EVALUATION REPORT

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DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07210—Building Insulation

REPORT HOLDER:
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EVALUATION SUBJECT:
JM Corbond™ lll PERFORMANCE INSULATION®

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2009 *International Building Code®* (IBC)
- 2009 *International Residential Code®* (IRC)
- 2009 *International Energy Conservation Code®* (IECC)
- 2009 NFPA 5000 *Building Construction and Safety Code™*

1.2 Evaluated in accordance with:

- ICC AC377 Dated November 2010

1.3 Properties evaluated:

- Surface burning characteristics
- Thermal performance (R-value)
- Physical properties
- Air Infiltration
- Vapor Permeance
- Fungal Resistance
- Exterior walls of Types I, II, III, IV, and V construction
- Attic and crawl space applications

2.0 USES

JM Corbond™ III is a non-structural, closed cell, spray applied, polyurethane foam plastic insulation for use in wall cavities, floor assemblies, ceiling assemblies, and attics and crawl spaces. It may be used in buildings of Type I, II, III, IV, and V construction per the IBC, residential structures constructed in accordance with the IRC, and buildings of Type I, II, III, IV, and V construction per NFPA 5000.

3.0 DESCRIPTION

3.1 Product Information:

3.1.1 JM Corbond™ III is a two component, spray applied, medium-density, closed cell polyurethane foam plastic insulation system having a nominal density of 2.0 pcf (32 kg/m^3). It is generated by combining the isocyanate (part A) and a polymeric resin (part B) through a dual component proportioner, on site, by factory trained and certified contractors. All materials should be stored in their original containers, kept out of direct sunlight and away from heat and moisture, especially after the seals have been broken and the containers have been opened. Shelf life is 6 months when unopened and stored indoors at a temperature between 60°F (16°C) and 70°F (21°C).

3.1.2 The part A isocyanate is red in color and the part B polymeric resin is blue in color which when properly mixed and applied yields a Lavender® finished foam insulation product. The Lavender® color is a Federal Registered Trademark color for JM Corbond™ III

3.2 Surface Burning Characteristics:

3.2.1 JM Corbond™ III, when tested in accordance with ASTM E-84, at a maximum thickness of 6 inches (152 mm), and a nominal density of 2.0 pcf (32 kg/m^3), has a flame spread index of less than 25 and a smoke developed index of not more than 450.

3.2.2 Thicknesses of up to 11-1/4 inches (285.8 mm) for ceiling or floor cavities and 9-1/4 inches (235 mm) for wall cavities are recognized based on testing in accordance with NFPA 286, when covered with a minimum ½ inch thick (12.7 mm) gypsum board or an equivalent thermal barrier complying with, and installed in accordance with, the applicable code.

3.3 Thermal Resistance, R-Values:

3.3.1 Refer to Table 1 for the values of thermal resistance (R-Value) for various thicknesses.

3.4 Vapor Retarder:

3.4.1 JM Corbond™ III, when tested in accordance with Procedure A of ASTM E96, has a vapor permeance of less than 1 perm (5.7 x 10^{-11} kg/Pa-s-m^2) at a minimum thickness of 1.5 inches (38.1 mm), and may be used where a

vapor retarder is required by the code and qualifies as a vapor retarder as defined in IBC Section 202, IRC Section R202 and NFPA 5000 Section 3.3.644.1.

3.5 Air Permeability:

3.5.1 JM Corbond™ III, when tested in accordance with ASTM E283 is air-impermeable when installed at 1.5 inch (38.1 mm) thickness or greater.

3.6 Fungal Resistance:

3.6.1 JM Corbond™ III, when tested in accordance with ASTM C1338 exhibits no fungal growth.

3.7 Ignition Barriers:

3.7.1 JM IB ignition Barrier: JM IB ignition barrier coating is supplied by Johns Manville Corporation. The coating is a single component, water-based, intumescent latex coating available in both 5 gallon (18.9 L) and 55 gallon (208 L) containers and has a shelf life of 12 months when stored in factory-sealed containers between 40°F (4.4°C) and 110°F (43.3°C).

3.7.2 TPR2 F1E Fireshell Ultra ignition barrier: TPR2 F1E Fireshell Ultra ignition barrier coating is manufactured by Thermal Products Research (TPR2). The coating is water-based and available in both 5 gallon (18.9 L) and 55 gallon (208 L) containers and has a shelf life of 12 months when stored in factory-sealed containers.

3.7.3 JM Spider® Ignition Barrier:

3.7.3.1 JM Spider® ignition barrier is supplied by Johns Manville Corporation. The JM Spider® loose-fill glass fiber material is mixed with an adhesive during the spraying process and adheres to the foam. The insulation is available in 30 lb (13.6 kg) bags. It must be kept clean and dry at all times. The spray-applied fiberglass product can be installed at variable thickness levels, is formaldehyde-free, and can be used for both wall and ceiling applications.

3.7.3.2 The JM Spider® adhesive comes in totes and 55 gallon (208 L) drums. The adhesive must be stored in a cool, dry area in original packaging and at temperatures above 40°F (4.4°C).

4.0 INSTALLATION

4.1 General:

4.1.1 JM Corbond™ III shall be installed in accordance with the manufacturer's installation instructions, the applicable code and this report. The installation instructions and this report shall be available on the jobsite during installation.

4.2 Application:

4.2.1 JM Corbond™ III shall be installed by spray application using a dual component, volumetric, positive displacement pump to combine A and B components in a one to one volumetric ratio, as specified in the manufacturer's installation instructions.

4.2.2 JM Corbond™ III shall not be applied to areas where the maximum service temperature is greater than 180°F (82°C). JM Corbond™ III, shall be applied to substrates that are clean, dry, and free from frost, ice, loose debris or contaminants that will interfere with the adhesion of the spray foam insulation. JM Corbond™ III shall not be applied in electrical outlets, junction boxes, to substrates over 110°F (43°C), or in direct contact with water and must be protected from the weather during and after application.

4.2.3 JM Corbond™ III may be applied in passes of uniform thickness from a minimum of ½ inch (13mm) to a maximum of 3 inches (76mm) per pass. The total thickness shall be as specified in Sections 3.2.1, 4.4, 4.5, 4.6, and 4.7. 'Flash' passes or a thin pass of less than 1" on cold surfaces is to be avoided and may result in loss of adhesion of subsequent passes. Thicknesses over 3 inches (76mm) require multiple passes. JM Corbond™ III, must be allowed to cure and cool between each pass.

4.2.4 When JM Corbond™ III is used in conjunction with wood construction, in jurisdictions that have adopted the IRC, and where termite infestation is "very heavy" as determined in accordance with IBC figure 2603.8 or IRC figure 301.2(6), the foam plastic shall be installed in accordance with IBC section 2603.8 or IRC section R318.4 as appropriate.

4.2.5 When JM Corbond™ III is used in conjunction with wood construction, in jurisdictions that have adopted NFPA 5000, and where termite infestation is known to be heavy, the foam plastic shall be installed in accordance with NFPA 5000 section 45.6.9.5.

4.3 Thermal Barrier:

4.3.1 JM Corbond™ III shall be installed at a maximum thickness of 9-1/4 inches (235 mm) in walls and 11-1/4 inches (285.8 mm) in ceilings and shall be separated from the interior of the building by a 15 minute thermal barrier such as 1/2" (12.7 mm) thick gypsum wallboard or an equivalent approved thermal barrier. The thermal barrier shall comply with, and be installed in accordance with IBC Section 2603.4, IRC Section R316.4, or NFPA 5000 section 48.3.3, as appropriate. See Sections 4.4, 4.5, 4.6, and 4.7 for requirements when installed in attics, crawl spaces or sill plates and headers.

4.4 Ignition Barriers:

4.4.1 JM IB ignition barrier: surfaces to be coated must be dry, clean, and free of dirt, loose particles and any other substances that could interfere with adhesion of the coating. Back-rolling of sprayed material may be necessary to fill pinholes in substrate. The intumescent coating is applied with a medium-size nap roller, soft brush or conventional airless spray equipment at 0.6 gallons per 100 sq. ft. and a minimum thickness of 10 wet mils (5 dry mils). The coating must be applied in accordance with manufacturer's specifications.

4.4.2 TPR2 F1E Fireshell Ultra: 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 intumescent coating is applied with a medium-size nap roller, soft brush or conventional airless spray equipment at a minimum thickness of 30 wet mils (17 dry mils). Foam must have at least 12 hours cure before applying TPR2 Fireshell. The coating must be applied in accordance with manufacturer's specifications.

4.4.3 JM Spider® shall be installed by insulation contractors who have been trained and certified by Johns Manville. Installers shall use only the JM Spider® Insulation Delivery System equipment engineered and provided by Johns Manville. JM Spider® must be applied in accordance with Johns Manville installation specifications. If being installed at temperatures below 50°F (10°C) the adhesive must be heated and applied per Johns Manville specifications. JM Spider® spray-on insulation shall be installed at a minimum 2-1/2 inches (63.5 mm) thickness and a nominal density of 1.8 pcf (28.8 kg/m^3).

4.5 Attics:

4.5.1 JM Corbond™ III may be installed in unvented conditioned attics and unvented cathedral ceilings in accordance with IRC section R806.4 provided the JM Corbond™ III is applied in a thickness of 1.5 inches (38.1 mm) or more, and is applied in direct contact with the underside/interior of the structural roof deck. The JM Corbond™ III must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

4.5.2 Application with prescriptive ignition barrier:

4.5.2.1 JM Corbond™ III may be installed in attics when covered with a prescriptive ignition barrier in lieu of a thermal barrier in accordance with IBC Section 2603.4.1.6, IRC Sections R316.5.3 or NFPA 5000 Section 48.3.3.4(6) under the following conditions:

- The JM Corbond™ III shall be applied to the underside/interior of the structural roof deck and rafters at a maximum thickness of 11-1/4 inches (285.8 mm) and to walls and floors at a maximum thickness of 9-1/4 inches (235 mm).
- Entry to the attic is limited to service of utilities, mechanical and electrical systems and the incidental access by the owner.
- The JM Corbond™ III shall be protected against ignition by one of the following:
  - 1.5-inch-thick (38mm) mineral fiber insulation;
  - 0.25-inch-thick (6.4 mm) wood structural panel, particleboard or hardboard;
  - 0.375-inch (9.5mm) gypsum wallboard,
  - corrosion-resistant steel having a base metal thickness of 0.016 inch (0.4mm), or
  - other approved material installed in such a manner that the JM Corbond™ III is not exposed.
  - The protective covering shall be consistent with the requirements for the type of construction.

The JM Corbond™ III must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

4.5.3 Application without a prescriptive ignition barrier:

4.5.3.1 JM Corbond™ III may be installed exposed in attics without a thermal barrier or prescriptive ignition barrier as described in this section.

- The JM Corbond™ III shall be applied to the underside/interior of the structural roof deck and rafters at a maximum thickness of 10 inches (254 mm) and to walls and floors at a maximum thickness of 8 inches (203.2 mm).
- The JM Corbond™ III shall be covered by a protective coating of one of the following:
  - JM IB applied at a thickness of not less than 10 mils wet or
  - TPR2 Fireshell Ultra applied at a thickness of not less than 30 mils wet.
  - JM Spider® applied at 2-1/2 inches (63.5 mm) thickness minimum.
- Entry to the attic is limited to the service of utilities, mechanical and electrical systems. No storage is permitted**.**
- Air in the attic is not circulated to other parts of the building**.**
- There are no interconnected attic areas**.**
- Attic ventilation is provided when required by IBC Section 1203.2 or IRC section R806**.**
- Combustion air is provided in accordance with Section 701 and Section 703 of the International Mechanical Code**.**

4.5.3.2 JM Corbond™ III may be installed in inaccessible attics without an ignition barrier. The JM Corbond™ III must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

4.6 Attic Floors:

4.6.1 Application with prescriptive ignition barrier:

4.6.1.1 JM Corbond™ III may be installed between and over joists in accessible attic floors at a maximum thickness of 9-1/4 inches (235 mm) in accordance with IBC Section 2603.4.1.6, IRC Sections R316.5.3 or NFPA 5000 Section 48.3.3.4(6) and, as applicable, with a prescriptive ignition barrier, under the following conditions:

- Entry to the attic is limited to service of utilities, mechanical and electrical systems and the incidental access by the owner.
- The JM Corbond™ III shall be protected against ignition by one of the following:
  - 1.5-inch-thick (38 mm) mineral fiber insulation;
  - 0.25-inch-thick (6.4 mm) wood structural panel, particleboard or hardboard;
  - 0.375-inch (9.5mm) gypsum wallboard,
  - corrosion-resistant steel having a base metal thickness of 0.016 inch (0.4 mm), or
  - other approved material installed in such a manner that the JM Corbond™ III is not exposed.
- The protective covering shall be consistent with the requirements for the type of construction.

The JM Corbond™ III must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

4.6.2 Application without a prescriptive ignition barrier or thermal barrier:

4.6.2.1 JM Corbond™ III may be installed exposed between and over joists in attic floors without a thermal barrier or prescriptive ignition barrier as described in this section.

- The JM Corbond™ III shall be applied to the underside/interior of the structural roof deck and rafters at a maximum thickness of 8 inches (203.2 mm).
- The JM Corbond™ III shall be covered by a protective coating of one of the following:
  - JM IB applied at a thickness of not less than 10 mils wet or
  - TPR2 Fireshell Ultra applied at a thickness of not less than 30 mils wet.
  - JM Spider® applied at 2-1/2 inches (63.5 mm) thickness minimum.
- Entry to the attic is limited to the service of utilities, mechanical and electrical systems. No storage is permitted**.**
- Air in the attic is not circulated to other parts of the building**.**
- There are no interconnected attic areas**.**

- Attic ventilation is provided when required by IBC Section 1203.2 or IRC section R806**.**
- Combustion air is provided in accordance with Section 701 and Section 703 of the International Mechanical Code**.**

4.6.2.2 JM Corbond™ III may be installed exposed between and over joists in inaccessible attics and attic floors without an ignition barrier, at a maximum thickness of 9-1/4 inches (235 mm). The JM Corbond™ III must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

4.7 Crawl Spaces:

4.7.1 Application with prescriptive ignition barrier:

4.7.1.1 JM Corbond™ III may be installed in crawl spaces when covered with a prescriptive ignition barrier in lieu of a thermal barrier in accordance with IBC Section 2603.4.1.6, IRC Sections R316.5.4 or NFPA 5000 Section 48.3.3.4(6), as applicable, with a prescriptive ignition barrier under the following conditions:

- The JM Corbond™ III shall be applied to the underside of the structural floor deck and joists at a maximum thickness of 11-1/4 inches (285.8 mm) and to walls at a maximum thickness of 9-1/4 inches (235 mm).
- Entry to the crawl space is limited to service of utilities, mechanical and electrical systems and the incidental access by the owner.
- The JM Corbond™ III shall be protected against ignition by one of the following:
  - 1.5-inch-thick (38 mm) mineral fiber insulation;
  - 0.25-inch-thick (6.4 mm) wood structural panel, particleboard or hardboard;
  - 0.375-inch (9.5 mm) gypsum wallboard,
  - corrosion-resistant steel having a base metal thickness of 0.016 inch (0.4 mm), or
  - other approved material installed in such a manner that the JM Corbond™ III is not exposed.
  - The protective covering shall be consistent with the requirements for the type of construction.

The JM Corbond™ III must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

4.7.2 Application without a prescriptive ignition barrier or thermal barrier:

4.7.2.1 JM Corbond™ III may be installed in crawl spaces without a thermal barrier or prescriptive ignition barrier as described in this section.

- The JM Corbond™ III shall be applied to the underside/interior of the structural floor deck and joists at a maximum thickness of 10 inches (254 mm) and on walls at a maximum thickness of 8 inches (203.2 mm).
- The JM Corbond™ III shall be covered by a protective coating of one of the following:
  - JM IB applied at a thickness of not less than 10 mils wet or
  - TPR2 Fireshell Ultra applied at a thickness of not less than 30 mils wet.
  - JM Spider® applied at 2-1/2 inches (63.5 mm) thickness minimum.
- Entry to the attic is limited to the service of utilities, mechanical and electrical systems. No storage is permitted**.**
- Air in the attic is not circulated to other parts of the building**.**
- There are no interconnected attic areas**.**
- Attic ventilation is provided when required by IBC Section 1203.2 or IRC section R806**.**
- Combustion air is provided in accordance with Section 701 and Section 703 of the International Mechanical Code**.**

4.7.2.2 JM Corbond™ III may be installed exposed in inaccessible crawl spaces without an ignition barrier, at a maximum thickness of 11-1/4 inches (285.8 mm) to the underside of floors and 9-1/4 inches (235 mm) to walls. The JM Corbond™ III must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

4.8 Sill Plates and Headers:

4.8.1 Application without a prescriptive ignition barrier or thermal barrier:

4.8.1.1 JM Corbond™ III may be installed exposed on sill plates and headers without a thermal barrier, or ignition barrier, in accordance with IBC Section 2603.4.1.13, IRC Section R316.5.11, or NFPA 5000 Section 48.3.3.4(11) subject to the following:

- The maximum thickness of the JM Corbond™ III shall be 3 ¼ inches (83mm)

4.9 Application in Exterior Walls of Types I, II, III and IV Construction:

4.9.1 When used on walls of Type I, II, III and IV construction, JM CORBOND™ III spray-applied foam insulation must comply with Section 2603.5 of the IBC. The potential heat of the foam plastic in any portion of the walls must not exceed the potential heat expressed in BTU/ft^2 (MJ/m^2), of the foam plastic contained in the wall assembly subjected to the NFPA 285 test procedure. The potential heat of the JM Corbond™ III is 1991 BTU/ft^2 (22.4 MJ/m^2) per inch of thickness.

Assembly Number 1:

1. Framing: 3-5/8 inch (92 mm), 25 GA galvanized steel studs, 24 inch (609.6 mm) o.c.

2. Interior Cladding: 5/8 inch (15.9 mm) Type X gypsum wallboard attached using 1-1/4 inch (31.8 mm) self-drilling screws spaced 8 inch (203.2 mm) o.c. around perimeter and 12 inch (304.8 mm) o.c. in the field.

2. Substrate: ½ inch thick DensGlass® Gold Exterior Sheathing attached with #6 x 1-1/4 inch (31.8 mm) self-drilling screws spaced 8 inches (203.2 mm) o.c.

3. Insulation: JM Corbond™ III SPF Insulation, nominal density 2.0 pcf (32 kg/m^3), nominal 3-1/2 inch (88.9 mm) thickness, spray applied to the DensGlass® Gold Exterior Sheathing.

4. Facing Anchors: 3-1/2 inch (88.9 mm) X-seal HD6 Hohmann & Barnard, Inc. anchors, installed in the insulation, over the DensGlass® Gold Exterior Sheathing, 16 inch (406.4 mm) o.c. using 5" (127 mm) hex head self drill screws, creating a minimum 1" (25.4 mm) airspace.

5. Exterior Facing: Standard 4 inch (101.6 mm) clay brick; running bond pattern using Type S masonry cement.

5.0 CONDITIONS OF USE

5.1 The JM Corbond™ III Performance Insulation System® described in this report complies with, or is a suitable alternative to what is specified in the codes listed in Section 1.0 of this report.

5.1.1 When required by the code official, this evaluation report, and the manufacturers most recently published installation instructions shall be submitted at the time of permit application.

5.1.2 JM Corbond™ III and the ignition barrier materials must be installed in accordance with this report, the applicable codes, and the manufacturer's installation instructions. If there are any conflicts among these documents, this report shall prevail.

5.1.3 JM Corbond™ III shall be separated from interior living spaces of the building by an approved 15 minute thermal barrier.

5.1.4 The thickness of JM Corbond™ III as installed shall not exceed those noted in sections 3.2.1, 4.4, 4.5, 4.6, and 4.7 of this report.

5.1.5 JM Corbond™ III shall be protected from the weather after installation.

5.1.6 Installation of JM Corbond™ III in areas where the probability of termite infestation is "Very Heavy" as determined in accordance with IBC Figure 2603.8 or IRC Figure R301.2(6), shall be in accordance with IBC Section 2603.8 or IRC Section R318.4 as applicable.

5.1.7 In jurisdictions that have adopted NFPA 5000, installation of JM Corbond™ III in areas where the probability of termite infestation is known to be Heavy shall be in accordance with NFPA 5000 section 45.6.9.5.

5.1.8 Installation of JM Corbond™ III shall be by contractors certified by Johns Manville.

5.1.9 JM Corbond™ III is produced by Johns Manville under a quality control system, including periodic inspections.

5.1.10 Jobsite certification and labeling of the components A and B must comply with IRC Sections N1101.4 and N1101.4.1 and IECC sections 303.1.1 and 303.1.1.1 as applicable.

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with ICC-ES Acceptance Criteria for Spray-Applied Foam Plastic Insulation (AC377) dated November 2010.

6.2 Reports on air leakage tests in accordance with ASTM E 283.

6.3 Reports on water vapor transmission tests in accordance with ASTM E 96.

6.4 Reports on Fungal Resistance tests in accordance with ASTM C1338.

6.5 Reports on flame spread and heat release in accordance with NFPA 286.

6.6 Reports on Exterior Fire Propagation tests in accordance with NFPA 285.

6.7 Reports on Potential Heat tests in accordance with NFPA 259.

6.8 Reports on Heat Release and Flame Propagation in accordance with AC377 Appendix X.

7.0 IDENTIFICATION

7.1 Each component for the JM Corbond™ III is identified with the following:

- Manufacturer's name (Johns Manville), address and telephone number,
- Product trade name (JM Corbond™ III),
- Product density,
- Flame-spread and smoke-development indices and the name of the inspection agency (Quality Auditing Institute, Ltd.),
- Evaluation report number (IAPMO-0146), and the name of the inspection agency (IAPMO ES).

IAPMO #0146

Director of Evaluation Services

TABLE 1—THERMAL RESISTANCE (R-Value)

JM Corbond™ III	
Thickness (Inch)	**R-Value (°F.ft^2.h/Btu)**
1.0	6.4
2.0	12.7
3.0	19.2
3.5	22.4
4.0	25.6
5.0	32.1
5.5	35.3
6.0	38.5
7.0	44.9
8.0	51.2
9.0	57.7
10.0	64.1
11.0	70.5
12.0	76.9