# UL Evaluation Report

## UL ER11812-06

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**UL Category Code: ULEX**

**CSI MasterFormat®**

**DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION**
**Sub-level 2: 07 20 00 - Thermal Protection**
**Sub-level 3: 07 21 00 - Thermal Insulation**
**Sub-level 4: 07 21 13 - Board Insulation**

**DIVISION: 31 00 00 - EARTHWORK**
**Sub-level 2: 31 20 00 - Earth Moving**
**Sub-level 3: 31 21 00 - Off-Gassing Mitigation**
**Sub-level 4: 31 21 13 - Radon Mitigation**

**DIVISION: 31 00 00 - EARTHWORK**
**Sub-level 3: 31 23 00 - Excavation and Fill**
**Sub-level 4: 31 23 23 - Fill**

**COMPANY:**

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**1. SUBJECT:**

**RADON GUARD® INSULATION BOARDS**

**RADON GUARD® INSULATION BOARDS WITH PERFORM GUARD**

**RADON GUARD® INSULATION BOARDS WITH PERFORM GUARD2**

Throughout this report, unless specifically indicated otherwise:

- The reference to Radon Guard Insulation Boards will also apply to all designations of Radon Guard Insulation Boards with Perform Guard and Perform Guard2.

**2. SCOPE OF EVALUATION:**

- 2015 *International Building Code* ® (IBC)
- 2015 *International Residential Code* ® (IRC)
- 2015 *International Green Construction Code* ® (IGCC)
- ICC-ES Acceptance Criteria for an Alternate Gas Permeable Layer of a Subslab Depressurization System for Radon Gas Control (AC461), dated October 2015
- ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2015 (editorially revised May 2016)
- ICC-ES Acceptance Criteria for Termite Resistant Foam Plastic (AC239), dated October 2008 (editorially revised February 2014)
- ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated June 2014

**The products were evaluated for the following properties**

**Radon Guard Insulation Boards:**

- Surface Burning Characteristics (ANSI/UL723, ASTM E84)
- For Use as an Alternate Gas Permeable Layer (AC461)
- Physical Properties (ASTM C578)
- Physical Properties (ASTM D6817)
- Termite Resistance –Radon Guard with Perform Guard Insulation Boards and Radon Guard with Perform Guard2 Insulation Boards, only, (ICC-ES AC239)

## 3. REFERENCED DOCUMENTS

- ICC-ES:
  - ICC-ES Acceptance Criteria for an Alternate Gas Permeable Layer of a Subslab Depressurization System for Radon Gas Control (AC461), dated October 2015
  - ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2015 (editorially revised May 2016)
  - ICC-ES Acceptance Criteria for Termite Resistant Foam Plastic (AC239), dated October 2008 (editorially revised February 2014)
  - ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated June 2014
- ANSI/UL:
  - ANSI/UL723 (ASTM E84), 10th Edition, Test for Surface Burning Characteristics of Building Materials
- ASTM:
  - ASTM C578-15b, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
  - ASTM D6817, Standard Specification for Rigid Cellular Polystyrene Geofoam

## 4. USES

Radon Guard Insulation Boards are used as structural insulation below concrete slabs and provide a means to ventilate radon gas when installed in accordance with Section 6.2 of this report.

## 5. PRODUCT DESCRIPTION

### 5.1 General:

Radon Guard Insulation Boards are molded, closed-cell expanded polystyrene having a flame spread index not exceeding 25 and a smoke developed index not exceeding 450 for thicknesses up to 4.5 inches when tested in accordance with UL723 (ASTM E84) as required by Section 2603.3 of the IBC or Section R316.3 of the IRC, as applicable.

Radon Guard 150, 250, 400, and 600 Insulation Boards are manufactured using Foam-Control EPS recognized in UL ER11812-01 at minimum densities of 1.35, 1.80, 2.40, and 3.00 lbs/ft$^3$, respectively and comply with ASTM C578 designations of Type II, Type IX, Type XIV, and Type XV, respectively and ASTM D6817 designations of EPS22, EPS29, EPS39, and EPS46 respectively. See Table 1 for applicable thermal resistance and compressive resistance values.

Radon Guard Insulation Boards are 2.5 inches (64 mm) thick with 1.5 inch (38mm) deep legs. The legs are 2 inches (51 mm) x 2 inches (51 mm) wide and are spaced 4 inches (102 mm) on center. The total product thickness is 4 inches (102 mm). See figure 1.

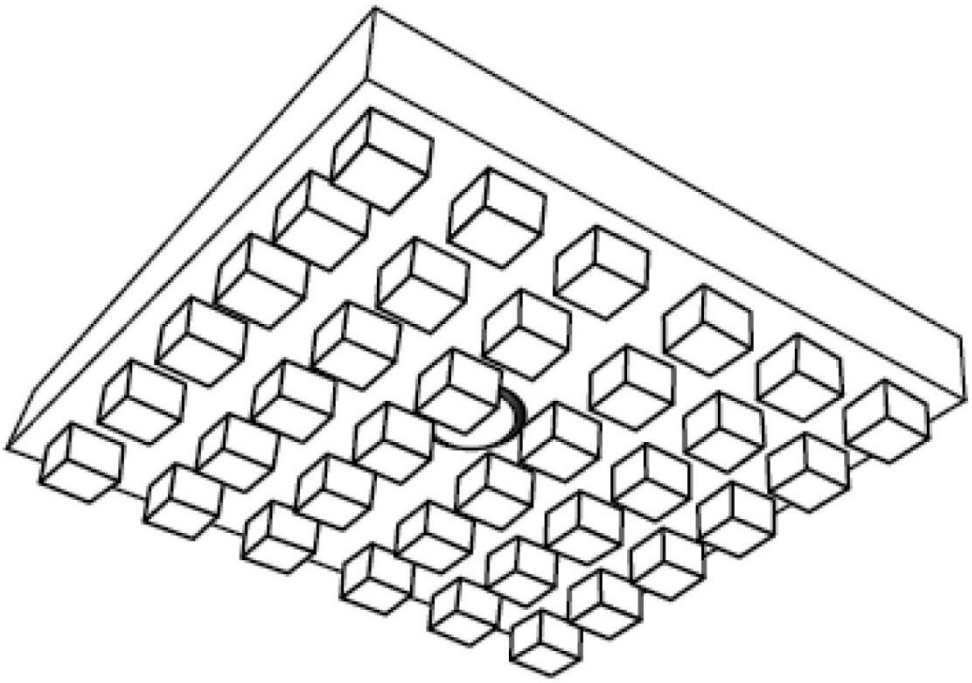

**Figure 1. Underside view of Radon Guard Insulation Boards**

The following products are treated for termite resistance in accordance with Section 2603.9, exception 2 of the IBC or Section R318.4, exception 2 of the IRC, as applicable:

- Radon Guard with Perform Guard Insulation Boards
- Radon Guard with Perform Guard2 Insulation Boards

**Table 1 – Thermal Resistance and Compressive Resistance of Radon Guard Insulation Boards**

| PRODUCT | DENSITY, min., lb/ft$^3$ | THERMAL RESISTANCE[1], min., °F-ft$^2$-h/Btu | COMPRESSIVE RESISTANCE AT 1% STRAIN, min., psf |
|---|---|---|---|
| Radon Guard 150 | 1.35 | 4.0 | 260 |
| Radon Guard 250 | 1.80 | 4.2 | 390 |
| Radon Guard 400 | 2.40 | 4.2 | 540 |
| Radon Guard 600 | 3.00 | 4.3 | 670 |

[1]Thermal resistance (R) values are based on 75F mean temperature.

## 6. INSTALLATION

### 6.1 General:

Radon Guard Insulation Boards are installed in accordance with the manufacturer's published installation instructions and this evaluation report. The manufacturer's published installation instructions and this report must be strictly adhered to, and a copy of the instructions shall be available on the jobsite during installation.

The interior of the building must be separated from the Radon Guard Insulation Boards with a thermal barrier as required by Section 2603.4 of the IBC or Section R316.4 of the IRC, as applicable.

### 6.2 Radon Guard Insulation Boards:

Radon Guard Insulation Boards may be used below concrete slabs as an alternate gas-permeable layer as required in Section AF103.4 of the IRC or as part of a soil gas retarding system as required by Section
8.3.4 of the IGCC, as follows:

1. Radon Guard Insulation Boards must be covered with a continuous membrane of soil-gas-retarder, such as 6-mil (0.15 mm) polyethylene, as required by Section AF103.3.1 of the IRC.

2. A 4 inch (100 mm) diameter vent pipe with collar is provided through the Radon Guard Insulation Boards and extends through the conditioned space of the dwelling and terminates not less than 10 feet (3.0 m) away from any window or other opening into the conditioned spaces of the building that is less than 2 feet (0.6 m) below the exhaust point.

3. Structural loads on the Radon Guard Insulation boards shall not exceed the compressive resistance at 1% strain in accordance with Table 1.

## 7. CONDITIONS OF USE

### 7.1 General:

The Radon Guard Insulation Boards described in this report comply with, or are suitable alternatives to what is specified in those codes listed in Section 2 of this report, subject to the following conditions. The Radon Guard Insulation Boards must be produced, identified, and installed in accordance with the manufacturer's published installation instructions. If there is a conflict between this report and the manufacturer's instructions this report governs.

In areas where the probability of termite infestation is defined as "very heavy", Radon Guard Insulation Boards without the Perform Guard or Perform Guard2 treatment must be installed in accordance with IBC Section 2603.9 of the IBC or Section R318.4 of the IRC, as applicable.

The use of Radon Guard Insulation Boards with the Perform Guard or Perform Guard2 treatment are not restricted in areas where the probability of termite infestation is defined as "very heavy" in accordance with Section 2603.9 of the IBC or Section R318.4 of the IRC, as applicable.

The Radon Guard Insulation Boards must be separated from the building interior with a thermal barrier as required by Section 2603.4 of the IBC or Section R316.4 of the IRC, as applicable.

Design loads to be resisted by the Radon Guard Insulation Boards must be determined in accordance with the IBC or IRC, as applicable, and must not exceed the allowable loads noted in this report.

All construction documents specifying the Radon Guard Insulations Boards must comply with the design limitations of this report. Design calculations and details for the specific applications must be furnished to

the code official, verifying compliance with this report and applicable codes. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

For a listing of applicable UL Certifications for the Foam-Control EPS of Radon Guard Insulation Boards, see the Online Certifications Directory for the following categories.

- See UL Online Certifications Directory for Foamed Plastic, UL Classified for Surface Burning Characteristics in accordance with UL723 (BRYX).
- See UL Online Certifications Directory for Polystyrene Thermal Insulation, Rigid Cellular, UL Classified in accordance with ASTM C578 and ASTM D6817 (QORW).

**7.2 Manufacturing Locations:**

The products are manufactured at the following locations described in Table 2 under the UL LLC Listing or Classification and Follow-Up Service Program, which includes audits in accordance with ICC-ES Acceptance Criteria for Quality Documentation, AC 10.

## Table 2 – Manufacturing Locations

| LISTEE | LOCATION | PLANT ID NO. |
|---|---|---|
| ACH Foam Technologies, Inc. | 5250 North Sherman Street<br>Denver, Colorado 80216 | U-1 |
| ACH Foam Technologies, Inc. | 111 West Fireclay Avenue<br>Murray, Utah 84107 | U-2 |
| ACH Foam Technologies, Inc. | 2731 White Sulfur Road<br>Gainesville, Georgia 30503 | U-4 |
| ACH Foam Technologies, Inc. | 13695 Mt. Anderson Street<br>Reno, NV 89506 | U-53 |
| ACH Foam Technologies, Inc. | 1400 North 3rd St.<br>Kansas City, Kansas 66101 | U-8 |
| ACH Foam Technologies, Inc. | 90 Trowbridge Drive<br>Fond Du Lac, Wisconsin 54936-0669 | U-37 |
| ACH Foam Technologies, Inc. | 809 East 15th Street<br>Washington, Iowa 52353 | U-55 |
| Big Sky Insulations, Inc. | 15 Arden Drive<br>Belgrade, Montana 59714 | U-30 |
| Branch River Plastics, Inc. | 15 Thurber Boulevard<br>Smithfield, Rhode Island 02917 | U-6 |
| Cellofoam North America, Inc. | 326 McGhee Road<br>Winchester, Virginia 22603 | U-14 |
| Henry Products, Inc. | 302 South 23rd Avenue<br>Phoenix, AZ 85009 | U-62 |
| Noark Enterprises, Inc. | 10101 Highway 70 East<br>North Little Rock, Arkansas 72117 | U-24 |
| Pacific Allied Products, Ltd. | 91-110 Kaomi Loop<br>Kapolei, Hawaii 96707 | U-17 |
| Poliestireno Alfa-Gamma S.A. de C.V. | Maquiladoras #331 Int A y B<br>Tijuana, Baja California<br>Mexico | U-60 |
| Poliestireno Alfa-Gamma S.A. de C.V. | Boulevard México Km. 2.5<br>exejido Aquiles Serdan C.P. 35080<br>Gómez Palacio, Durango<br>Mexico | U-67 |
| PFB Manufacturing LLC, dba Plasti-Fab EPS Product Solutions | 116 Pine Street South<br>Lester Prairie, Minnesota 55354 | U-22 |
| Therma Foam, LLC | 1240 Hwy 77 N<br>Hillsboro, Texas 76645 | U-25 |
| Thermal Foams, Inc. | 2101 Kenmore Ave<br>Buffalo, NY 14207 | U-26 |
| Thermal Foams/Syracuse Inc. | 6173 S Bay Rd<br>Cicero, NY 13039 | U-27 |

## 8. SUPPORTING EVIDENCE

**8.1** Data in accordance with ICC-ES Acceptance Criteria for an Alternate Gas Permeable Layer of a Subslab Depressurization System for Radon Gas Control (AC461), dated October 2015

**8.2** Data in accordance with ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2012 (editorially revised August 2013).

**8.3** Data in accordance with ICC-ES Acceptance Criteria for Termite Resistant Foam Plastics (AC239), dated October 2008 (editorially revised February 2014).

**8.4** UL Classification reports in accordance with UL 723, ASTM C578, and ASTM D6817. See UL Product Certification Categories (BRYX) and (QORW).

See links to UL's On-Line Certification Directory in Section 7.1.

**8.5** Documentation of quality system elements described in (AC10), dated June 2014.

## 9. IDENTIFICATION

The Radon Guard Insulation Boards described in this evaluation report are identified by a marking bearing the report holder's name (AFM), the plant identification, the product name, the UL Classification Mark, and the evaluation report number UL ER11812-06. The validity of the evaluation report is contingent upon this identification appearing on the product or UL Classification Mark certificate.

## 10. USE OF UL EVALUATION REPORT

**10.1** The approval of building products, materials or systems is under the responsibility of the applicable authorities having jurisdiction.

**10.2** UL Evaluation Reports shall not be used in any manner that implies an endorsement of the product, material or system by UL.

**10.3** The current status of this report, as well as a complete directory of UL Evaluation Reports may be found at UL.com via our On-Line Certifications Directory:

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