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# ICC-ES Report

## ESR-3776

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Valid: 01/15 to 11/15

**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION**

**SECTION: 07 21 00—THERMAL INSULATION**

**REPORT HOLDER:**

**JOHNS MANVILLE**

**717 17<sup>TH</sup> STREET  
DENVER, CO 80202**

**EVALUATION SUBJECT:**

**JM CORBOND® OPEN-CELL (OC) SPRAY POLYURETHANE FOAM (SPF) INSULATION**



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**DIVISION: 07 00 00—THERMAL AND MOISTURE  
PROTECTION****Section: 07 21 00—Thermal Insulation****REPORT HOLDER:****JOHNS MANVILLE**  
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[www.jm.com](http://www.jm.com)**EVALUATION SUBJECT:****JM CORBOND® OPEN-CELL (OC) SPRAY  
POLYURETHANE FOAM (SPF) INSULATION****1.0 EVALUATION SCOPE****Compliance with the following codes:**

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

**Properties evaluated:**

- Surface-burning characteristics
- Physical properties
- Thermal resistance (*R*-values)
- Attic and crawl space installation

**2.0 USES**

JM Corbond® oc SPF is used as a nonstructural thermal insulating material in buildings of Type V-B construction (IBC) and nonfire-resistance-rated construction under the IRC. The insulation is for use in wall cavities and floor/ceiling assemblies, and, when installed as described in Section 4.4, in attics and crawl spaces.

**3.0 DESCRIPTION****3.1 General:**

JM Corbond® oc SPF is a two-component, low-density, open-cell, spray-applied, polyurethane foam plastic insulation. The installed nominal density of JM Corbond® oc SPF is 0.5 pcf. The two components of the insulation are polymeric isocyanate (A-component) and a polymeric resin (B-component). When stored in unopened containers at temperatures between 60°F and 75°F (16°C and 24°C), the A-component has a shelf life of twelve months; when stored in unopened containers at

temperatures between 40°F and 100°F (4°C and 38°C), the B-component has a shelf life of twelve months.

**3.2 Surface Burning Characteristics:**

When tested in accordance with ASTM E84, at a maximum thickness of 4 inches (102 mm) and a nominal density of 0.5 pcf, JM Corbond® oc SPF has a flame-spread index of 25 or less and a smoke-developed index of 450 or less. Thicknesses of up to 7½ inches (191 mm) for wall cavities and 11½ inches (292 mm) for ceiling cavities are recognized, based on room corner fire testing in accordance with NFPA 286, when the product is covered with minimum ½-inch-thick (13 mm) gypsum wallboard or an equivalent thermal barrier complying with, and installed in accordance with, the applicable code.

**3.3 Thermal Resistance, *R*-values:**

JM Corbond® oc SPF has thermal resistance (*R*-values) at a mean temperature of 75°F (24°C) as shown in Table 1.

**3.4 Intumescent Coatings:**

**3.4.1 TPR<sup>2</sup> Fireshell® TB Intumescent Coating System:** The Fireshell® TB intumescent coating system consists of Fireshell® ICP Primer and Fireshell® TB Top Coat coatings, manufactured by TPR<sup>2</sup> Corporation. The coatings are single-component, water-based coatings, supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and having a shelf life of 12 months when stored in factory-sealed containers at temperatures above 50°F (10°C).

**3.4.2 TPR<sup>2</sup> Fireshell® IB Intumescent Coating:** Fireshell® IB intumescent coating, manufactured by TPR<sup>2</sup> Corporation, is a single-component, water-based coating. The coating is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of 12 months when stored in factory-sealed containers at temperatures above 50°F (10°C).

**3.4.3 DC315 Intumescent Coatings:** DC315 Primer and DC315 Top Coat are intumescent coatings, manufactured by International Fireproof Technology Inc. The coatings are single-component, water-based coatings, supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and have a shelf life of two years when stored in factory-sealed containers at temperatures between 41°F (5°C) and 95°F (35°C).

**4.0 INSTALLATION****4.1 General:**

JM Corbond® oc SPF must be installed in accordance with the report holder's (Johns Manville) published installation instructions and this report. The report holder's installation

instructions and this report must be strictly adhered to, and a copy of the instructions and this evaluation report must be available on the jobsite at all times during installation.

#### 4.2 Application:

The insulation must be applied using spray equipment specified by Johns Manville. The product must not be used in areas which have a maximum service temperature greater than 180°F (82°C), nor in electrical outlet or junction boxes or in contact with rain or water. The product must be protected from the weather during and after application. The insulation can be installed in a single pass up to a maximum 13<sup>1</sup>/<sub>2</sub>-inch (343 mm) thickness.

#### 4.3 Thermal Barrier:

**4.3.1 Application with a Prescriptive Thermal Barrier:** JM Corbond<sup>®</sup> oc SPF must be separated from the interior of the building by an approved 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. Thicknesses up to 7<sup>1</sup>/<sub>2</sub> inches (191 mm) for wall cavities and 11<sup>1</sup>/<sub>2</sub> inches (292 mm) for ceiling cavities are recognized based on room corner testing in accordance with NFPA 286, when covered with minimum 1/2-inch-thick (13 mm) gypsum wallboard or an equivalent thermal barrier complying with, and installed in accordance with, the applicable code.

#### 4.3.2 Application without a Prescriptive Thermal Barrier:

**4.3.2.1 Application with the TPR<sup>2</sup> Fireshell<sup>®</sup> TB Intumescent Coating System:** The prescriptive 15-minute thermal barrier may be omitted when installation is in accordance with this section (Section 4.3.2.1). The insulation and coatings may be spray-applied to the interior facing of walls, 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 prescribed ignition barrier. The thickness of the foam plastic applied to the underside of the roof sheathing must not exceed 13<sup>1</sup>/<sub>2</sub> inches (343 mm). The thickness of the foam plastic applied to walls and/or vertical surfaces must not exceed 11 inches (279 mm). The foam plastic must be covered on all surfaces with the TPR<sup>2</sup> Fireshell<sup>®</sup> TB intumescent coating system (TPR<sup>2</sup> Fireshell<sup>®</sup> ICP Primer and Fireshell<sup>®</sup> TB Top Coat). The Fireshell<sup>®</sup> ICP Primer must be applied at a minimum wet film thickness of 9 mils (0.23 mm) [5-mil (0.13 mm) dry film thickness], at a rate of 0.53 gallon (2 L) per 100 square feet (9.2 m<sup>2</sup>). After curing, Fireshell<sup>®</sup> TB Top Coat must be applied at a minimum wet film thickness of 15 mils (0.38 mm) [9-mil (0.23 mm) dry film thickness], at a rate of 1 gallon (3.8 L) per 100 square feet (9.2 m<sup>2</sup>). The coatings must be applied over the JM Corbond<sup>®</sup> oc SPF insulation and cured in accordance with the coating report holder's published 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. Each coating must be applied in one coat by airless spray equipment at ambient temperatures above 50°F (10°C) and relative humidity of less than 70 percent.

**4.3.2.2 Application with the DC 315 Intumescent Coating System:** The prescriptive, 15-minute thermal barrier may be omitted when installation is in accordance with this section (Section 4.3.2.2). The insulation and coating system may be spray-applied to the interior facing of walls, 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

prescribed ignition barrier. The thickness of the foam plastic applied to the underside of the roof sheathing must not exceed 12 inches (305 mm). The thickness of the foam plastic applied to walls and/or vertical surfaces must not exceed 8 inches (203 mm). The foam plastic must be covered on all surfaces with the DC 315 intumescent coating system (DC 315 Primer and DC 315 Top Coat). The DC 315 Primer must be applied at a minimum wet film thickness of 4 mils (0.10 mm) [3-mil (0.08 mm) dry film thickness], at a rate of 0.25 gallon (0.95 L) per 100 square feet (9.2 m<sup>2</sup>). After curing, the DC 315 Top Coat must be applied at a minimum wet film thickness of 16 mils (0.41 mm) [11-mil (0.28 mm) dry film thickness], at a rate of 1 gallon (3.8 L) per 100 square feet (9.2 m<sup>2</sup>). The coatings must be applied over the JM Corbond<sup>®</sup> oc SPF insulation and cured in accordance with the coating report holder's published 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. Each coating must be applied in one coat, by low-pressure airless spray equipment at ambient and substrate temperatures above 50°F (10°C) and relative humidity of less than 70 percent.

#### 4.4 Attics and Crawl Spaces:

**4.4.1 Application with a Prescriptive Ignition Barrier:** When JM Corbond<sup>®</sup> oc SPF 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 that the foam plastic insulation is not exposed. Ventilation in the attic or crawl space must be in accordance with the applicable code. The attic or crawl space area must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1.

**4.4.2 Application without a Prescriptive Ignition Barrier:** Where JM Corbond<sup>®</sup> oc SPF insulation is installed in accordance with Sections 4.4.2.1, 4.4.2.2 or 4.4.2.3, the following conditions apply:

- a. Entry to the attic or crawl space is only for the service of 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. Under-floor (crawl-space) ventilation is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.
- e. Combustion air is provided in accordance with IMC (*International Mechanical Code*<sup>®</sup>) Section 701.

**4.4.2.1 Application with TPR<sup>2</sup> Fireshell<sup>®</sup> IB Intumescent Coating:** JM Corbond<sup>®</sup> oc SPF insulation may be spray-applied, in attics, to the interior facing of walls and to the underside of roof sheathing or roof rafters; and in crawl spaces, as described in this section (Section 4.4.2.1). The thickness of the insulation applied to the underside of roof sheathing and/or rafters and the underside of wood floors and/or floor joists in crawl spaces must not exceed 11<sup>1</sup>/<sub>2</sub> inches (292 mm); the thickness of the insulation applied to the vertical surfaces must not exceed 7<sup>1</sup>/<sub>2</sub> inches (191 mm). The Fireshell<sup>®</sup> IB

intumescent coating must be applied over the insulation in accordance with the coating manufacturer's published 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. The coating is applied with low-pressure airless spray equipment, at a minimum wet film thickness of 4 mils (0.10 mm) [3-mil (0.08 mm) dry film thickness], at a rate of 0.29 gallon (1.10 L) per 100 square feet (9.2 m<sup>2</sup>). The coating must be applied where ambient and substrate temperature is at least 50°F (10°C). The attic or crawl space area must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1.

#### 4.4.2.2 Application with DC315 Intumescent Coating System:

JM Corbond<sup>®</sup> oc SPF insulation may be spray-applied, in attics, to the interior facing of walls and to the underside of roof sheathing or roof rafters; and in crawl spaces, as described in this section (Section 4.4.2.2). The thickness of the insulation applied to the underside of roof sheathing and/or rafters and the underside of wood floors and/or floor joists in crawl spaces must not exceed 11½ inches (292 mm); the thickness of the insulation applied to the vertical surfaces must not exceed 7½ inches (191 mm). The DC315 Top Coat intumescent coating must be applied over the insulation in accordance with the coating manufacturer's published 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. The coating is applied with low-pressure airless spray equipment, at a minimum wet film thickness of 4 mils (0.10 mm) [3-mil (0.08 mm) dry film thickness], at a rate of 0.25 gallon (0.95 L) per 100 square feet (9.2 m<sup>2</sup>). The coating must be applied where ambient and substrate temperature is at least 50°F (10°C). The attic or crawl space area must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1.

**4.4.2.3 Use on Attic Floors:** JM Corbond<sup>®</sup> oc SPF insulation may be installed at a maximum thickness of 7½ inches (191 mm) between joists in attic floors. The insulation must be covered on all exposed surfaces with TPR<sup>2</sup> Fireshell<sup>®</sup> IB intumescent coating as described in Section 4.4.2.1, or the DC315 intumescent coating system as described in Section 4.4.2.2, as applicable. The JM Corbond<sup>®</sup> oc SPF insulation must be separated from the area beneath the attic by an approved thermal barrier. An ignition barrier in accordance with IBC Section 2603.4.1.6 or IRC Section R316.5.3, as applicable, may be omitted.

## 5.0 CONDITIONS OF USE

The JM Corbond<sup>®</sup> oc SPF spray-applied polyurethane 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 and intumescent coatings must be installed in accordance with the report holder's and manufacturer's published installation instructions, this

evaluation report and the applicable code. If there is a conflict between the published installation instructions and this report, this report governs.

- 5.2** This evaluation report and the report holder's (Johns Manville) published installation instructions, when required by the code official, must be submitted at the time of permit application.
- 5.3** The insulation must be separated from the interior of the building by an approved 15-minute thermal barrier as described in Section 4.3.1, except as noted in when installed as described in Section 4.3.2.
- 5.4** The insulation must not exceed the thicknesses and density noted in Sections 3.2, 4.3 and 4.4 of this report.
- 5.5** The insulation must be protected from the weather during and after application.
- 5.6** A vapor retarder must be installed in accordance with the applicable code.
- 5.7** The insulation must be applied by installers approved by Johns Manville.
- 5.8** Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with 2012 IBC Section 2603.9, 2009 IBC Section 2603.8 or IRC Section R318.4, as applicable.
- 5.9** Jobsite certification and labeling of the insulation must comply with IRC Sections N1101.4 and N1101.4.1 and IECC Sections 303.1.1 and 303.1.2, as applicable.
- 5.10** The insulation components are manufactured 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 November 2012 (editorially corrected April 2013), including data in accordance with Appendix X of AC377.
- 6.2** Reports of room corner fire testing in accordance with NFPA 286.

## 7.0 IDENTIFICATION

All packages and containers of JM Corbond<sup>®</sup> oc SPF insulation components must be labeled with the Johns Manville name and address; the product name (JM Corbond<sup>®</sup> oc SPF); the product type (A- or B-component); the flame spread index and the smoke-developed index; the shelf life and expiration date; the mixing instructions; the density; and the evaluation report number (ESR-3776).

The Fireshell<sup>®</sup> (IB) and DC315 (Primer and Top Coat) intumescent coatings must be identified with their respective manufacturer's name and address, the product name and use instructions.

TABLE 1—THERMAL RESISTANCE (R-VALUES<sup>1,2</sup>)JM Corbond<sup>®</sup> oc SPF

THICKNESS (inches)	R-VALUE (°F·ft <sup>2</sup> ·h/Btu)
1	3.6
4	14
6	21
7.5	26
8	28
10	35
11	38
11.5	40
12	42
13	46
13.5	47

For **SI**: 1 inch = 25.4 mm, 1°F·ft<sup>2</sup>·h/Btu = 0.176 110K·m<sup>2</sup>/W.

<sup>1</sup>R-values are calculated based on tested *k* values at 1- and 4-inch thicknesses.

<sup>2</sup>R-values greater than 10 are rounded to the nearest whole number.