ICC-ES Evaluation Report

ESR-4003

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

REPORT HOLDER:

PCC PRODEX SP. Z.O.O.

EVALUATION SUBJECT:

CROSSIN 450 OPEN CELL SPRAY FOAM INSULATION

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2018 and 2015 *International Building Code®* (IBC)
- 2018 and 2015 *International Residential Code®* (IRC)
- 2018 and 2015 *International Energy Conservation Code®* (IECC)

Properties evaluated:

- Physical properties
- Surface-burning characteristics
- Thermal resistance (*R*-values)
- Water vapor transmission
- Attic and crawl space installation
- Air permeability

1.2 Evaluation to the following green standard:

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

- See Section 3.1

Attributes verified:

2.0 USES

Crossin 450 Open Cell Spray Foam Insulation is an open-cell, spray-applied polyurethane foam insulation used as a nonstructural thermal insulating material in Type V-B construction under the IBC and in dwellings under the IRC. The insulation is for use in wall cavities, floor assemblies or ceiling assemblies, or in attics and crawl spaces when installed in accordance with Section 4.4.

3.0 DESCRIPTION

3.1 Crossin 450 Open Cell Spray Foam:

Crossin 450 spray foam insulation is a two-component, low-density, open-cell, spray-applied polyurethane foam with a nominal in-place density of 0.50 pcf (8 kg/m^3). The insulation is produced in the field by combining an isocyanate component A with a resin component B in a one to one volume ratio. Component A has a shelf life of 4 months when stored in factory-sealed containers at temperatures between 50°F and 77°F (10°C and 25°C). Component B has a shelf life of 4 months when stored in factory-sealed containers at temperatures between 32°F and 77°F (0°C and 25°C). The liquid components are supplied in 53-gallon (200 L) drums.

3.2 Surface-burning Characteristics:

The insulation, at a maximum thickness of 5 inches (127 mm) and a nominal density of 0.5 pcf (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). Greater thicknesses are recognized as described in Section 4.3 and 4.4. Crossin 450 spay foam thickness is not limited when separated from the interior of the building by a prescriptive thermal barrier as complying with the IBC or IRC and as described in Section 4.3.1.

The attributes of the insulation have been verified as conforming to the requirements 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 the 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.

3.3 Thermal Resistance (*R*-Values):

The insulation has thermal resistance (*R*-value) at a mean temperature of 75°F (24°C) as shown in Table 1.

3.4 Air Permeability:

Crossin 450 spray foam insulation, at a minimum thickness of 4$^1/_2$ inches (114.3 mm), is considered air-impermeable insulation in accordance with IBC Section 1202.3 and IRC Section R806.5 based on testing in accordance with ASTM E2178.

3.5 DC 315 Coating:

DC 315, manufactured by International Fireproof Technology, Inc. (ESR-3702), is a one-component, water-based, liquid-applied intumescent coating. DC 315 is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of one (1) year when stored in factory-sealed containers at temperatures between 50°F and 80°F (10°C and 27°C).

4.0 INSTALLATION

4.1 General:

Crossin 450 spray-applied foam insulation must be installed in accordance with the manufacturer's published installation instructions and this report. A copy of the manufacturer's published installation instructions must be available at all times on the jobsite during installation.

4.2 Application:

The insulation is spray-applied at the jobsite using a volumetric positive displacement pump to combine the A and B components at a one-to-one volume ratio, as specified in the manufacturer's published installation instructions. The insulation must be applied when the ambient temperature is greater than 50°F (10°C). The insulation is applied in multiple passes having a maximum thickness of 6 inches (152 mm) per pass up to the maximum insulation thicknesses specified in this report. The insulation must not be used in areas that have a maximum service temperature greater than that specified in the manufacturer's installation instructions. The insulation must not be used in electrical outlets or junction boxes or in contact with rain, water (e.g., rain, condensation, ice, snow) or soil. The substrate must be free of moisture, frost or ice, loose scales, rust, oil, and grease or other surface contaminants. The spray-applied foam insulation must be protected from weather during and after installation.

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier: Crossin 450 spray foam insulation must be separated from the interior of the building by a thermal barrier of $^{1}/_{2}$-inch-thick (12.7 mm) gypsum wallboard or an equivalent thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section R316.4, as applicable, except where insulation is in an attic or crawl space as described in Section 4.4. Crossin 450 thickness is not limited when separated from the interior of the building by a prescriptive thermal barrier complying with the IBC or IRC.

4.3.2 Application without a Prescriptive Thermal Barrier: Crossin 450 spray foam insulation may be installed without the prescriptive thermal barrier when installation is in accordance with this section. The thickness of the foam plastic applied to ceilings must not exceed 14 inches (356 mm). The thickness of the foam plastic applied to vertical wall surfaces must not exceed 8 inches (203 mm). The foam plastic must be covered on all surfaces with DC 315 coating (ESR-3702) at a minimum wet film thickness of 18 mils (0.46 mm) [12 mils (0.31 mm) dry film thickness]. The coating must be applied over Crossin 450 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 adhesion of the coating.

4.4 Ignition Barrier – Attics and Crawl Spaces:

4.4.1 Application with a Prescriptive Ignition Barrier: When Crossin 450 spray foam 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 Section R316.5.3 or 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.

4.4.1.1 General: Crossin 450 spray-applied foam insulation may be installed in attics and crawl spaces, without a prescriptive ignition barrier as described in IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, in accordance with Section 4.4.2.2 when all of the following conditions apply:

- Entry to the attic or crawl space is only to service utilities, and no storage is permitted.
- There are no interconnected attic or crawl space areas.
- Air in the attic or crawl space is not circulated to other parts of the building.
- Under-floor (crawl space) ventilation is provided when required by 2018 IBC Section 1202.4 (2015 IBC Section 1203.4) or IRC Section R408.1, as applicable.
- Attic ventilation is provided when required by 2018 IBC Section 1202.2.1 (2015 IBC Section 1203.2) or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with 2018 IBC Section 1202.3 (2015 IBC Section 1203.3) or IRC Section R806.5.
- Combustion air is provided in accordance with IMC (*International Mechanical Code*®) Section 701.

4.4.1.2 Application with DC 315 Coating: In attics, Crossin 450 may be spray-applied to the underside of roof sheathing and/or rafters; and the underside of wood floors and/or floor joists in crawl spaces as described in this section. The thickness of the plastic applied to the underside of wood floor and roof sheathing must not exceed 14 inches (356 mm). The spray foam insulation applied to vertical wall surfaces in attics and crawl spaces must not exceed 8 inches (203 mm) in depth. The foam plastic surface must be covered with DC 315 coating (ESR-3702) at a minimum wet film thickness of 4 mils (0.10 mm) [3 mils (0.08 mm) dry film thickness]. The coating must be applied over Crossin 450 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 adhesion of the coating.

5.0 CONDITIONS OF USE

The Crossin 450 Open Cell Spray Foam 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 insulation must 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, this report governs.

5.2 The insulation must be separated from the interior of the building by an approved thermal barrier, in accordance with Section 4.3, except as noted in Sections 4.3.2 or Sections 4.2 for attics and crawl spaces.

5.3 Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with IBC Section 2603.8 or IRC Section R318.4.

5.4 The insulation has been evaluated only for use in Type V-B construction under the IBC and in dwellings under the IRC.

5.5 Jobsite certification and labeling of the insulation must comply with IRC Section N1101.10 and IECC Section C303.1, R303.1 and R401.3, as applicable.

5.6 A vapor retarder must be installed in accordance with the applicable requirements of the applicable code.

5.7 The insulation is produced in Brzeg Dolny, Poland 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 (editorially revised April 2018), including reports of tests in accordance with Appendix X.

6.2 Reports of air permeance tests in accordance with ASTM E2178.

6.3 Reports of room corner tests in accordance with NFPA 286.

7.0 IDENTIFICATION

7.1 Components of the spray foam insulation are identified with the manufacturer's name (PCC Prodex Sp. z.o.o.), address and telephone number; the product name (Crossin 450 Open Cell Spray Foam Insulation); use instructions; the density; product gross and net weight, safety communication according to CLP; shelf-life; expiration date the flame-spread and smoke-developed indices; the date of manufacture; batch number; thermal resistance values; and the evaluation report number (ESR-4003).

International Fireproof Technology, Inc., DC315 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:

PCC PRODEX SP. Z.O.O.
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56–120 BRZEG DOLNY,
POLAND
+48-71-794-34-10
www.pcc-prodex.eu

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

THICKNESS (inches)	*R*-Value (°F▪ft²▪h/Btu)[1]
1	3.9
2	7.1
3.5	12
4	14
5	17
6	20
7	23
8	27
9	30
10	33
11	36
12	38
13	39
14	46

For **SI**: 1 inch = 25.4 mm, 1°F▪ft²▪Btu= 0.176 110˚K▪m2/W.

[1]*R*-Values are calculated based on tested values at 1-inch and 3.5-inch thicknesses.