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ESR-3776

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Reissued 11/2016
This report is subject to renewal 11/2017.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
SECTION: 07 21 00—THERMAL INSULATION
SECTION: 07 27 00—AIR BARRIERS

REPORT HOLDER:

JOHNS MANVILLE

717 17TH STREET
DENVER, COLORADO 80202

EVALUATION SUBJECT:

JM CORBOND® oc SPF SPRAY FOAM

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ICC-ES Evaluation Report

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 21 00—Thermal Insulation
Section: 07 27 00—Air Barriers

REPORT HOLDER:

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DENVER, COLORADO 80202
(800) 654-3103
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EVALUATION SUBJECT:

JM CORBOND® oc SPF SPRAY FOAM

1.0 EVALUATION SCOPE

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)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Property evaluated:

- Surface-burning characteristics
- Physical properties
- Thermal resistance
- Attic and crawl space applications
- Air permeability
- Exterior walls in Types I through IV construction

2.0 USES

JM Corbond® oc SPF open cell spray foam is used as a nonstructural thermal insulating material in Types I, II, III, IV and V construction (IBC) and dwellings under the IRC. The insulation is for use in wall cavities, floor assemblies, ceiling assemblies or attics and crawl spaces when installed in accordance with Section 4.4; and in Types I through IV construction when installed in accordance with Section 4.5.

Under the IRC, the insulation may be used as air impermeable insulation when installed in accordance with Section 3.4.

3.0 DESCRIPTION

3.1 General:

JM Corbond® oc SPF is a spray-applied cellular polyurethane foam plastic insulation installed as a component of wall assemblies, ceilings, floors, crawlspaces and cavities of roofs. The foam plastic insulation is a two-component, open-cell, one-to-one by volume spray foam system with a nominal density of 0.5 pcf (8 kg/m^3). The insulation is produced in the field by combining a polymeric isocyanate (A component) with a polymeric resin blend (B component). The insulation components have a shelf life of six months when stored in factory-sealed container at temperatures between 40°F (4°C) and 85°F (29°C) before installation.

3.2 Surface-burning Characteristics:

The insulation, at a maximum thickness of 4 inches (102 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. Thicknesses greater than 4 inches (102 mm) are recognized, based on a flame spread index of 25 or less, when the insulation is covered with a minimum $^1/_2$-inch-thick (12.7 mm) gypsum wallboard or an equivalent thermal barrier complying with and installed in accordance with the applicable code.

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:

JM Corbond® oc SPF, at a minimum thickness of 3.75 inches (95 mm), is considered air-impermeable insulation in accordance with 2015 and 2012 IRC Section R806.5 (2009 IRC Sections R806.4) and 2015 IBC Section 1203.3 based on testing in accordance with ASTM 2178.

3.5 TPR^2 Fireshell® JM-TC Intumescent Coating:

TPR^2 Fireshell® JM-TC Intumescent Coating is a one-component, water-based polymer coating. The coating is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of one year when stored in factory-sealed containers at temperatures of 45°F (7°C) or above.

3.6 TPR^2 Fireshell® F10E/TB Intumescent Coating:

TPR^2 Fireshell® F10E/TB Intumescent Coating is identical to TPR^2 Fireshell® JM-TC Intumescent Coating and may be used wherever TPR^2 Fireshell® JM-TC Intumescent Coating is specified.

3.7 TPR^2 Fireshell® JM-IC Intumescent Coating:

TPR^2 Fireshell® JM-IC Intumescent Coating is a one-component, water-based polymer coating. The coating is

supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of one year when stored in factory-sealed containers at temperatures of 45°F (7°C) or above.

3.8 TPR^2 Fireshell® IB4 Intumescent Coating:

TPR^2 Fireshell® IB4 Intumescent Coating is identical to TPR^2 Fireshell® JM-IC Intumescent Coating and may be used wherever TPR^2 Fireshell® JM-IC Intumescent Coating is specified.

3.9 Paint to Protect® DC315 Intumescent Coating:

Paint to Protect® DC315 intumescent coating is manufactured by International Fireproof Technology, Inc. and is a water-based coating supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums. The coating material has a shelf life of 12 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:

JM Corbond® oc SPF insulation must be installed in accordance with the manufacturer's published installation instructions and this report. A copy of the manufacturer's published instructions must be available at all times on the jobsite during installation.

4.2 Application:

The JM Corbond® oc SPF insulation is spray applied on the jobsite using a volumetric positive displacement pump as identified in the Johns Manville application guide. The insulation must be applied when the substrate temperature is between 45°F (7°C) and 120°F (49°C) and must be protected from the weather during and after application. The insulation must not be used in areas that have a maximum service temperature greater than 180°F (82°C). The substrates to which the insulation is applied must be clean, dry and free of frost, ice, loose debris, or contaminates that will interfere with adhesion of the spray foam insulation. The insulation must not be used in electrical boxes or junction boxes or in contact with rain, water or soil.

The insulation is applied in passes having a maximum thickness of 12 inches (305 mm) per pass. Multiple passes can be applied to obtain the desired thickness. The cure time between passes is negligible where multiple passes are used.

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier: JM Corbond® oc SPF insulation must be separated from the interior of the building by an approved thermal barrier of $^1/_2$-inch-thick (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier complying with and installed in accordance with the applicable code, except where the installation complies with the requirements set forth in Section 4.3.2. 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 thermal barrier except as noted in Section 4.4.2.1.

4.3.2 Application without a Prescriptive Thermal Barrier:

4.3.2.1 Application with TPR^2 Fireshell® JM-TC Intumescent Coating: The prescriptive 15-minute thermal barrier may be omitted when installation is in accordance with this section. The insulation and coating may be spray-applied to the interior facing of walls and ceilings and may be left exposed as an interior finish without a code-prescribed 15-minute thermal barrier. The thickness of the foam plastic insulation and intumescent coating applied to the vertical wall surfaces and underside of ceilings must comply with this section and Table 2. The JM Corbond® oc SPF insulation must be covered on all surfaces with the intumescent coating at a minimum wet film thickness and coverage rate indicated in Table 2 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 a single coat by airless spray equipment at ambient temperatures between 62°F and 95°F (16°C and 35°C) and relative humidity of less than 70 percent.

4.3.2.2 Application with Paint to Protect® DC-315 Intumescent Coating: The prescriptive 15-minute thermal barrier may be omitted when installation is in accordance with this section. The insulation and coating may be spray-applied to the interior facing of walls and ceilings and may be left exposed as an interior finish without a code-prescribed 15-minute thermal barrier. The thickness of the foam plastic insulation and intumescent coating applied to the vertical wall surfaces and underside of ceilings must comply with this section and Table 2. The JM Corbond® oc SPF insulation must be covered on all surfaces with the intumescent coating at a minimum wet film thickness and coverage rate indicated in Table 2 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 a single coat by airless spray equipment at ambient temperatures above 50°F (10°C) and relative humidity of less than 70 percent.

4.4 Ignition Barrier - Attics and Crawl Spaces:

4.4.1 Application with a Prescriptive Ignition Barrier: When JM Corbond® 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 and 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. 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.

JM Corbond® oc SPF 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 the requirements of this section, the following conditions apply:

a) Entry to the attic or crawl space is 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 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 with TPR^2 Fireshell® JM-IC Intumescent Coating: In attics, JM Corbond® oc SPF insulation may be spray-applied to the underside of roof rafters, and in crawl spaces, JM Corbond® oc SPF insulation may be spray-applied to the underside of floors as described in this section. The thickness of the foam plastic insulation and intumescent coating applied to the vertical wall surfaces and underside of ceilings must comply with this section and Table 2. The JM Corbond® oc SPF insulation must be covered on all surfaces with the intumescent coating at a minimum wet film thickness and coverage rate indicated in Table 2 in accordance with the coating manufacturer's instructions and this report. The insulation may be left exposed without a covering or coating. 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.

4.4.2.2 Application with Paint to Protect® DC315 Intumescent Coating: In attics, JM Corbond® oc SPF insulation may be spray-applied to the underside of roof rafters, and in crawl spaces, JM Corbond® ocx SPF insulation may be spray-applied to the underside of floors as described in this section. The thickness of the foam plastic insulation and intumescent coating applied to the vertical wall surfaces and underside of ceilings must comply with this section and Table 2. The JM Corbond® oc SPF insulation must be covered on all surfaces with the intumescent coating at a minimum wet film thickness and coverage rate indicated in Table 2 in accordance with the coating manufacturer's instructions and this report. The insulation may be left exposed without a covering or coating. 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.

4.4.2.3 Use on Attic Floors: JM Corbond® oc SPF insulation may be installed at a maximum thickness of 16 inches (406 mm) between and over joists in attic floors. The JM Corbond® oc SPF insulation must be separated from the interior of the building by an approved thermal barrier. The coatings specified in Sections 4.4.2.1 and 4.4.2.2 and the ignition barrier in accordance with IBC Section 2603.4.1.6 and IRC Section R316.5.3 may be omitted.

4.5 Exterior Walls in Types I, II, III and IV Construction: When used on exterior walls of Type I, II, III and IV construction, the JM Corbond® oc SPF spray-applied polyurethane insulation must comply with IBC Section 2603.5 and this section, and the insulation must be installed at a maximum thickness indicated in Table 3. The potential heat of the JM Corbond® oc SPF insulation is 12,385 Btu/lbs (28802 MJ/kg).

5.0 CONDITIONS OF USE

The JM Corbond® oc SPF 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 This evaluation report and the manufacturer's published installation instructions, when required by the code official, must be submitted at the time of permit application.

5.2 JM Corbond® oc SPF insulation and applicable coatings must be installed in accordance with the manufacturer's published installation instructions, this 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.

5.3 JM Corbond® oc SPF 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 Section 4.3.2.

5.4 JM Corbond® oc SPF insulation must be protected from the weather during and after application.

5.5 JM Corbond® oc SPF insulation must be applied by installers certified by Johns Manville or the Spray Polyurethane Foam Alliance (SPFA).

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

5.7 Jobsite certification and labeling of the insulation must comply with 2015 IRC Sections N1101.10.1 and N1101.10.1.1 (2012 IRC Sections N1101.12.1 and N1101.12.1.1 or 2009 IRC Sections N1101.4 and N1101.4.1) and 2015 and 2012 IECC Sections C303.1.1, C303.1.1.1, R303.1.1 and R303.1.1.1 (2009 IECC Sections 303.1.1 and 303.1.1.1), as applicable.

5.8 JM Corbond® oc SPF insulation is produced by Johns Manville 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 2015, including reports of tests in accordance with Appendix X of AC377.

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

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

6.4 Report of critical radiant flux test in accordance with NFPA 259.

6.5 Report on fire propagation characteristics test in accordance with NFPA 285.

7.0 IDENTIFICATION

Components for JM Corbond® oc SPF insulation are identified with the manufacturer's name (Johns Manville), address and telephone number; the product trade name (JM Corbond® oc SPF); product type (A or B component); use instructions; the density; the flame-spread and smoke-developed indices; the evaluation report number (ESR-3776).

Intumescent coatings are identified with the manufacturer's name and address, the product name and use instructions.

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

THICKNESS (inches)	*R*-VALUE (°F.ft^2.h/Btu)
1	3.8
2	7.4
3	11
3.5	13
4	14
5	18
5.2	19
5.5	20
6	22
7	25
7.5	27
8	29
9	33
10	36
11	40
12	43
13	47
14	51
15	54
16	58

For **SI:** 1 inch = 25.4 mm; 1°F.ft^2.h/Btu = 0.176 110 k.m^2/W.
[1]Calculated *R*-values are based on tested *K*-values at 1- and 3.5-inch thicknesses
[*] *R*-values greater than 10 are rounded to the nearest whole number

TABLE 2—ALTERNATE ASSEMBLIES WITHOUT A PRESCRIPTIVE THERMAL BARRIER OR IGNITION BARRIER

Coating	Max. Insulation Thickness Overhead Surfaces	Max. Insulation Thickness Vertical Surfaces	Dry Film Thickness	Wet Film Thickness (minimum)	Application Rate	Applicable Report Section	Test Submitted (AC377)
JM-TC or F10E/TB	9.5 inches (241 mm)	7.5 inches (191 mm)	12 mils (0.30 mm)	18 mils (0.51 mm)	1.23 gal/100 ft^2 (0.508 L/m^2)	4.3.2.1	NFPA 286
DC315	11.5 inches (292 mm)	7.5 inches (191 mm)	12 mils (0.30 mm)	18 mils (0.51 mm)	1.12 gal/100 ft^2 (0.508 L/m^2)	4.3.2.2	NFPA 286
JM-TC or IB4	9.5 inches (241 mm)	7.5 inches (191 mm)	3 mils (0.08 mm)	4 mils (0.10 mm)	0.27 gal/100 ft^2 (0.113 L/m^2)	4.4.2.1	AC377 Appendix X
DC315	11.5 inches (292 mm)	9.5 inches (191 mm)	3 mils (0.08 mm)	4 mils (0.10 mm)	0.25 gal/100 ft^2 (0.112 L/m^2)	4.4.2.2	AC377 Appendix X

TABLE 3—NFPA 285 COMPLYING EXTERIOR WALL ASSEMBLIES

WALL COMPONENT	MATERIALS
Base wall system – Use either 1, 2, or 3	1 – Concrete wall. 2 - Concrete Masonry wall. 3 – 1 layer of $^5/_8$-inch thick Type X gypsum wallboard installed on the interior side of minimum 3$^5/_8$ inch deep, minimum No. 20 gage, galvanized steel studs spaced a maximum of 24-inch on center. Gypsum wallboard must be attached with No. 6, 1$^1/_4$-inch-long self-tapping screws located 8 inches on center along the perimeter and 12 inches in the field of wallboard. Gypsum wallboard joints must be taped and treated with joint compound in accordance with ASTM C840 or GA-216. Lateral bracing installed minimum every 4-ft vertically or as required. Wall stud cavities shall be filled at each floor line with minimum 4 lbs/ft^3 density mineral wool, friction fit between steel wall studs.
Perimeter Fire Barrier System	Perimeter fire barrier system complying with 2015 and 2012 IBC Section 715.4 (2009 IBC Section 714.4) as applicable, shall be installed to fill void between the edge of the concrete floors slab, and the interior surface of the exterior wall assembly.
Cavity insulation	Full cavity depth or less of JM Corbond® oc SPF insulation applied using exterior sheathing as substrate and covering the width of the cavity and inside of stud flange.
Exterior sheathing	Minimum $^5/_8$-inch-thick Type X exterior gypsum sheathing complying with ASTM C1177. (for Base wall system 3 above)
Exterior Wall Covering – Use either 1 or 2	1 – Any noncombustible exterior wall covering material. 2 – Any noncombustible exterior wall covering system with a combustible water resistive barrier (WRB) that has successfully been tested in accordance with NFPA 285. Combustible material, other than the WRB, is not allowed on the exterior side of the exterior sheathing.