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EVALUATION SUBJECT: JM CORBOND III® PERFORMANCE INSULATION SYSTEM®

REPORT HOLDER:

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CSI DIVISION: 07 - THERMAL AND MOISTURE PROTECTION

CSI Section: 07210 - Building Insulation

1.0 SCOPE OF EVALUATION

1.1 Compliance to the following codes & regulations:

- 2012 and 2009 International Building Code® (IBC)
- 2012 and 2009 International Residential Code® (IRC)
- 2012 and 2009 International Energy Conservation Code® (IECC)
- 2012 and 2009 NFPA 5000 Building Construction and Safety Code™

1.2 Evaluated in accordance with:

- ICC-ES AC377 Dated November 2012 (Editorially corrected April 2013)

1.3 Properties assessed:

- 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 PRODUCT USE

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. The foam plastic insulation complies with Section 2603 of the IBC, Section R316 of the IRC, and Sections C402 and R402 of the IECC for the specific uses described in this report. The insulation may be used in buildings of Types 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 PRODUCT DESCRIPTION

3.1 General Description

3.1.1 JM Corbond III® is a two-component, spray-applied, medium-density, closed-cell polyurethane foam plastic insulation system having a nominal core density of 2.0 pcf (32 kg/m³). It is generated by combining the isocyanate (A-component) and a polymeric resin (B-component) through a dual component proportioner, on site, by SPFA certified or Johns Manville certified applicators. All materials shall be stored in their original containers, which shall be kept out of direct sunlight and away from heat and moisture. When stored unopened and indoors at a temperature between 50°F (10°C) and 80°F (27°C), the shelf life for A-component isocyanate is 12 months, and B-component polymeric resin is 6 months. Prior to use, both components (A and B) shall be conditioned in a manner that results in drum temperatures between 60°F (16°C) and 75°F (24°C).

3.1.2 A-component isocyanate and B-component polymeric resin properly mixed and applied yields a Lavender® finished foam insulation product. The Lavender® color is a Federal Registered Trademark color of Johns Manville.

3.2 Surface Burning Characteristics

3.2.1 JM Corbond III®, when tested in accordance with ASTM E84, at a maximum thickness of 4 inches (102 mm), and a nominal core density of 2.0 pcf (32 kg/m³), has a flame spread index of less than 25 and a smoke developed index of not more than 450.

3.2.2 Thicknesses are not limited for ceiling cavities and wall cavities when covered by a prescriptive thermal barrier (minimum ½-inch [12.7 mm] thick gypsum board) in accordance with Section 4.3.1 of this report. Thicknesses of up to 11½ inches (292 mm) for ceiling or floor cavities and 7½ inches (191 mm) for wall cavities are recognized based on testing in accordance with NFPA 286, when installed in accordance with Section 4.3.2 of this report.

3.3 Thermal Resistance: The R-value of JM Corbond III is 7.0 per inch regardless of thickness. Refer to Table 1 of this report for additional information on the values of thermal resistance (R-Value) for specific thicknesses.

3.4 Water Vapor Resistance: JM Corbond III®, when tested in accordance with Procedure A of ASTM E96, has a vapor permeance of less than 1 perm (57 ng/Pa-s-m²) at a

The product described in this Uniform Evaluation Service (UES) Report has been evaluated as an alternative material, design or method of construction in order to satisfy and comply with the intent of the provisions of the code, as noted in this report, and for at least equivalence to that prescribed in the code in quality, strength, effectiveness, fire resistance, durability and safety, as applicable, in accordance with IBC Section 104.11.

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minimum thickness of 1.5 inches (38 mm), and qualifies as a Class II vapor retarder as defined in IBC Section 202, IRC Section R202 and NFPA 5000 Section 3.3.644.1.

3.5 Air Permeability: JM Corbond III[®], when tested in accordance with ASTM E283 at a minimum thickness of 1.0 inches (25.4 mm) exhibits a maximum total air leakage rate of 0.02 L/s-m² (0.004 ft³/min-ft²) when tested at a 75 Pa pressure differential and qualifies as an air-impermeable insulation for use in attics in accordance with the applicable code.

3.6 Fungal Resistance: JM Corbond III[®], when tested in accordance with ASTM C1338 exhibits no fungal growth.

3.7 Fire Protective Coatings

3.7.1 JM IC: JM IC 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 above 45°C (7°C).

3.7.2 JM TC: JM TC thermal 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 above 45°C (7°C).

3.7.3 DC315 Fireproof Paint: DC315 Fireproof Paint is a water-based latex intumescent coating manufactured by International Fireproof Technology, Inc. and is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums. When stored in factory-sealed containers at temperatures between 50°F (10°C) and 80°F (27°C), the coating has a shelf life of 12 months.

3.8 JM Spider[®] Ignition Barrier

3.8.1 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 plastic. The JM Spider[®] is available in 30 lb (13.6 kg) bags. It shall be kept clean and dry at all times. The spray-applied fiberglass product may be installed at variable thickness levels, and may be used for both wall and ceiling applications.

3.8.2 The JM Spider[®] adhesive comes in totes and 55 gallon (208 L) drums. The adhesive shall 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. Where conflicts occur the more restrictive shall govern. The installation instructions and this report shall be made available upon request.

4.2 Application

4.2.1 JM Corbond III[®] shall be installed by spray application using a dual component, volumetric, positive displacement proportioner 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 120°F (49°C), or in direct contact with water and shall be protected from the weather during application.

4.2.3 JM Corbond III[®] may be applied in passes of uniform thickness from a minimum of ½ inch (13 mm) to a maximum of 3 inches (76 mm) per pass. The total thickness shall be as specified in Sections 3.2.2, 4.3, 4.4, and 4.5. "Flash" passes or a thin pass of less than 1 inch (25 mm) on cold surfaces is to be avoided and may result in loss of adhesion of subsequent passes. Thicknesses over 3 inches (76 mm) require multiple passes allowing JM Corbond III[®] to cure and cool between each pass.

4.2.4 When JM Corbond III[®] is used in conjunction with wood construction, and where termite infestation is "very heavy" as determined in accordance with IBC Figure 2603.9 or IRC Figure 301.2(6), the foam plastic shall be installed in accordance with IBC Section 2603.9 or IRC Section R318.4 as applicable.

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 General: JM Corbond III[®] shall be covered with a thermal barrier except as specifically excluded by the applicable code.

4.3.2 Application with a Prescriptive Thermal Barrier: JM Corbond III[®] may be applied at any thickness in ceiling



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cavities and in wall cavities when separated from the interior of the building by a prescriptive thermal barrier (1/2-inch [12.7 mm] minimum thickness of gypsum board). The gypsum board shall be installed in accordance with the applicable provisions in Section 2508 of the IBC or Section R702.3 of the IRC in such a manner that the foam plastic is not exposed.

4.3.3 Application without a Prescriptive Thermal Barrier: JM Corbond III® may be installed without a prescriptive thermal barrier when it has been installed in accordance with one of the assemblies in Table 2 of this report.

4.4 Attics and Crawl Spaces: When installing JM Corbond III® in attics and/or crawl spaces and a thermal barrier is omitted in accordance with IBC Section 2603.4.1.6 or IRC Sections R316.5.3 or R316.5.4, installation shall comply with either Sections 4.4.1 or 4.4.2 of this report.

JM Corbond® III spray-foam insulation qualifies as an air-impermeable insulation and, when installed in accordance with Sections 4.4.1 or 4.4.2 of this report, may be used to insulate unvented attics and/or unvented cathedral ceilings in accordance with IRC Section R806.4.

4.4.1 Application with a Prescriptive Ignition Barrier: When JM Corbond III® insulation is installed within attics and crawl spaces where entry is made only service of utilities, the insulation shall be protected by an ignition barrier in accordance with IBC Section 2603.4.1.6 or IRC Sections R316.5.3 and R316.5.4, as applicable. The ignition barrier shall be consistent with the construction type of the building. The ignition barrier shall be installed in accordance with the provisions applicable to the material referenced in the IBC or IRC in such a manner that the foam plastic is not exposed. The maximum thickness of JM Corbond® III is limited to 11½ inches (292 mm) on overhead surfaces and floors and 9¼ inches (235 mm) on vertical surfaces.

4.4.2 Application without a Prescriptive Ignition Barrier: Where the spray-applied foam plastic insulation is installed in accordance with Section 4.4.2.1 or 4.4.2.2 of this report, the following conditions apply:

- a) Entry to the attic or crawl space is only to service utilities, and no storage is permitted.
- b) Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806, except when an air-impermeable insulation is permitted in unvented attics in accordance with Section R806.4 of the IRC. Under-floor (crawl space) ventilation

is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.

- c) The foam plastic insulation is limited to the maximum thickness and density stated in this report.
- d) Combustion air is provided in accordance with Sections 701 and 703 (2006 IMC) and Section 701 (2009 IMC).
- e) The installed coverage rate or thickness of coatings, if part of the insulation system, shall be equal to or greater than that which was tested.

4.4.2.1 Attic and Crawl Space Overhead and Vertical Surfaces: JM Corbond III® spray foam insulation may be spray-applied without a prescriptive ignition barrier to overhead surfaces and/or vertical surfaces when covered with an alternative ignition barrier as described in Sections 4.4.2.1.1, or 4.4.2.1.2 (and as summarized in Table 4).

4.4.2.1.1 JM IC Ignition Barrier: Surfaces to be coated shall 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 substrates. The JM IC Ignition Barrier shall be applied with a medium-size nap roller, soft brush or conventional airless spray equipment to a minimum dry film thickness of 3 mils (0.08 mm) (requiring an application rate of approximately 4 wet mils [0.10 mm] or 345 ft²/gal [8.3 m²/L]). The coating shall be applied in accordance with the JM IB Product Data Sheet and this report. The maximum thickness of JM Corbond® III is limited to 5½ inches (140 mm) on overhead surfaces and 3½ inches (89 mm) on vertical surfaces.

4.4.2.1.2 JM Spider®: 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 specified by Johns Manville. JM Spider® shall be applied in accordance with Johns Manville installation specifications. If the installation temperatures are below 50°F (10°C) the adhesive shall be heated and applied per Johns Manville specifications. JM Spider® spray-on insulation shall be installed at a minimum 2½ inches (63.5 mm) thickness and a nominal density of 1.8 pcf (28.8 kg/m³). The maximum thickness of JM Corbond® III is limited to 10 inches (254 mm) on overhead surfaces and 8 inches (203 mm) on vertical surfaces.

4.4.2.2 Attic Floors: JM Corbond III® insulation may be installed exposed (no coating), without an ignition barrier up to a maximum thickness of 11½ inches (292 mm) between and over the joist in attic floors. The insulation shall be separated from the interior of the building by a minimum ½-inch (12.7 mm) thick gypsum board or an



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approved equivalent thermal barrier, which shall be installed in accordance with the provisions set forth in the IBC, IRC, or evaluation report. The ignition barrier required by IBC Section 2603.4 and IRC Section R316.5.3 may be omitted in this case.

4.5 Exterior Walls of Types I, II, III and IV Construction (IBC)

4.5.1 When used on exterior walls of Type I, II, III and IV construction, JM Corbond III[®] spray-applied foam insulation shall comply with Section 2603.5 of the IBC and Section 4.5.2, and shall be installed at a maximum thickness of 3½ inches (88.9 mm). The potential heat of the JM Corbond III[®] is 1991 BTU/ft² (22.4 MJ/m²) per inch of thickness when tested in accordance with NFPA 259.

4.5.2 Specific Wall Assemblies: Wall assemblies shall be constructed as described in Table 3 of this report.

5.0 LIMITATIONS

The JM Corbond III[®] spray-applied foam plastic 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 Installation: The product shall be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. The more restrictive shall govern if there are any conflicts between the manufacturer's published installation instructions and this report.

5.2 Thermal Barrier: JM Corbond III[®] insulation shall be protected by a 15-minute thermal barrier in accordance with Section 4.3 of this report except when installation complies with one or more of the following:

- (1) Exceptions specifically provided in the applicable code;
- (2) Section 4.3.2 (Application without a Prescriptive Thermal Barrier) of this report;
- (3) Section 4.4 (Attics and Crawl Spaces) of this report.

5.3 Quality Assurance: The A- and B-components of the insulation are produced by Johns Manville under a quality control program with inspections by Quality Auditing Institute, Ltd.

5.4 Contractor Certification: JM Corbond III[®] insulation shall be installed by contractors certified by SPFA or Johns Manville.

5.5 Termite Protection: When JM Corbond III[®] insulation

is used in areas where the likelihood of termite infestation is "very heavy," it shall be installed in accordance with 2009 IBC Section 2603.8 or IRC Section R318.4, as applicable.

5.6 Jobsite Labeling: Jobsite labeling and certification of the insulation shall comply with IRC Sections N1101.4 and N1101.4.1 and IECC Sections C303.1.1 and C303.1.2, R303.1.1 and R303.1.2 as applicable.

5.7 Water Vapor Retarder: The JM Corbond III[®] qualifies as a Class II vapor retarder at thicknesses of 1.5 inches (38 mm) or greater as defined in IRC Section R202 and IECC Section 202.

5.8 Construction Types: When used in exterior walls of buildings of Type I, II, III or IV construction, application shall be as described in Section 4.5 of this report.

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with ICC-ES Acceptance Criteria for Spray-Applied Foam Plastic Insulation (AC377) dated November 2012 (Editorially revised April 2013).

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.



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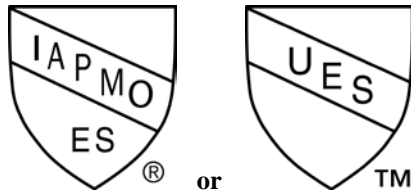
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7.0 IDENTIFICATION

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 (ER146), and the name of the inspection agency (IAPMO ES).

Either Mark of Conformity may be used as shown below:



IAPMO ER #146

Brian Gerber, P.E., S.E.
Vice President, Technical Operations
Uniform Evaluation Service

Richard Beck, PE, CBO, MCP
Vice President, Uniform Evaluation Service

GP Russ Chaney
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For additional information about this evaluation report please visit
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TABLE 1—THERMAL RESISTANCE (R-Value)¹

Thickness (Inch)	R-Value (°F.ft ² .h/Btu)
1.0	7.0
2.0	14
3.0	21
3.5	24.5
4.0	28
5.0	35
5.5	38.5
6.0	42
7.0	49
8.0	56
9.0	63
10.0	70
11.0	77
12.0	84

For SI: 1 inch= 25.4 mm; 1 °F•ft²•hr/Btu =0.176110 °K•m²•hr/W.

¹R-values are calculated based on tested k-factors at 1- and 4-inch thicknesses

TABLE 2: ALTERNATE ASSEMBLIES WITHOUT A PRESCRIPTIVE THERMAL BARRIER^{1,2}

Coating	Max. Insulation Thickness Overhead Surfaces	Max. Insulation Thickness Vertical Surfaces	Dry Film Thickness	Wet Film Thickness (nominal)	Application Rate ¹ (theoretical)
JM TC	11.5 in. 292 mm	7.5 in. 191 mm	12 mils 0.30 mm	18 mils 0.46 mm	86 ft ² /gal 2.11 m ² /L
DC315	11.5 inches 292 mm	7.5 inches 191 mm	12 mils 0.30 mm	18 mils 0.46 mm	89 ft ² /gal 2.18 m ² /L

Notes:¹Theoretical coating application rates are based strictly on minimum wet film thickness requirements and shall be increased for site-specific conditions such as foam plastic surface texture, overspray loss, container and other residues, application technique and environmental conditions.

² The coatings shall be applied in accordance with the Product Data Sheet and this report in such a manner that the foam plastic is not exposed.



TABLE 3: NFPA 285 COMPLYING EXTERIOR WALL ASSEMBLIES

WALL COMPONENTS	MATERIALS
Base wall system	1 layer of minimum 5/8-inch thick Type X gypsum wallboard installed over 3 5/8 inch deep No. 25-gage galvanized steel studs at a minimum of 24-inches on center
Wall Openings	Wall openings framed with minimum No.14 gage [0.075 in (1.91 mm)] steel such that insulation and cavity are not exposed.
Exterior sheathing	1/2-inch thick minimum DensGlass® Gold Exterior Sheathing attached with # 6 x 1 1/4 inch long self-drilling screws spaced 8 inches on center
Exterior insulation	JM Corbond® III SPF Insulation, nominal density 2.0 pcf, maximum 3.5 inch thickness, spray-applied to the exterior side of the exterior sheathing.
Exterior wall covering – Use either 1, 2, 3 or 4	<ol style="list-style-type: none"> 1. Brick <ol style="list-style-type: none"> a. 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) on center using 5-inch (127 mm) hex head self-drilling screws, creating a minimum 1 inch (25.4 mm) airspace. b. Standard 4-inch (101.6 mm) clay brick; running bond pattern using Type S masonry cement mortar. 2. Stucco: Minimum 3/4-inch thick, exterior Portland cement-sand plaster and metal lath. 3. Stone: Minimum 2-inch thick natural stone or minimum 1 1/2-inch thick cast artificial stone. Any standard non-open jointed installation technique can be used. 4. Terracotta cladding: Minimum 1 1/4-inch thick cladding system. Any standard non-open jointed installation technique can be used

For SI: 1 inch= 25.4 mm; 1.0 pcf =16 kg/m³

TABLE 4: ALTERNATE IGNITION BARRIERS

Coating/Cover	Max. Insulation Thickness Overhead Surfaces	Max. Insulation Thickness Vertical Surfaces	Dry Film Thickness	Wet Film Thickness (nominal)	Application Rate (nominal)
JM IC Ignition Barrier Coating	5 1/2 inches 140 mm	3 1/2 inches 89 mm	3 mils 0.08 mm	4 mils 0.1 mm	345 ft ² /gal 8.3 m ² /L
JM Spider®	10 inches 254 mm	8 inches 203 mm	2.5 inches 64 mm	NA	NA

Notes: NA = Not Applicable