



# ICYNENE™

## **ICYNENE LD-R-50™ and NAHB National Green Building Standard (NGBS)**

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

Selected excerpts (new construction provisions) from Draft Standard v. 2.0 (December 21, 2007)

**November 27, 2008**

NAHB National Green Building Standard  
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## CHAPTER 6 – RESOURCE EFFICIENCY

### 606 Renewable Materials

**606.1** The following bio-based products are used:

Certified solid wood in accordance with Section 606.2, engineered wood, bamboo, cotton, cork, Straw, natural fiber products made from crops (soy-based, corn-based), other bio-based materials with at least 50% bio-based content (by weight or volume) **or products with the minimum bio-based contents of the USDA’s Designation of BioPreferred.**

**Two types of bio-based materials are used, each for more than 0.5% of the project’s building material cost.**

**Points: 3**

Significance: ICYNENE LD-R-50™ meets the minimum bio-based content requirements of the USDA BioPreferred<sub>SM</sub> program, based on ASTM D6866 testing.

### 607 Resource-Efficient Materials

**607.1** Products used contain fewer materials to meet the same end use requirements as conventional products, including but not limited to...

**Points: 3**

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

### 608 Indigenous Materials

**608.1** Indigenous materials are used for major elements of the building.

**Points: 2**

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

## CHAPTER 7 – ENERGY EFFICIENCY

### 701.4 Mandatory Practices

(applicable to either the performance or prescriptive paths)

#### 701.4.1

Space heating and cooling system/equipment shall be 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.

#### 701.4.5 Insulation and Air-sealing

##### 701.4.5.1 GENERAL

Insulation and Air-sealing

- insulation and air-sealing is in accordance with the following. Insulation shall be installed in accordance with the manufacturer's instructions or local code, as applicable.

**Mandatory**

##### 701.4.5.2 FLOOR / FOUNDATION / CRAWLSPACE

Floor (Includes Insulated Floor Above Garage, Cantilevered Floor)

- insulation is installed to maintain permanent contact with the underside of the subfloor decking, enveloping any attached ductwork within the thermal envelope without compression or air gaps in the insulation. Exception: Where ducts or other mechanical equipment are adjacent to the underside of the subfloor.

**Mandatory**

Crawlspace

- Where insulated, crawlspace wall insulation is permanently attached to the walls.....

**Mandatory**

##### 701.4.5.3 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 to the same level as the exterior walls.

**Mandatory**

## Exterior Architectural Features

- Code required building envelope insulation and air-sealing is not disrupted at exterior architectural features such as stairs and decks.

**Mandatory**

### 701.4.5.4 CEILING / ATTIC

#### Attic Access (except unvented attic)

- Attic access, knee wall door or drop down stair is covered with insulation and gasketed. Knee wall door is insulated unit or 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.

## 702 PERFORMANCE PATH

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

Note: The performance path **must** be used to achieve the highest performance level (Emerald).

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

### 702.2

Energy efficiency features are implemented to achieve energy cost performance that exceeds IECC by:

- |          |                    |
|----------|--------------------|
| (1) 15 % | <b>Points: 30</b>  |
| (2) 30 % | <b>Points: 60</b>  |
| (3) 50 % | <b>Points: 100</b> |
| (4) 60 % | <b>Points: 120</b> |

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.

**703 PRESCRIPTIVE PATH**

Note: A minimum of 30 points must be obtained.

**703.1 Building Envelope**

**703.1.1**

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.

Note: Refer to the detailed requirements that follow.

Total Building Thermal Envelope UA

% UA Improvement

**Points (\*)**

10%  
20%

**10 to 18**  
**20 to 36**

(\*) depending on Climate Zone

**OR**

703.1.2 Insulation is graded by a third party.

**Table 703.1.2**

Insulation Installation Grades

**Points**

Grade 1  
Grade 2

**15**  
**10**

Note: Points shall not be awarded under this section if already awarded under Section 703.1.1

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.

## 703.2 Insulation and Air-sealing

### 703.2.1

Insulation and air-sealing is installed in accordance with **all of the following**, as applicable.

	<b>Points</b>
Third Party Verification	<b>15</b>
NO Third Party Verification	<b>3</b>

#### 703.2.1.1 GENERAL

##### Air Barrier and Thermal Barrier

- Thermal insulation is installed in substantial contact with interior and exterior air barrier to provide continuous alignment of the insulation with the air barrier.
  - o **To qualify as its own air barrier, spray foam is:** 1) **continuously attached** to the top, bottom and both sides of the cavity; 2) **continuous** in the cavity without any unrepaired breaks; and air impermeable.
  - o **Any spray or hard foam insulation with an air permeance of no more than 0.02 L/s.m<sup>2</sup> at 75 Pa qualifies as an air barrier.**
  - o Voids or areas of incomplete fill (less than 30% of full thickness) are not more than 2% of the insulated area.
  - o Insulation is in **substantial contact with the 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.

#### 703.2.1.2 FLOOR / FOUNDATION / CRAWLSPACE

##### Floors (Includes Insulated Floor Above Garage, Cantilevered Floor)

- air barrier is installed at any exterior edge of insulation

#### 703.2.1.3 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 the air barrier extends completely behind the boxes.
- Electrical outlet boxes are (to be) covered prior to spraying insulation.

### Common Walls Between Dwelling Units

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

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 are physically supported by stapling in place, netting or using other mechanical attachment.

### 703.2.1.4 CEILING / ATTIC

#### Dropped Ceiling / Soffit

- Air barrier is substantially aligned with insulation and any gaps are sealed with caulk, foam or tape.

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.

## 704 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.

### 704.4 Ducts

**Points: 12**

704.4.4 Ductwork is in accordance with all of the following:

- (1) Building cavities are not used as return ductwork.
- (2) Heating and cooling ducts and mechanical equipment are installed within the conditioned building space.
- (3) Ductwork is not 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.

## 704.6 Installation and Performance Verification

### 704.6.1

**Points: 5**

Third party onsite inspection, including compliance with Section 704.6.1.1 and 704.6.1.2, is conducted to verify installation of energy related features, with all of the following as applicable. When multiple buildings or dwelling units of the same model are built by the same builder, a representative sample inspection of a minimum of 15% of the buildings or dwelling units is permitted.

- (1) Ducts installed per IRC/IMC and duct sealing is performed.
- (2) Building envelope air sealing is performed.**
- (3) Insulation is installed in conformance with requirements of Section 703.1.2.**
- (4) Windows, skylights and doors are flashed, caulked and sealed in accordance with manufacturer's recommendations and in conformance with Section 703.2.1.
- (5) Minimum of two inspections are performed. One inspection after insulation is installed and prior to being covered, and another inspection upon completion of the project.

### 704.6.2

Third-party testing is conducted to verify performance.

#### 704.6.2.1

**Building envelope leakage is demonstrated by blower door test.** In addition to the test, the following practices are required:

- (1) Mechanical ventilation is provided in accordance with 902.5.
- (2) Fossil fuel furnace and water heater is sealed combustion or power vented in accordance with 801.1.
- (3) Fireplaces and fuel Burning Appliances are in accordance with 901.2.

The maximum leakage rate is in accordance with:

- (a) 5 ACH 50
- (b) 4 ACH 50
- (c) 3 ACH 50
- (d) 2 ACH 50
- (e) 1 ACH 50

**Points: 3**  
**Points: 6**  
**Points: 9**  
**Points: 12**  
**Points: 15**

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

## CHAPTER 9 - INDOOR ENVIRONMENTAL QUALITY

### 901 Pollutant Source Control

#### 901.1.2

**Points: 5**

Air handling equipment or return ducts are not located in the garage, unless placed in isolated / air sealed mechanical rooms with an outside air source.

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.

#### 901.3 Garages are in accordance with the following

- (1) Attached garage
- (b) A continuous air barrier is provided between walls and ceilings separating the garage space from the conditioned living spaces.

**Points: 2 (Mandatory)**

Note: Other mandatory requirements apply – refer to Section 901.3

#### 901.11 Insulation is in accordance with the following:

- (1) Formaldehyde emissions of wall, ceiling and floor insulation materials are in compliance with the emissions levels of the California Department of Health's "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources using Small-Scale Environmental Chambers" (CA 01350), as certified by a third party program, such as the GREENGUARD Environmental Institute's Children and Schools Certification Program or the Scientific Certification (SCS) Systems Indoor Advantage Gold 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#BuildingI](http://www.chps.net/manual/lem_table.htm#BuildingI)

#### 902.11

Perimeter of living space is sealed to prevent unwanted contaminants.

(1) Attic access, knee wall or drop down stair is.....

**Points: 2**

(2) All penetrations, such as.....are sealed in the following areas:

- (a) Attic ceiling
- (b) Walls
- (c) Floors

**Points: 6**  
**2 each for (a), (b) & (c)**

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

**903.4**

Crawlspace that is built as a conditioned area is sealed to prevent outside air infiltration and provided with conditioned air at a rate.....

Note: Other related requirements apply. Refer to Section 903.4

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

**903.5**

(1) Building materials with visible mold are not installed or are cleaned or encapsulated prior to concealment and closing.

**Points: 2**

(2) Walls shall not be enclosed (e.g. with drywall) if the insulation has a high moisture content. Wet insulation products shall be dry before enclosing.

**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 INC.**

