



Report Number: 0174  
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## DIVISION: 07—THERMAL AND MOISTURE PROTECTION

Section: 07210—Building Insulation

### REPORT HOLDER:

ICYNENE INC.

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### EVALUATION SUBJECT:

MD-R-200™ Spray Foam Insulation

## 1.0 EVALUATION SCOPE

### 1.1 Compliance with the following codes:

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

### 1.2 Evaluated in accordance with:

- ICC AC 377 Dated July 2009

### Property evaluated:

- Surface burning characteristics
- Thermal performance (R-value)
- Physical properties
- Water Vapor Transmission
- Air Infiltration

## 2.0 USES

Icynene MD-R-200™ Spray Foam Insulation is spray-applied, semi-rigid, medium-density, open cell cellular polyurethane foam plastic that is installed as a nonstructural component of floor/ceiling and wall assemblies.

## 3.0 DESCRIPTION

### 3.1 Product Information:

**3.1.1** Icynene MD-R-200™ is a two-component, open cell spray-applied semi-rigid polyurethane foam plastic insulation system, fully water blown with a density of 2.0 lbs/ft<sup>3</sup> (32 kg/m<sup>3</sup>). The polyurethane foam is produced by combining a polymeric isocyanate (A) and a resin (B). By-products of the reaction include carbon dioxide and steam which act together as a blowing agent.

### 3.2 Surface Burning Characteristics:

**3.2.1** The Icynene MD-R-200™, at a thickness of 2 inches (50.8 mm) and a density of 2.0 lbs/ft<sup>3</sup> (32 kg/m<sup>3</sup>) has a flame spread index of less than 25 and a smoke developed index of less than 450 when tested in accordance with ASTM E84.

### 3.3 Thermal Resistance, R-Values:

**3.3.1** The Icynene MD-R-200™ has a thermal transmission (R-Value) of 5.2 ft<sup>2</sup>-h-°F/Btu (0.80 m<sup>2</sup>-K/W) at a 1-inch (25.4 mm) thickness and a density of 2.0 lbs/ft<sup>3</sup> (32 kg/m<sup>3</sup>). See Table 1 for R-value ratings at various thicknesses.

### 3.4 Vapor Retarder:

**3.4.1** Icynene MD-R-200™, when tested in accordance with Procedure A of ASTM E96, has a perm rating of 1.31 perms and is not a vapor retarder. Therefore, when required by IRC Section R318 or IECC Sections 402.5 and 502.5, a vapor retarder must be provided.

### 3.5 Air Permeability:

**3.5.1** Icynene MD-R-200™, when tested in accordance with ASTM E283 is air-impermeable when installed at 2 inch (50.8 mm) thickness or greater.

### 3.6 Intumescent Coatings:

**3.6.1 Aldocoat 757:** Aldocoat 757 Ignition Barrier Protective Coating® is a water based latex coating manufactured by Aldo Products Company Inc. Aldocoat 757 is supplied in 5-gallon (19L) pails and 55-gallon (208 L) drums. It has a shelf life of 6 months when stored in factory sealed containers at temperatures between 40°F (4.5°C) and 90°F (32°C).



Report Number: 0174  
Issued: 01/2010  
Expires: 01/2011

**3.6.2 Magna Safecoat Latex:** Magna Safecoat Latex intumescent fire retardant coating is a latex based coating manufactured by Magna Coatings Technology Inc. Magna Safecoat is supplied in 1-gallon (4 L) or 5-gallon (19 L) pails and 55-gallon (208 L) drums. It has a shelf life of 24 months when stored in factory sealed containers at temperatures above 50°F (10°C).

## 4.0 INSTALLATION

### 4.1 General

**4.1.1 Icynene MD-R-200™ Spray Foam Insulation** shall be installed in accordance with the manufacturer's published installation instructions and this report. The manufacturer's published installation instructions and this report shall be strictly adhered to and a copy of these instructions shall be available at all times on the jobsite during installation.

### 4.2 Application

**4.2.1 Icynene MD-R-200™** is spray-applied on the jobsite using a volumetric positive displacement pump as identified in the Icynene application manual. The Icynene MD-R-200™ resin component shall not be stored, before installation, at temperatures below 50°F (10°C) or above 100°F (35°C). Icynene MD-R-200™ shall not be used in areas that have a maximum service temperature greater than 200°F (93°C). The foam plastic shall not be sprayed into electrical outlet or junction boxes or in contact with rain, water, or soil. The foam plastic shall not be sprayed onto a substrate that is wet or covered with frost or ice, loose scales, rust, oil, or grease. The insulation shall be protected from the weather after application.

**4.2.2 Aldocoat 757:** When required by Sections 4.4.3, 4.5.2 or 4.6.2, the Aldocoat 757 ignition barrier protective coating is recommended to be applied by medium nap rollers, soft brushes or conventional airless spray equipment. Surface must be free of loose particles or other foreign matter that may inhibit proper adhesion and affect performance of the coating. Apply Aldocoat 757 in one coat at the rate of not less than 0.75 gallon per 100 sq. ft. Minimum dry mil

thickness shall be 7.5 mils. Do not store material at temperatures below 45° F. Do not apply Aldocoat 757 when ambient air and substrate temperatures fall below 50° F.

**4.2.3 Magna Safecoat Latex:** When required by Sections 4.4.3, 4.5.2 or 4.6.2, the Magna Safecoat Latex protective coating must be applied in accordance with the coating manufacturer's instructions. 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 Magna Safecoat Latex ignition barrier is applied by brush, roller or airless sprayer. Apply uniformly to entire surface in one coat at the rate of not less than 0.75 gallon per 100 sq. ft. The wet film thickness should be 11.7 mil yielding a dry thickness of 5.0 mil. A wet film thickness gauge can be used at the start of the application to check that sufficient SafeCoat Latex has been applied. Surface and ambient temperature must be maintained at greater than 50° F (10° C) during application and must remain so for at least 48 hours following the application. The application of SafeCoat Latex should be uniform and leave no exposed uncoated surfaces or edges.

### 4.3 Thermal Barrier

Icynene MD-R-200™ shall be separated from the interior occupied area of the building by an approved thermal barrier of 0.5 inch (12.7mm) gypsum wallboard or an equivalent 15-minute thermal barrier complying with and installed in accordance with the applicable code. A thermal barrier is not required where installation is in an attic or crawl space as described in Section 4.4.1, 4.4.2 and 4.4.3 of this report, between the foam plastic insulation and the attic or crawl space.

### 4.4 Attics:

**4.4.1 Icynene MD-R-200™** may be installed in unvented conditioned attics and unvented cathedral ceilings in accordance with IRC section R806.4 and IECC Section 502.5 provided the Icynene MD-R-200™ is applied in a thickness of 2 inches (38.1 mm) or more, and is applied in direct contact with the underside/interior of the structural roof deck. The Icynene MD-R-200™ must be separated from the interior occupied area of the building

Report Number: 0174

Issued: 01/2010

Expires: 01/2011

by an approved thermal barrier in accordance with Section 4.3.

**4.4.2 Application with prescriptive ignition barrier:** Icynene MD-R-200™ may be installed within attics, when covered by a prescriptive ignition barrier, in accordance with IBC Section 2603.4.1.6 or IRC Section R314.5.3, under the following conditions:

- MD-R-200 may be applied at a maximum thickness of 11 inches (279.4mm) to the underside of the roof ceiling and 5 inches (127mm) on the walls.
- Entry to the attic is limited to service of utilities, mechanical and electrical systems. No storage is permitted.
- The Icynene MD-R-200™ shall be protected against ignition by one of the following:
  - 1.5-inch-thick (38mm) mineral fiber insulation;
  - 0.25-inch-thick (6.4mm) 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 Icynene MD-R-200™ is not exposed.
- The protective covering shall be consistent with the requirements for the type of construction.

The Icynene MD-R-200™ must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

**4.4.3 Application without a prescriptive ignition barrier:**

**4.4.3.1 Intumescent Coated:** Icynene MD-R-200™ may be installed in attics without a prescriptive ignition barrier subject to the following conditions:

- Entry to the attic is limited to 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.
- Combustion air is provided in accordance with Section 701.4.2 of the International Mechanical Code.
- The maximum thickness of the MD-R-200 foam on the ceiling or roof shall be 11 inches (279.4mm).
- The maximum thickness of MD-R-200 foam on the walls shall be 6 inches (152.4 mm).
- The foam on the walls shall be covered with Aldocoat 757 or Safecoat Latex per Sections 4.2.2 or 4.2.3 of this report.

The Icynene MD-R-200™ must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

**4.4.3.2 Icynene MD-R-200™** may be installed in inaccessible attics without an ignition barrier. The maximum thickness shall be 11.25 inches (285.8mm) on roofs and 5.5 inches (139.7mm) on walls. The Icynene MD-R-200™ must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

**4.5 Attic Floors:**

**4.5.1 Application with prescriptive ignition barrier:**

**4.5.1.1 Icynene MD-R-200™** may be installed between and over joists in accessible attic floors at a maximum thickness of 5 inches (127mm) in accordance with IBC Section 2603.4.1.6 or IRC Sections R314.5.3 with a prescriptive ignition barrier, under the following conditions:

- Entry to the attic is limited to 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.
- Combustion air is provided in accordance with Section 701.4.2 of the International Mechanical Code.

Report Number: 0174  
Issued: 01/2010  
Expires: 01/2011

- The Icynene MD-R-200™ shall be protected against ignition by one of the following:
  - 1.5-inch-thick (38mm) mineral fiber insulation;
  - 0.25-inch-thick (6.4mm) 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 Icynene MD-R-200™ is not exposed.
- The protective covering shall be consistent with the requirements for the type of construction.

The Icynene MD-R-200™ 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 without a prescriptive ignition barrier or thermal barrier:

4.5.2.1 Icynene MD-R-200™ may be installed between and over joists in attics and attic floors without an ignition barrier, at a maximum thickness of 3.5 inches (88.9mm) 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.
- Air in the attic is not circulated to other parts of the building
- There are no interconnected attic areas.
- Combustion air is provided in accordance with Section 701.4.2 of the International Mechanical Code.

The maximum thickness of spray foam shall be 6 inches (152mm) if covered with Aldocoat 757 or Safecoat Latex per Sections 4.2.2 or 4.2.3 of this report.

The Icynene MD-R-200™ must be separated from the interior occupied area of the building

by an approved thermal barrier in accordance with Section 4.3.

#### 4.6 Crawl Spaces:

4.6.1. Application with prescriptive ignition barrier: Icynene MD-R-200™ may be installed within crawl spaces, when covered by a prescriptive ignition barrier, in accordance with IBC Section 2603.4.1.6 or IRC Section R314.5.3, under the following conditions:

- MD-R-200 may be applied at a maximum thickness of 11 inches (279.4mm) to the underside of the floor and 3.5 inches (88.9mm) on the walls.
- Entry to the attic is limited to service of utilities, mechanical and electrical systems. No storage is permitted.
- The Icynene MD-R-200™ shall be protected against ignition by one of the following:
  - 1.5-inch-thick (38mm) mineral fiber insulation;
  - 0.25-inch-thick (6.4mm) 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 Icynene MD-R-200™ is not exposed.
- The protective covering shall be consistent with the requirements for the type of construction.

The Icynene MD-R-200™ 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:

4.6.2.1 Intumescent Coated: Icynene MD-R-200™ may be installed in crawl space without a prescriptive ignition barrier subject to the following conditions:



**Report Number: 0174**  
**Issued: 01/2010**  
**Expires: 01/2011**

- Entry to the crawl space is limited to service of utilities, mechanical and electrical systems. No storage is permitted.
- Under-floor (crawl space) ventilation is provided in accordance with IMC Sections 701 and 703.
- Combustion air is provided in accordance with Sections 701 and 703 of the International Mechanical Code.
- The maximum thickness of the MD-R-200 foam on the ceiling shall be 11 inches (279.4mm).
- The maximum thickness of MD-R-200 foam on the walls shall be 6 inches (152.4 mm).
- The foam on the walls shall be covered with Aldocoat 757 or Safecoat Latex per Sections 4.2.2 or 4.2.3 of this report.
- The Icynene MD-R-200™ must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

**4.6.2.2** Icynene MD-R-200™ may be installed exposed in inaccessible crawl spaces without an ignition barrier. The maximum thickness shall be 11.25 inches (285.8mm) on floor joists and 5.5 inches (139.7mm) on walls. The Icynene MD-R-200™ must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

## **5.0 CONDITIONS OF USE**

**5.1** The Icynene MD-R-200™ Spray Foam Insulation 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, subject to the following conditions:

**5.1.1** This evaluation report and the manufacturer's published installation instructions, when required by the code official, shall be submitted at the time of permit application.

**5.1.2** The Icynene MD-R-200™ Spray Foam Insulation shall be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code.

**5.1.3** The Icynene MD-R-200™ Spray Foam Insulation shall be separated from the interior occupied area of the building by an approved 15-minute thermal barrier, except when installed in attics and crawl spaces as described in Sections 4.4, 4.5, and 4.6 of this report.

**5.1.4** The Icynene MD-R-200™ Spray Foam Insulation shall not exceed the thicknesses noted in Sections 4.4, 4.5, and 4.6 of this report.

**5.1.5** The Icynene MD-R-200™ Spray Foam Insulation shall be protected from the weather after installation.

**5.1.6** The Icynene MD-R-200™ Spray Foam Insulation shall be applied by contractors certified by Icynene Inc.

**5.1.7** In jurisdictions that have adopted the IRC, when installed in buildings of wood construction, the insulation shall not be installed on the exterior of foundation walls or below floor slabs on ground or in contact with ground. The insulation shall have a clearance above grade and exposed earth of 6 inches (152 mm) or greater.

**5.1.8** The Icynene MD-R-200™ Spray Foam Insulation is limited to use in Type V-B construction under the IBC and dwellings under the IRC except where a Fire Performance Evaluation in accordance with ASTM E119 and other applicable tests allows for use in other types of building construction.

**5.1.9** The Icynene MD-R-200™ Spray Foam Insulation is produced in Mississauga, Ontario, Canada, under a quality control program with inspections by Intertek Testing Services NA, Ltd. (IAS AA-689).

**5.1.10** Use of Icynene MD-R-200™ Spray Foam Insulation as fire blocking has not been evaluated and is beyond the scope of this report.

**5.1.11** Jobsite certification and labeling of the insulation must comply with IRC Sections N1101.4 and N1101.4.1 and IECC Sections 102.1.1 and 102.1.1.1 as applicable.

## **6.0 EVIDENCE SUBMITTED**

**6.1** Data in accordance with ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC377), dated July 2009.

Report Number: 0174  
Issued: 01/2010  
Expires: 01/2011

**6.2** Engineering fire risk analysis of comparative crawl space fire testing.

**6.3** Reports of water vapor transmission in accordance with ASTM E96 Procedure A.

**6.4** Reports of air leakage in accordance with ASTM E283.

## 7.0 IDENTIFICATION

**7.1** Each package of components for the Icynene MD-R-200™ Spray Foam Insulation is identified with

- the manufacturer's name (Icynene Inc.)
- the manufacturer's address and telephone number,
- the product trade name (Icynene MD-R-200™),
- use instructions,
- the density,
- the flame spread and smoke developed indices,
- the evaluation report number (IAPMO-0174), and
- the name of the inspection agency (Intertek Testing Services NA, Ltd.).



IAPMO #0174

A handwritten signature in black ink, appearing to read 'Amir M. ...'.

Director of Evaluation Services

# EVALUATION REPORT



Report Number: 0174  
Issued: 01/2010  
Expires: 01/2011

**TABLE 1 — THERMAL PERFORMANCE MD-R-200**

<b>Tested per ASTM C518</b>	<b>Thermal Resistance (R-value)</b>
Thickness (Inch)	(°F-ft <sup>2</sup> -h/Btu)
1	5.2
3.5	18.3
5.5	28.7
6	31.4
7.5	39.2
9	47.0
10	52.3
11	57.5
15	78.4