.

3.2.2 SOPRA-SPF 202: SOPRA-SPF 202 insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 2.1 pounds per cubic foot (33.6 kg/m^3), 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 (UL 723). There is no thickness limit when installation is behind a code-prescribed 15-minute thermal barrier.

3.2.3 SOPRA-SPF 201: SOPRA-SPF 201 insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 2.2 pounds per cubic foot (35.2 kg/m^3), 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 (UL 723). There is no thickness limit when installation is behind a code-prescribed 15-minute thermal barrier.

3.3 Thermal Resistance:

SOPRA-SPF 500, SOPRA-SPF 201 and SOPRA-SPF 202 insulation have thermal resistances, *R*-values, at a mean temperature of 75°F (24°C) as shown in Table 1.

3.4 Vapor Permeance:

3.4.1 SOPRA-SPF 202:

SOPRA-SPF 202 has a vapor permeance of less than 1.0 perm ($5.7x10^{-11}$ kg/Pa-s-m^2) when applied at a minimum thickness of 2 inches (51 mm) and may be used where a Class II vapor retarder is required by the applicable code.

3.4.2 SOPRA-SPF 201: SOPRA-SPF 201 has a vapor permeance of less than 1.0 perm ($5.7x10^{-11}$ kg/Pa-s-m^2) when applied at a minimum thickness of 2 inches (51 mm) and may be used where a Class II vapor retarder is required by the applicable code.

3.5 Air Permeance:

SOPRA-SPF 202 insulation, at a minimum thickness of 1.5 inches (38 mm), is considered air-impermeable insulation in accordance with 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2015 IBC Section 1203.3, based on testing in accordance with ASTM E2178.

The attribute of the SOPRA-SPF 202 insulation has been verified as conforming to the provisions of ICC 700-2008 Section 703.2.1.1.1(c) as an air impermeable insulation. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. These codes or standards often provide supplemental information as guidance.

3.6 DC 315 Coating:

DC 315 coating (ESR-3702), manufactured by International Fireproof Technology, Inc. / Paint to Protect Inc., is a one-component water-based intumescent coating. The coating is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of 24 months when stored in factory-sealed containers at temperatures between 50°F (10°C) and 80°F (27°C).

4.0 INSTALLATION

4.1 General:

The manufacturer's published installation instructions and this report must be strictly adhered to and a copy of these instructions and this evaluation report must be available on the jobsite at all times during installation.

4.2 Application:

SOPRA-SPF 500, SOPRA-SPF 201 and SOPRA-SPF 202 insulation must be applied using spray equipment specified by Soprema Corporation. The insulation must not be used in areas having a maximum service temperature greater than 180°F (82°C), must not be used in electrical outlets or junction boxes or in direct continuous contact with rain or water; and surfaces to which the spray-applied foam insulation is to be applied to must be protected from the weather during and after application.

4.2.1 SOPRA-SPF 500: The insulation is applied to the intended thickness, with each pass being a maximum of 12 inches (305 mm). Where multiple passes are required, the cure time between passes is negligible. SOPRA-SPF 500 insulation must be installed by installers certified by Soprema Corporation or the Spray Polyurethane Foam Alliance (SPFA).

4.2.2 SOPRA-SPF 202: The insulation is applied to the intended thickness, with each pass being a maximum of 2 inches (51 mm). Where multiple passes are required, the cure time between passes is negligible. SOPRA-SPF 202 insulation must be installed by installers certified by Soprema Corporation or the Spray Polyurethane Foam Alliance (SPFA).

4.2.3 SOPRA-SPF 201: The insulation is applied to the intended thickness, with each pass being a maximum of 2 inches (51 mm). Where multiple passes are required, the cure time between passes is negligible. SOPRA-SPF 202 insulation must be installed by installers certified by Soprema Corporation or the Spray Polyurethane Foam Alliance (SPFA).

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier:

SOPRA-SPF 500, SOPRA-SPF 201 and SOPRA-SPF 202 insulations must be separated from the interior of the building by an approved thermal barrier of $^1/_2$-inch-thick (12.7 mm) gypsum board or an equivalent 15-minute thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section R316.4. When installation is within an attic or crawl space as described in Section 4.4, a thermal barrier is not required between the foam plastic and the attic or crawl space, but is required between the insulation and the interior of the building. There is no thickness limit when installed behind a code-prescribed 15-minute thermal barrier.

4.3.2 Application without a Prescriptive Thermal Barrier: The prescriptive 15-minute thermal barrier may be omitted when SOPRA-SPF 202 is installed in accordance with this section. The insulation and coating may be spray-applied to the interior facing of walls and the underside of roof sheathing or roof rafters, and in crawl spaces, and may be left exposed as an interior finish without a prescribed 15-minute thermal barrier or ignition barrier. The thickness of the foam plastic applied to the underside of the roof sheathing must not exceed $7^1/_4$ inches (184 mm). The thickness of the foam plastic applied to the vertical wall surfaces must not exceed $7^1/_4$ inches (184 mm). The foam plastic must be covered on all surfaces with DC 315 Coating (ESR-3702) at a minimum wet film thickness of 18 wet mils (0.46 mm) [12 dry mils (0.31 mm)], at a rate of 1.12 gal/100 ft^2 (0.457 L/m^2). The coating must be applied over the SOPRA-SPF 202 insulation in accordance with the coating manufacturer's instructions and this report. Surfaces to be coated must be dry, clean and free of dirt, loose debris and other substances that could interfere with the adhesion of the coating. The coating is applied in one coat by airless spray equipment at ambient temperatures between 50°F (10°C) and 90°F (32°C), and a relative humidity of less than 65 percent.

4.4 Ignition Barrier: Attics and Crawl Spaces:

4.4.1 Application with a Prescriptive Ignition Barrier:

When SOPRA-SPF 500, SOPRA-SPF 201 and SOPRA-SPF 202 insulation is installed within attics or crawl spaces where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 or IRC Sections R316.5.3 and R316.5.4, as applicable. The ignition barrier must be consistent with the requirements for the type of construction required by the applicable code, and must be installed in a manner so the foam plastic insulation is not exposed.

SOPRA-SPF 202 insulation, as described in this section, may be installed in unvented attics in accordance with 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4) or 2015 IBC Section 1203.3.

4.4.2 Application without a Prescriptive Ignition Barrier: Where the spray-applied insulation is installed in accordance with Section 4.4.2.1, the following conditions apply:

a) Entry to the attic or crawl space is to only 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 or 2015 and 2012 IRC Section R806.5 (2009 IRC Section R806.4). Under-floor (crawl space) ventilation is provided when required by 2015 IBC Section 1203.4 (2012 and 2009 IBC Section 1203.3) or IRC Section R408.1, as applicable.

e) Combustion air is provided in accordance with *International Mechanical Code*® Section 701.

4.4.2.1 Application without a Prescriptive Ignition Barrier: In attics and crawl spaces, SOPRA-SPF 202 insulation may be spray-applied to the underside of roof sheathing and/or rafters, and to vertical surfaces and the underside of floors as described in this section. The thickness of the foam plastic applied to the underside of the overhead surfaces (roof sheathing, rafters and the underside of floors) must not exceed $7^1/_4$ inches (184 mm). The thickness of the foam plastic applied to vertical surfaces must not exceed $7^1/_4$ inches (184 mm). The foam plastic must be covered on all surfaces with DC-315 coating at a minimum wet film thickness of 18 wet mils (0.46 mm) [12 dry mils (0.31 mm)], at a rate of 1.12 gal/100 ft^2 (0.457 L/m^2). The coating must be applied over the SOPRA-SPF 202 insulation in accordance with the coating manufacturer's instructions, ESR-3702, and this report. Surfaces to be coated must be dry, clean and free of dirt, loose debris and other substances that could interfere with the adhesion of the coating. The coating is applied in one coat by airless spray equipment at ambient temperatures above 50°F (10°C) and relative humidity of less than 70 percent. The attic or crawl space must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1.

5.0 CONDITIONS OF USE

The SOPRA-SPF 500, SOPRA-SPF 201 and SOPRA-SPF 202 insulation described in this report complies with, or is a suitable alternative to what is specified in those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The product must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. The instructions within this report govern if there are any conflicts between the manufacturer's published installation instructions and this report.

5.2 The insulation must be separated from the interior of the building by an approved 15-minute thermal barrier in accordance with IBC Section 2603.4, except when installation is as described in Section 4.3.2.

5.3 The insulation must not exceed the thickness and density noted in Sections 3.2, 4.3.2 and 4.4.2.1 of this report.

5.4 The insulation must be protected from the weather during and after application.

5.5 The insulation must be applied by installers certified by Soprema Corporation or the Spray Polyurethane Foam Alliance (SPFA).

5.6 Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with IRC Section R318.4 or 2015 or 2012 IBC Section 2603.9 or 2009 IBC Section 2603.8, as applicable.

5.7 Jobsite certification and labeling of the insulation must comply with IRC Sections N1101.4 and N1101.4.1 and 2015 or 2012 IECC Sections C303.1.1, 303.1.2 and R401.3 or 2009 IECC Sections 303.1.1, 303.1.2 and 401.3, as applicable.

5.8 The A and B components of the insulation are produced under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated April 2016.

6.2 Reports on room corner tests in accordance with NFPA 286.

6.3 Report on air leakage testing in accordance with ASTM E2178.

6.4 Reports on water vapor transmission tests in accordance with ASTM E96 (desiccant method).

7.0 IDENTIFICATION

7.1 Containers of SOPRA-SPF 500, SOPRA-SPF 201 and SOPRA-SPF 202 Part A and Part B components are identified with a label bearing the Soprema Corporation name and address; the product trade name (SOPRA-SPF 500 Part A or Part B; SOPRA-SPF 201 Part A or Part B; or SOPRA-SPF 202 Part A or Part B); the lot number; the flame spread and smoke developed indices; mixing instructions; density; the shelf life and the expiration date; and the evaluation report number (ESR-4411).

International Fireproof Technology, Inc. / Paint to Protect Inc., DC 315 coating is labeled with the manufacturer's name and address; the product name; the date of manufacture; the shelf life or expiration date; the manufacturer's instructions for application, and evaluation report number (ESR-3702).

7.2 The report holder's contact information is the following:

SOPREMA CORPORATION
1688 JEAN-BERCHMANS-MICHAUD
DRUMMONDVILLE, QUEBEC J2C 8E9
CANADA
(800) 567-1492
www.soprema.ca

TABLE 1—THERMAL RESISTANCE (*R*-VALUES)

THICKNESS (inch)	*R*-VALUE (°F.ft².h/Btu)		
	SOPRA-SPF 500	SOPRA SPF 201	SOPRA SPF 202
1.0	3.6	6.9	6.9
2.0	6.9	14	14
3.0	10	20	20
3.5	12	24	23
4.0	14	27	27
5.0	17	34	33
5.5	19	37	37
6.0	21	41	40
7.0	24	48	47
7.75	27	53	52
8.0	28	54	54
9.0	31	61	60
10.0	34	68	67
11.0	38	75	74
12.0	41	82	80
13.0	45	88	87
14.0	48	95	94
15.0	52	102	100
16.0	55	109	107

For **SI:** 1 inch= 25.4 mm; 1°F.ft².h/Btu = 0.176110°K.m².h/W.

[1]*R*-values are calculated based on tested *K*-values at 1- and 4-inch thicknesses.
[2]*R*-values greater than 10 are rounded to the nearest whole number.