



ICYNENE™

ICYNENE LD-R-50™ and the ICC-700-2008 National Green Building Standard

This is a general guide as to ways in which the installation of ICYNENE LD-R-50™ can help contribute to NAHB/ ICC National Green Building Standard points, either directly or through assisting strategies that are complementary.

The user of this guide should refer to the ICC-700-2008 standard for complete and officially worded requirements.

February 20, 2009

The ICC-700-2008 Standard may be purchased at www.BuilderBooks.com

WL-300-01

RESOURCE EFFICIENCY

Renewable Materials

Bio-based products are used:

Products meet the minimum bio-based content of the USDA's Designation of BioPreferredSM. Of the two types of bio-based materials used, each contributes more than 0.5% of the project's building material cost.

Points: 3

Significance: ICYNENE LD-R-50TM meets the minimum bio-based content requirements of the USDA BioPreferredSM program, based on ASTM D6866 testing.

Resource-Efficient Materials

Products used contain fewer materials.

Points: 3

Significance: ICYNENE LD-R-50TM is light-density spray foam; approximately one-quarter the density of closed cell spray foam products and less than that of fibrous insulations.

Indigenous Materials

Indigenous materials are used for major building elements.

Points: 2

Significance: ICYNENE LD-R-50TM is produced on site and meets the definition of "indigenous" materials i.e. is produced within 500 miles of the construction site.

ENERGY EFFICIENCY

Mandatory Practices

(applicable to either the performance or prescriptive paths)

Space heating and cooling equipment is sized according to loads calculated using ACCA Manual J or equivalent.

Significance: An effectively sealed building envelope, such as can be achieved with the installation of ICYNENE LD-R-50™, facilitates the proper sizing of space heating and cooling equipment.

Insulation and Air-Sealing

GENERAL

Insulation and Air-sealing

- Insulation installed in accordance with the manufacturer's instructions or local code. **Mandatory**

FLOOR / FOUNDATION / CRAWLSPACE

Floor (Insulated Floor Above Garage, Cantilevered Floor)

- Insulation installed maintains permanent contact with the underside of the subfloor decking, enveloping any attached ductwork. No compression or gaps in the insulation.

Mandatory

Crawlspace

- Crawlspace wall insulation is permanently attached to the walls

Mandatory

WALLS

Band Joist / Rim Joists

- band / rim joists are insulated and air-sealed.

Mandatory

Skylights and Knee Walls

- Skylight shafts and knee walls are insulated as per exterior walls.

Mandatory

Exterior Architectural Features

- No disruption of Building envelope insulation and air-sealing at exterior architectural features.

Mandatory

CEILING / ATTIC

Attic Access (except unvented attic)

- Attic access, knee wall door or drop down stair covered with insulation.

Significance: ICYNENE LD-R-50™ is an effective means of insulating and air-sealing all of the above **mandatory** areas while providing the required continuity, permanent attachment and uninterrupted encapsulation of service penetrations.

PERFORMANCE PATH

Note: The building **is to exceed** the baseline minimum performance required by the IECC by 15%.

Note: The performance path is used to achieve the highest performance level (Emerald).

Note: An ENERGY STAR qualified home achieves compliance with the Bronze level (30 points) for the Energy Chapter.

Energy cost performance exceeds IECC by:

15 %	Points: 30
30 %	Points: 60
50 %	Points: 100
60 %	Points: 120

Significance: A software performance calculation such as REM / Design™ can be used. The typical low air infiltration rate of ICYNENE LD-R-50™ is difficult to achieve with conventional materials. Input into the calculation, this optimal value can result in significant energy cost savings as compared to the reference design.

PRESCRIPTIVE PATH

Note: A minimum of 30 points must be obtained.

Building Envelope

Note: Total Building Thermal Envelope UA is less than required by Section 402.1.4 of the IECC by the percentage specified in Table 703.1.1. When insulation is used to achieve these percentages, grading by a third party as **Grade 1** insulation is required.

Significance: “Grade 1” is the most stringent Grade, extremely difficult to achieve with conventional materials and installations.

Total Building Thermal Envelope UA

UA is improved by:

	Points (*)
10%	10 to 18
20%	20 to 36

(*) depending on Climate Zone

OR

703.1.2 Insulation is third-party graded, as:

	Points
Grade 1	15
Grade 2	10

Significance: "Total UA improvement" (points) requires "Grade 1" insulation. Insulation installation grading (option) requires at least "Grade 2", with the most points being achieved for "Grade 1". ICYNENE LD-R-50™, properly installed, facilitates the achievement of these most stringent Grades. A continuous fill is achieved which fully encapsulates services and penetrations and maintains permanent contact with the intended substrate.

Insulation and Air-sealing

	Points
Third Party Verified	15
Not Third Party Verified	3

GENERAL

Air Barrier and Thermal Barrier

- Installed insulation is in substantial contact with interior and exterior air barrier. Continuous alignment of the insulation with the air barrier is provided.
 - o **Spray foam qualifying as an air barrier is:**
 - **continuously attached** to the top, bottom and both sides of the cavity,
 - **continuous** in the cavity without any unrepaired breaks, and
 - **air impermeable (air permeance less than 0.02 L/s.m² at 75 Pa).**
 - o Voids or incomplete fill (less than 30% of full thickness) not more than 2% of the insulated area.
 - o Insulation **substantially contacts sheathing materials** on at least one side.

Significance: ICYNENE LD-R-50™ meets the technical requirement for a spray foam that is an air barrier. Installation of ICYNENE LD-R-50™ assures a continuous cavity fill, integrally adhered to the substrate and achieves the installation of thermal insulation and an air barrier in one step.

FLOOR / FOUNDATION / CRAWLSPACE

Floors (and Insulated Floor Above Garage, Cantilevered Floor)

- air barrier is installed at any exterior edge of insulation

WALLS

Shower / Tub at Exterior Wall

- Exterior walls behind the tub / shower are insulated.
- Exterior walls behind the tub / shower includes an interior and exterior air barrier.

Electrical Outlet Boxes

- Air-sealed type boxes are installed or
- air barrier extending completely behind the boxes.

Common Walls

- Air barrier is installed to air-seal the gap between a gypsum shaft wall (i.e., common wall) and the structural framing.

Note: Re. Common Walls: Although ICYNENE LD-R-50™ provides the air-seal, use and application should conform to the required fire rated and tested wall assembly related to the use classification of the building.

Skylights and Knee Walls

- Skylight shafts and knee walls are air sealed.
- Insulation on attic knee walls and skylight shafts is physically supported.

CEILING / ATTIC

Dropped Ceiling / Soffit

- Air barrier is aligned with insulation. Gaps are sealed. .

Significance: With ICYNENE LD-R-50™, insulating and air-sealing **all of the above** critical and often difficult to insulate areas is achieved in one step by one trade with one self-adhering and non-sagging single material. The required alignment of the air barrier with the insulation is achieved.

ADDITIONAL PRACTICES

Note: Two (2) such practices are required for compliance with either the Performance or the Prescriptive Path. Any points available can be added to points earned by either path.

Ducts

Points: 12

Ductwork meets the following requirements:

- No building cavity is used as return ductwork.
- Heating and cooling ducts and mechanical equipment are installed within conditioned space.
- No ductwork installed in exterior walls.

Significance: ICYNENE LD-R-50™ facilitates practice (2) above. Further, in appropriate climates, direct application of ICYNENE LD-R-50™ to the underside of the roof deck i.e. unvented attic design, provides for the achievement of these points.

Installation and Performance Verification

Points: 5

Third party onsite inspection is conducted. A representative sample inspection of the buildings or dwelling units is permitted under identified conditions. Qualifying practices include the following:

- Ducts installed per IRC/IMC.
- Ducts are sealed.
- Building envelope is air-sealed.**
- Insulation is installed.**

Third-party testing is conducted.

Building Envelope Leakage

Is blower door tested.

Also provided is the following:

- Mechanical ventilation.
- Sealed combustion furnace and power-vented water heater.
- Requirements for fireplaces and fuel burning appliances.

The following air leakage rates qualify for points as follows:

5 ACH 50	Points: 3
4 ACH 50	Points: 6
3 ACH 50	Points: 9
2 ACH 50	Points: 12
1 ACH 50	Points: 15

Significance: Air infiltration rates of less than 2 ACH 50 are typical of ICYNENE LD-R-50™ installations.

INDOOR ENVIRONMENTAL QUALITY

Pollutant Source Control

Air handling equipment or return ducts are not located in the garage.

Points: 5

Significance: In an appropriate climate, direct application of ICYNENE LD-R-50™ to the underside of the roof deck i.e. unvented attic design, provides an ideal opportunity to relocate these to a more energy-efficient space.

Attached Garages - Air Barrier

A continuous air barrier separates the garage space from the adjoining conditioned living spaces.

Points: 2 (Mandatory)

Note: Other mandatory requirements apply – refer to Section 901.3

Insulation - Emissions

Formaldehyde emissions of wall, ceiling and floor insulation materials comply with the emissions levels of the California Department of Health's (CA 01350), or are certified by a third party program.

Points: 4

Significance: ICYNENE LD-R-50™ is CHPS E.Q. 2.2/Section 01350 Compliant meets the test criteria for a standard classroom. See http://www.chps.net/manual/lem_table.htm#Building

Perimeter of living space is sealed.

Attic access, knee wall door or drop down stair is insulated.

Points: 2

All penetrations in the following areas are sealed:

Attic ceiling

Walls

Floors

**Points: 6
(2 each)**

Significance: ICYNENE LD-R-50™ contributes to the effective sealing of the perimeter of the living space.

Crawlspaces built as conditioned spaces are sealed.

Note: Other related requirements apply. Refer to ICC-700

Significance: ICYNENE LD-R-50™ is an effective material for sealing as well as insulating crawlspaces.

Building materials with visible mold are not installed.

Points: 2

Walls with high moisture-content or wet insulation are not to be enclosed

Points: 2 (Mandatory)

Significance: ICYNENE LD-R-50™ is not formed until it is installed on site. There are no job site storage issues as can arise with pre-manufactured material. Independent testing conducted as per ASTM C 1338 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. There are no “drying time” issues as ICYNENE LD-R-50™ cures in seconds.

Presented in good faith without warranty.

Icynene advocates compliance with all local building codes and ordinances.

ICYNENE INC.