ICC-ES Evaluation Report

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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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EVALUATION SUBJECT:

JM OPEN CELL SPRAY FOAM

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2009 *International Building Code*® (IBC)
- 2009 *International Residential Code*® (IRC)
- 2009 *International Energy Conservation Code*® (IECC)
- Other Codes (see Section 8.0)

Properties evaluated:

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

2.0 USES

JM Open Cell Spray Foam is used as a nonstructural thermal insulating material in Type I, II, III, IV and V construction (IBC) and dwellings under the IRC. See Section 4.5 for use in Type I, II, III and IV construction. The insulation is for use in wall cavities, floor assemblies, ceiling assemblies or attics and crawl spaces when installed in accordance with Section 4.0. The insulation may be used in wall assemblies in fire-resistive-rated-construction as described in Sections 3. 5 and 4.4.

3.0 DESCRIPTION

3.1 General:

JM Open Cell Spray Foam is a spray-applied cellular polyurethane foam plastic insulation that is installed in stud 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 is applied in passes having a maximum thickness of 5 inches per pass. Multiple passes are applied to obtain the desired thickness, not exceeding a total thickness of 12 inches (305 mm) for wall cavities and 16 inches (406 mm) for ceiling cavities. The insulation components have a shelf life of six months when stored at temperatures between 65°F (18°C) and 85°F (29°C) before installation. The insulation must not be used in areas that have a maximum service temperature greater than 180°F (82°C). The foam plastic insulation must not be used in electrical outlet or junction boxes or in contact with rain, water or soil. The substrate must be free of moisture, frost or ice, loose scales, rust, oil and grease.

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 less than 25 and a smoke-developed index of less than 450 when tested in accordance with ASTM E 84. Thicknesses up to 12 inches (305 mm) for wall cavities and 16 inches (406 mm) for ceiling cavities are recognized based on room corner fire testing in accordance with NFPA 286, when covered with minimum $^1/_2$-inch-thick (13 mm) gypsum board 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 JM IB Coating:

JM IB coating is a water-based latex coating with a specific gravity of 1.31. JM IB 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 a factory-sealed container at temperatures between 50°F (10°C) and 100°F (38°C).

3.5 Fire resistance-rated Construction:

JM Open Cell Spray Foam insulation is recognized for use in a limited load-bearing, one-hour, fire-resistance-rated wall assembly when installed as described in Section 4.4.

3.6 Air Permeability:

JM Open Cell Spray Foam, at a minimum thickness of 3.5 inches (89 mm), is considered air-impermeable insulation

in accordance with Section R806.4 of the IRC based on testing in accordance with ASTM E 283.

4.0 INSTALLATION

4.1 General:

JM Open Cell Spray Foam insulation must be installed in accordance with the manufacturer's published installation instructions and this report. A copy of the instructions must be available at all times on the jobsite during installation.

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 be applied when the ambient and substrate temperature is between 40°F (4°C) and 120°F (49°C) and must be protected from the weather during and after application. The insulation must not be applied in electrical boxes.

4.2 Thermal Barrier:

JM Open Cell Spray Foam insulation, with a maximum nominal thickness of 12 inches (305 mm) for wall cavities and 16 inches (406 mm) for ceiling cavities, 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. Exception: within an attic or crawl space, installation must be in accordance with Section 4.3.

4.3 Attics and Crawl Spaces:

4.3.1 Application with a Prescriptive Ignition Barrier: When JM Open Cell 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 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. JM Open Cell Spray Foam insulation, as described in this section, may be installed in unvented attics in accordance with IRC Section R806.4.

4.3.2 Application without a Prescriptive Ignition Barrier: In attics, JM Open Cell Spray Foam insulation may be spray-applied to the underside of roof sheathing or roof rafters; and in crawl spaces, JM Open Cell Spray Foam insulation may be spray-applied to the underside of floors as described in this section. The thickness of the foam plastic applied to the underside of the top space must not exceed 16 inches (406 mm). The thickness of the foam plastic applied to vertical surfaces must not exceed 12 inches (305 mm). All foam plastic surfaces must be covered with JM IB intumescent coating described in Section 3.4. The JM IB intumescent coating must be applied over the JM Open Cell Spray Foam insulation in accordance with the manufacturer's instructions and this report. Surfaces to be coated must be dry, clean, and free of dirt, loose debris and any other substances that could interfere with adhesion of the coating. The JM IB coating is applied with a medium-size nap roller, soft brush or conventional airless spray equipment at a rate of 0.6 gallon (2.3 L) per 100 square feet (9.2 m^2). The coating must be applied when ambient and substrate temperatures are above 50°F (10°C) and requires a 24-hour curing time after application. JM Open Cell Spray Foam insulation, as described in this section, may be installed in unvented conditioned attics in accordance with IRC Section R806.4.

4.3.3 Use on Attic Floors: JM Open Cell Spray Foam insulation may be installed at a maximum thickness of 12 inches (305 mm) between joists in attic floors. JM Open Cell Spray Foam 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 and IRC Section R316.5.3 may be omitted.

4.4 One-hour Fire-resistance-rated Wall Assembly (Limited Load-bearing):

4.4.1 Initial Face: One layer of $^{5}/_{8}$-inch-thick (15.9 mm) Type X gypsum wallboard must be applied parallel to the interior face of 2-by-6 wood studs spaced a maximum of 16 inches (406 mm) on center. The gypsum boards must be attached using Type S, $1^{5}/_{8}$-inch-long (41 mm) screws spaced 8 inches (203 mm) on center. All exposed wallboard joints must be taped with joint tape, and compound and screw heads must be covered with joint compound in accordance with ASTM C 840 or GA216.The interior cavity is filled with JM Open Cell Spray Foam insulation.

Opposite Face: One layer of $^{5}/_{8}$-inch-thick (15.9 mm) Type X gypsum wallboard must be applied in the same manner as for the initial face. The horizontal joints in the gypsum wallboard on the opposite face must be staggered a minimum of 8 inches (203mm) from the horizontal joints in the wallboard on the initial face. If the intention is for use as an exterior wall, code-complying sheathing and a code-complying exterior wall covering must be installed in accordance with the applicable code.

4.4.2 Axial Load Design: Axial loads applied to the wall assembly must be limited to the lesser of the following:

1. 2,756 pounds (122 642 N) per stud.
2. A maximum of 51 percent of the load calculated in accordance with Sections 3.6 and 3.7 of the ANSI/AF&PA NDS.

4.5 Exterior Walls in Types I, II, III and IV Construction:

When used on walls of Type I, II, III and IV construction, the assembly in which the JM Open Cell Spray Foam insulation is used must comply with Section 2603.5 of the IBC. The potential heat of the foam plastic in any portion of the walls or panels must not exceed the potential heat, expressed in Btu/ft² (MJ/m²), of the foam plastic insulation contained in the wall assembly tested in accordance with NFPA 285. The potential heat of the JM Open Cell Spray Foam insulation is 488 Btu/ft² (5.5 MJ/m²) per inch of thickness.

5.0 CONDITIONS OF USE

The JM 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 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 Open Cell Spray Foam insulation and JM IB intumescent coating 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 Open Cell Spray Foam insulation must be separated from the interior of the building by an approved 15-minute thermal barrier, as described in Section 4.2, except as noted in this report.

5.4 JM Open Cell Spray Foam insulation must be protected from the weather during and after application.

5.5 JM Open Cell Spray Foam insulation must be applied by installers certified by Johns Manville.

5.6 When use is on buildings of Types I, II, III and IV construction, documentation must be submitted to the code official verifying that the insulation has been qualified as a component of an assembly tested in accordance with IBC Sections 2603.5.1 (unless constructed in accordance with Section 4.4), 2603.5.5 and 2603.5.7. The maximum potential heat of the foam plastic used in the assembly must be no greater than that noted in Section 4.5.

5.7 Use of JM Open Cell Spray Foam 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, as applicable.

5.8 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.

5.9 In exterior wall applications, a vapor retarder may be required by the code official in accordance with IBC Section 1405.3 or IRC Section R601.3, as applicable.

5.10 JM Open Cell Spray Foam insulation is produced in Phoenix, Arizona and Spring, Texas, under a quality control program with inspections by Underwriters Laboratories Inc. (AA-668).

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated November 2009, 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 Reports of air leakage tests in accordance with ASTM E 283.

6.4 Reports of tests in accordance with ASTM E 119.

6.5 Reports of potential heat of foam plastic tests in accordance with NFPA 259.

7.0 IDENTIFICATION

Components for JM Open Cell Spray Foam insulation are identified with the report holder's name (Johns Manville), address and telephone number; the product trade name (JM Open Cell Spray Foam); product type (A or B component); use instructions; the density; the flame-spread and smoke-developed indices; the evaluation report number (ESR 3086); and the name of the inspection agency (Underwriters Laboratories Inc.).

JM IB Coating is identified with the report holder's name (Johns Manville) and address, the product name and use instructions.

8.0 OTHER CODES:

In addition to the codes reference in Section 1.0, the products described in this report were evaluated for compliance with the requirements of the following codes:

- 2006 *International Building Code*® (2006 IBC)
- 2006 *International Residential Code*® (2006 IRC)
- 2006 *International Energy Conservation Code*® (2006 IECC)
- 2003 *International Building Code*® (2003 IBC)
- 2003 *International Residential Code*® (2003 IRC)
- 2003 International Energy Conservation Code® (2003 IECC)

The products comply with the above-mentioned codes as described in Sections 2.0 through 7.0 of this report, except as noted below:

- **Application with a Prescriptive Ignition Barrier:** See Section 4.3,1 except attics must be vented in accordance with Section 1203.2 of the 2003 IBC or Section R806 of the 2003 IRC, and crawl space ventilation must be in accordance with IBC Section 1203.3 or IRC Section R408, as applicable.
- **Application without a Prescriptive Ignition Barrier:** See Section 4.3.2, except attics must be vented in accordance with Section 1203.2 of the 2003 IBC or Section R806 of the 2003 IRC, and crawl space ventilation must be in accordance with IBC Section 1203.3 or IRC Section R408, as applicable.

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

THICKNESS (inches)	*R*-VALUE (°F.ft^2.h/Btu)
ASTM C 518 TEST VALUES	
1	3.8
2	7.5
3	11
3.5	12
3.5*	13
4	14
CALCULATED VALUES[1]	
5	17
5.5	19
6	21
6.5	22
7	24
7.5	26
8	27
9	31
10	34
11	38
12	41
13	45
14	48
15	51
16	54

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 a 3.5-inch thickness.
*Values are applicable when application is in multiple passes.