

PRODUCT SPECIFICATION

1. PRODUCT NAME

ICYNENE LD-R-50™

ICYNENE LD-R-50™ is a trademark for renewable based, light density, open celled, flexible, all water blown polyurethane foam insulation manufactured by Icynene Inc. ICYNENE LD-R-50™ is a 0.5 lbs/ft³ density, free rise material.

2. MANUFACTURER

ICYNENE LD-R-50™ is made on-site from liquid components manufactured by Icynene Inc. Installation and on-site manufacturing are supplied by independent Icynene Licensed Dealers.

3. PRODUCT DESCRIPTION

Icynene’s next generation of high performance products, ICYNENE LD-R-50™, is a renewable-based, 0.5 lb., 100% water-blown foam insulation and air barrier material. ICYNENE LD-R-50™ exceeds ICC-SAVE and USDA BioPreferredSM standards for a renewable-based product.

Using high-yield castor oil, a safe, natural ingredient also found in personal care products such as lip balm, ICYNENE LD-R-50™ reduces the need for petroleum-based polyol. ICYNENE LD-R-50™ is an environmentally preferable product that contains no ozone-depleting substances, is PBDE-free, and is 100% water-blown.

It insulates and air-seals in one step for maximum energy conservation while minimizing the environmental impact during manufacturing and construction. Significantly reducing air leakage means ICYNENE LD-R-50™ contributes to a healthier, quieter and more comfortable indoor environment, while reducing energy consumption and related greenhouse gas emissions by as much as 50%.

ICYNENE LD-R-50™ is an effective “breathing” [Vapor Permeable] air barrier that can move with the building to maintain the air barrier characteristic against energy-robbing air leakage for the life of the building. Convective air movement inside cavities is virtually

eliminated, providing more uniform temperatures throughout the building.

The result is superior quality construction, with higher comfort levels and lower heating and/or cooling costs. Energy savings will vary depending on building design, location, etc.

ICYNENE LD-R-50™ is applied by spraying liquid components onto an open wall, crawl space, ceiling surface or cathedral ceiling. There it expands 100:1 in seconds to provide a flexible foam blanket of millions of tiny air cells, filling building cavities, cracks and crevices in the process. It adheres to virtually all surfaces, sealing out air infiltration. Excess material is easily trimmed off, leaving a surface ready for drywall or other finish.

4. TECHNICAL DATA

(Based on Core Samples)

Renewable Content

ASTM D6866 > 7%

Thermal Performance

Thermal resistance R/in. (RSI/25mm)
ASTM C518: R3.7 hr. ft² °F/BTU
RSI 0.65 m² °C/W

Average insulation contribution in a full fill stud wall:

2” x 4” = R13 2” x 6” = R20

ICYNENE LD-R-50™ provides more effective performance than the equivalent R-value of air permeable insulation materials. ICYNENE LD-R-50™ is not subject to loss of R-value due to aging, settling, convection or air infiltration; nor will it be prone to traditional moisture intrusion via convective air flow. A FACT SHEET with R-value data is available upon request.

Air Permeance/Air Barrier /Air Seal

ICYNENE LD-R-50™ fills any shaped cavity, and adheres to most construction materials, creating assemblies with very low air permeance. Additional interior or exterior air infiltration protection is subject to applicable codes.

Air permeability of core foam:
ASTM E283 data
<0.02 L/S-m² @75 Pa for 3”

ASTM E2178 data
0.007 L/s.m² @ 75 Pa. for 5.5”

In all buildings, adequate mechanical ventilation/air supply should be provided for optimum IAQ [Indoor Air Quality]. See ASHRAE Guidelines #62 – Ventilation for Acceptable Indoor Air Quality.

Water Vapor Permeance

ICYNENE LD-R-50™ is water vapor permeable and allows moisture to diffuse through the insulation and dissipate from the building envelope.

Water vapor transmission properties:

ASTM E96 data:
17 perms @ 2”
1005 ng (Pa.s.m²) @ 50mm

In those situations that warrant a vapor barrier, the use of low vapor permeable paint on the interior drywall is adequate.

Water Absorption Properties

Water can be forced into the foam under pressure because it is open celled. Water will drain by gravity, given favorable drying potential and upon drying, all chemical and physical properties are fully restored.

Burn Characteristics

ICYNENE LD-R-50™ is a combustible product and is therefore, consumed by flame, but will not sustain flame upon removal of the flame source. It leaves a charcoal residue. It will not melt or drip. ICYNENE LD-R-50™ is subject to all applicable National/State and County building codes regarding fire prevention and requirements for Thermal Barrier coverings must be met as per the applicable building code having jurisdiction.

U.S.A. Specifications

Surface Burning Characteristics as per ASTM E84*:	
Flame Spread	<25
Smoke Development	<450
Fuel Contribution	Zero
Oxygen Index ASTM D2863	23%
[Will not sustain flame]	

*flame spread rating not intended to reflect hazards under actual fire conditions.

Bacterial or Fungal Growth and Food Value

Independent testing conducted as per ASTM C1338 showed that ICYNENE LD-R-50™ is not a source of food for mold; and as an air barrier, ICYNENE LD-R-50™ reduces the airborne introduction of moisture, food, and mold spores into the building envelope.

Environmental / Health / Safety

ICYNENE LD-R-50™ is 100% water-blown and therefore contains no ozone-depleting blowing agents. It is also PBDE-free. It has been thoroughly evaluated for in-situ emissions by industry and government experts. VOC emissions are below 1/100th of the safe concentration level (TLV) within hours following the application ICYNENE LD-R-50™. A 12 hr. time to occupancy period is established for ICYNENE LD-R-50™ and recommended for highly sensitive people.

ICYNENE LD-R-50™ is CHPS E.Q. 2.2/Section 01350 Compliant and listed as such in the Collaborative for High Performance Schools (CHPS) Low Emitting Materials (LEM) Table. Under LEED guidelines, products that are CHPS E.Q. 2.2/Section 01350 Compliant are considered Environmentally Preferable Products.

Not intended for exterior use. Not to be installed within 3" of heat emitting devices, where the temperature is in excess of 200°F, or in accordance with applicable codes.

5. INSTALLATIONS

ICYNENE LD-R-50™ is installed by a network of Licensed Dealers, trained in the installation of ICYNENE LD-R-50™. Installation is generally independent of

environmental conditions. ICYNENE LD-R-50™ can be installed in hot, humid or freezing conditions. Surface preparation is generally not necessary. Within seconds, the foaming process is complete.

6. AVAILABILITY

Check regional Yellow Pages™ or contact Icynene Inc. at 800-758-7325 or our website at www.Icynene.com for a local Icynene Licensed Dealer.

7. WARRANTY

WHEN INSTALLED PROPERLY IN ACCORDANCE WITH INSTRUCTIONS, THE COMPANY WARRANTS THAT THE PROPERTIES OF THE PRODUCT MEET PRODUCT SPECIFICATIONS AS OUTLINED IN THIS PRODUCT SPECIFICATION SHEET. SAVE AND EXCEPT ANY EXCLUSIONS REFERENCED IN THE WARRANTY.

8. TECHNICAL

Icynene Licensed Dealers and Icynene Inc. provide support on both technical and regulatory issues. Architectural specifications in CSI 3-Part format are available upon request.

9. REGULATORY

ICYNENE LD-R-50™ has been tested as per the requirements of The International Code Council — Evaluation Service's AC377. ESR 0165 (IAPMO report) has been issued. This data has also been submitted for the preparation of an ICC ES Report.

10. RELATED REFERENCES

All physical properties were determined through testing by accredited third party

agencies. Icynene Inc. reserves the right to change specifications in its effort of continuous improvement. Please confirm that technical data literature is current.

11. PACKAGING AND STORAGE

- Packaging - 55 U.S. gallon open top steel drums
- Component 'A' - 550 lb. per drum
- Base Seal® - Polyisocyanate MDI
- Component 'B' - 500 lb. per drum
- ICYNENE LD-R-50™ - Resin

Storage

Component A, Base Seal®, Polymeric Isocyanate and ICYNENE LD-R-50™ Resin (Component B) ideally should be stored between 15°C (60°F) and 32°C (90°F).

Component A should be protected from freezing.

Component B can be frozen but must be protected from overheating (49°C /120°F) and prolonged storage above 38°C /100°F. Component B separates during storage and should be mixed thoroughly prior to use.

12. INSTALLATION SPECIFICATIONS

Must be installed by Icynene Licensed Dealers.

Refer to the Icynene Installer's Manual for expanded information.



ICYNENE™
HEALTHIER, QUIETER, MORE ENERGY EFFICIENT*

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DIVISION: 07—THERMAL AND MOISTURE PROTECTION

Section: 07210—Building Insulation

REPORT HOLDER:

ICYNENE INC.

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EVALUATION SUBJECT:

LD-C-50™ and LD-R-50™

Spray Foam Insulation and Air Barrier

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
- Air Infiltration
- Fungal Resistance

2.0 USES

Icynene LD-C-50™ and LD-R-50™ Spray Foam Insulation is spray-applied, semi-rigid, low-density, 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 LD-C-50™ and LD-R-50™ is a two-component, open cell spray-applied semi-rigid polyurethane foam plastic insulation system, fully water blown with a density of 0.42 – 0.55 lbs/ft² (6.7 – 8.8 kg/m²). 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 LD-C-50™ and LD-R-50™, at a thickness of 5 inches (152 mm) and a density of 0.42 – 0.55 lbs/ft² (6.7 – 8.8 kg/m²) 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 LD-C-50™ and LD-R-50™ has a thermal transmission (R-Value) of 3.7 ft²-h-°F/Btu (0.80 m²-K/W) at a 1-inch (25.4 mm) thickness and a density of 0.42 – 0.55 lbs/ft² (6.7 – 8.8 kg/m²). See Table 1 for R-value ratings at various thicknesses.

3.4 Air Permeability:

3.4.1 Icynene LD-C-50™ and LD-R-50™, when tested in accordance with ASTM E283 is air-impermeable when installed at 1.5 inch (38.1 mm) thickness or greater.

3.5 Fungal Resistance:

3.5.1 Icynene LD-C-50™ and LD-R-50™, when tested in accordance with ASTM C1338 exhibits no fungal growth.

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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).

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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ are spray-applied on the jobsite using a volumetric positive displacement pump as identified in the Icynene application manual. The Icynene LD-C-50™ resin component shall not be stored, before installation, at temperatures below 50°F (10°C) or above 100°F (35°C). Icynene LD-C-50™ shall not be used in areas that have a maximum service temperature greater than 200°F (93°C). The foam plastic shall not be 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, 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, 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 LD-C-50™ and LD-R-50™ 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, except where installation is in an attic or crawl space as described in Section 4.4.1 and 4.4.2 of this report.

4.4 Attics:

4.4.1 Icynene LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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 maximum thickness shall be 11.25 inches (285.8mm) on roofs and 5.5 inches (139.7mm) on walls. The Icynene LD-C-50™ and LD-R-50™ must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

4.4.2 Application with prescriptive ignition barrier: Icynene LD-C-50™ and LD-R-50™ 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:

- LD-C-50 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.
- LD-R-50 may be applied at a maximum thickness of 15 inches (381mm) on the roof deck and 5 inches (127mm) on the walls.
- Entry to the attic is limited to service of utilities, mechanical and electrical systems and the incidental access by the owner.
- The Icynene LD-C-50™ and LD-R-50™ shall be protected against ignition by 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 LD-C-50™ and LD-R-50™ is not exposed. The protective covering shall be consistent with the requirements for the type of construction.

The Icynene LD-C-50™ and LD-R-50™ 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: Icynene LD-C-50™ and LD-R-50™ 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 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 the LD-C-50 foam on the ceiling or roof shall be 11 inches (279.4mm).
- The maximum thickness of LD-C-50 foam on the walls shall be 3.5 inch (88.9 mm).
- The maximum thickness of the LD-R-50 foam on the ceiling or roof shall be 15 inches (381mm).
- The maximum thickness of LD-R-50 foam on the walls shall be 3.5 inch (88.9 mm). The walls may be bare.

The Icynene LD-C-50™ and LD-R-50™ must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

4.4.3.1 Intumescent Coated: Icynene LD-C-50™ and LD-R-50™ 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 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 the LD-C-50 foam on the ceiling or roof shall be 11 inches (279.4mm).

- The maximum thickness of the LD-R-50 foam on the ceiling or roof shall be 15 inches (381mm).
- The maximum thickness of LD-C-50 or LD-R-50 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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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 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 Icynene LD-C-50™ and LD-R-50™ shall be protected against ignition by 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 Icynene LD-C-50™ and LD-R-50™ is not exposed. The protective covering shall be consistent with the requirements for the type of construction.

The Icynene LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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:

- LD-C-50 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.
- LD-R-50 may be applied at a maximum thickness of 15 inches (381mm) on 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 and the incidental access by the owner.
- The Icynene LD-C-50™ and LD-R-50™ shall be protected against ignition by 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 LD-C-50™ and LD-R-50™ is not exposed. The protective covering shall be consistent with the requirements for the type of construction.

The Icynene LD-C-50™ and LD-R-50™ 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: Icynene LD-C-50™ and LD-R-50™ may be installed in crawl spaces without a prescriptive ignition barrier subject to the following conditions:

- Entry to the crawl space is limited to service of utilities, mechanical and electrical systems and the incidental access by the owner.

- 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 LD-C-50 foam on the ceiling shall be 11 inches (279.4mm).
- The maximum thickness of LD-C-50 foam on the walls shall be 3.5 inch (88.9 mm).
- The maximum thickness of the LD-R-50 foam on the ceiling shall be 15 inches (381mm).
- The maximum thickness of LD-R-50 foam on the walls shall be 3.5 inch (88.9 mm). The walls may be bare.

The Icynene LD-C-50™ and LD-R-50™ must be separated from the interior occupied area of the building by an approved thermal barrier in accordance with Section 4.3.

4.6.2.1 Intumescent Coated: Icynene LD-C-50™ and LD-R-50™ may be installed in crawl space without a prescriptive ignition barrier subject to the following conditions:

- Entry to the crawl space is limited to service of utilities, mechanical and electrical systems and the incidental access by the owner.
- 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 LD-C-50 foam on the ceiling shall be 11 inches (279.4mm).
- The maximum thickness of the LD-R-50 foam on the ceiling shall be 15 inches (381mm).
- The maximum thickness of LD-C-50 or LD-R-50 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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ may be installed exposed in inaccessible crawl spaces 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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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 4.2, 4.3, 4.4, 4.5, and 4.6 of this report.

5.1.4 The Icynene LD-C-50™ and LD-R-50™ Spray Foam Insulation shall not exceed the thicknesses noted in Sections 4.2, 4.3, 4.4, 4.5, and 4.6 of this report.

5.1.5 The Icynene LD-C-50™ and LD-R-50™ Spray Foam Insulation shall be protected from the weather after installation.

5.1.6 The Icynene LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ Spray Foam Insulation is limited to use in Types III-A, III-B, V-A, and 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 LD-C-50™ and LD-R-50™ 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 LD-C-50™ and LD-R-50™ 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 102.1.11 as applicable.

6.0 EVIDENCE SUBMITTED

See Table 2 for test reports analyzed and accepted for this Evaluation Report.

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

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

6.3 Reports of air leakage in accordance with ASTM E283.

6.4 Reports of water vapor transmission in accordance with ASTM E96.

EVALUATION REPORT



Report Number: 0165
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Expires: 09/2010

7.0 IDENTIFICATION

7.1 Each package of components for the Icynene LD-C-50™ and LD-R-50™ Spray Foam Insulation is identified with the manufacturer's name (Icynene Inc.) the manufacturer's address and telephone number, the product trade name (Icynene LD-C-50™ and LD-R-50™), use instructions, the density, the flame spread and smoke developed indices, the evaluation report number (IAPMO-0165), and the name of the inspection agency (Intertek Testing Services NA, Ltd.).



Director of Evaluation Services

TABLE 1 — THERMAL PERFORMANCE

Tested per ASTM C518	Thermal Resistance (R-value)	Thermal Resistance (R-value)
Thickness (Inch)	(°F-ft ² -h/Btu)	(°F-ft ² -h/Btu)
	LD-R-50	LD-C-50
1	3.9	3.7
3.5	13.6	13.0
5.5	21.3	20.4
6	23.3	22.2
7.5	29.1	27.8
9	34.9	33.3
10	38.8	37.0
11	42.6	40.7
15	58.1	55.5

EVALUATION REPORT



Report Number: 0165

Issued: 09/2009

Expires: 09/2010

TABLE 2—TEST DATA SUBMITTED

TESTS REQUIRED	Requirement	Lab	Report	Date	Value	
LD-R-50						
Thermal Resistance	ASTM C518	As reported	Bodycote	08-06-M0048A-1-RV4	June, 2009	3.9 per inch
Core Density	ASTM D1622	As reported	Bodycote	08-06-M0048A-1-RV4	June, 2009	0.62 lb/ft ³
Tensile Strength	ASTM D1623	3 lbf/in ² , minimum	Intertek	3150624C0Q	May, 2008	3.4 lbf/in ²
Closed Cell Content	ASTM D2856	<90%	Intertek	3150624C0Q	May, 2008	Open Cell >90%
Dimensional Stability	ASTM D2126	<15%	Bodycote	08-06-M0048A	June, 2009	Passed
Surface Burning Characteristics	ASTM E84	75/450	Bodycote	08-06-M0048A	June, 2009	Passed
Air Leakage	ASTM E283	<0.02 L/sm ²	Bodycote	08-006-2142	June, 2009	<0.02 L/sm ²
Critical Radiant Flux	ASTM E970	<0.12 w/cm ²	Bodycote	08-006-2142	June, 2009	28 w/cm ²
Attic and Crawl Space	SwRI 99-02	As Reported	Intertek	Numerous	Nov., 2007	Passed
Attic and Crawl Space Analysis	NFPA 286	>15 minutes	Intertek	31755666SAT-001	Mar., 2009	Passed
Fungal Resistance	ASTM C1338	No Growth	Bodycote	0-011-10657-1	Feb., 2009	No Growth
LD-C-50						
Thermal Resistance	ASTM C518	As reported	Bodycote	06-06-M007-B Rev. 3	June, 2009	3.7 per inch
Core Density	ASTM D1622	As reported	Bodycote	06-06-M007-B Rev. 3	June, 2009	0.53 lb/ft ³
Tensile Strength	ASTM D1623	3 lbf/in ² , minimum	Intertek	07-06-M0293	May, 2008	19.2 lbf/in ²
Closed Cell Content	ASTM D2856	<90%	Intertek	07-06-M0293	May, 2008	Open Cell >90%
Dimensional Stability	ASTM D2126	<15%	Bodycote	06-06-M007-B Rev. 3	June, 2009	Passed
Surface Burning Characteristics	ASTM E84	75/450	Bodycote	06-06-03107	April, 2007	Passed
Air Leakage	ASTM E283	<0.02 L/sm ²	Bodycote	01-06-M0345	June, 2002	<0.02 L/sm ²
Water Vapor Transmission	ASTM E96	≤ 1 perm	Bodycote	06-06-M007-B Rev. 3	April, 2007	10 perms
Hot Surface Performance	ASTM C411	200°F (93°C)	Bodycote	08-06-M0022	Feb., 2008	Passed
Attic and Crawl Space	SwRI 99-02	As Reported	Intertek	Numerous	Nov., 2007	Passed
Attic and Crawl Space Analysis	NFPA 286	>15 minutes	Intertek	31755666SAT-001	Mar., 2009	Passed



MATERIAL SAFETY DATA SHEET

Product Name: ICYNENE LD-R-50™:
ICYNENE LD-R-50™ Resin and Base Seal®
MSDS (F) Spray ICYNENE LD-R-50™

Section 1: Chemical, Product and Company Information

Product Name: ICYNENE LD-R-50™
ICYNENE LD-R-50™ is a trademark of Icynene Inc. Base Seal® is a registered trademark of Icynene Inc.

Product Use: SPRAY-ON CELLULAR PLASTIC INSULATION

Product Code: Not Applicable

Revision Date: July 28, 2009

Section 2: Ingredient Information

<u>Ingredients (% w/v, unless otherwise noted)</u>	<u>Cas No:</u>	<u>Wt. %:</u>
(BASE SEAL®), Component A	CAS# 009016-87-9	50 % by volume
(ICYNENE LD-R-50™), Resin Component B		50 % by volume

NOTE: Does not contain any ozone destroying or global warming refrigerants such as CFC's, HCFC's, or HFA's.

Section 3: PHYSICAL DATA

Appearance: Yellow coloured cellular foam of "angel food cake" consistency and appearance (may become deeper yellow to light brown if exposed to sunlight for extended period of time).

Solubility In Water: Insoluble.

Density: 0.5 lbs./cubic foot

Odour: None

Emissions: Safe for occupancy after 24 hrs, no emissions detectable after 30 days.

Section 4: FIRE & EXPLOSION HAZARD DATA

Flammability: Combustion occurs at 400°F (material will not sustain combustion on its own)

Flame Spread: Less than 25

Smoke Developed: Less than 400

Method Used: ASTM E84

Melting: Does not melt

MATERIAL SAFETY DATA SHEET
Product Name: ICYNENE LD-R-50™:
ICYNENE LD-R-50™ Resin and Base Seal®
MSDS (F) Spray ICYNENE LD-R-50™

Flammable Limits: LFL: - not determined
UFL: - not determined

Extinguishing Media: Water, carbon dioxide, dry chemical or foam.

Fire & Explosion Hazards: Prevent breathing of combustion fumes (smoke)

Fire Fighting Equipment: Firefighters must wear a self-contained breathing apparatus to avoid breathing smoke generated by combustion.

Section 5: REACTIVITY DATA

Stability: Stable under all normal conditions

Incompatibility: Compatible with all products

Section 6: ENVIRONMENTAL & DISPOSAL INFORMATION

Disposal Method: Follow all federal, provincial, state and local regulations.

Section 7: HEALTH HAZARD DATA

Detectable Emissions: No detectable emissions

Systemic & Other Effects: Not available

Ingestion: The consequences of ingestion of large amounts are unknown

Dust Inhalation: May cause mechanical irritation to the respiratory system

Eye Protection: Use glasses when cutting foam

Skin Protection: Dust from foam cutting may cause irritation

Section 8: FIRST AID

Ingestion: Medical advice should be obtained

Inhalation: Remove to fresh air, consult a physician

Eye Contact: Flush with water to remove particles

Skin Contact: No special precautions required

Section 9: ADDITIONAL INFORMATION

THE INFORMATION HEREIN IS GIVEN IN GOOD FAITH, BUT NO WARRANTY EXPRESS OR IMPLIED, IS MADE. CONTACT ICYNENE INC. FOR FURTHER INFORMATION.

Section 10: PREPARATION INFORMATION:

Prepared by: D. Thom

Title: R&D Manager

Telephone: 1-800-758-7325

Date of Preparation: July 28, 2009