

UL Evaluation Report

UL ER11812-02

Issued: September 27, 2013

Revised: September 12, 2017

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UL Category Code: ULEX

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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

Sub-level 3: 07 22 00 - Roof and Deck Insulation

Sub-level 4: 07 22 16 - Roof Board Insulation

Sub-level 3: 07 25 00 - Weather Barriers

Sub-level 3: 07 27 00 - Air Barriers

COMPANY:

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1. SUBJECT:

POLAR-R™ INSULATION BOARDS

POLAR-R™ WITH PERFORM GUARD INSULATION BOARDS

POLAR FOLD™ INSULATION BOARDS

POLAR FOLD™ WITH PERFORM GUARD INSULATION BOARDS

Throughout this report, unless specifically indicated otherwise:

- The reference to Polar-R Insulation Boards will also apply to Polar-R Insulation Boards with Perform Guard.
- The reference to Polar Fold Insulation Boards will also apply to Polar Fold Insulation Boards with Perform Guard.

2. SCOPE OF EVALUATION:

- 2015 *International Building Code*® (IBC)
- 2015 *International Residential Code*® (IRC)
- 2015 *International Energy Code*® (IECC)
- ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2015 (editorially revised May 2016)
- ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels used as Water Resistive Barriers (AC71), dated February 2003 (editorially revised Jun 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:

Polar-R Insulation Boards:

- Surface Burning Characteristics (ANSI/UL723, ASTM E84)
- Physical Properties (ASTM C578)
- Roofing Systems for Exterior Fire Exposure (ANSI/UL790, ASTM E108)
- Air Barrier (ASTM E2178)
- Flammability Testing for Use in Attics and Crawl Spaces (AC12, App. A and B)
- Water-resistive Barrier (AC71)
- Termite Resistance –Foam-Control Climate with Perform Guard and Foam-Control Climate with Perform Guard2 only, (ICC-ES AC239)

Polar Fold Insulation Boards:

- Surface Burning Characteristics (ANSI/UL723, ASTM E84)
- Physical Properties (ASTM C578)
- Roofing Systems for Exterior Fire Exposure (ANSI/UL790, ASTM E108)
- Air Barrier (ASTM E2178)
- Flammability Testing for Use in Attics and Crawl Spaces (AC12, App. A and B)
- Termite Resistance –Foam-Control Climate with Perform Guard and Foam-Control Climate with Perform Guard2 only, (ICC-ES AC239)

3. REFERENCED DOCUMENTS

- ICC-ES:
 - ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2012 ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2015 (editorially revised May 2016)
 - ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated June 2014
 - ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels Used as Water-Resistive Barriers (AC71), dated February 2003 (editorially revised Jun 2016)
 - ICC-ES Acceptance Criteria for Termite Resistant Foam Plastic (AC239), dated October 2008 (editorially revised February 2014)
- ANSI/UL:
 - ANSI/UL723 (ASTM E84), Test for Surface Burning Characteristics of Building Materials
 - ANSI/UL790 (ASTM E108), Standard Test Methods for Fire Tests of Roof Coverings
 - ANSI/UL1897, Uplift Tests for Roof Covering Systems
- ASTM:
 - ASTM C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
 - ASTM E2178, Standard Test Method for Air Permeance of Building Materials

4. USES

4.1 Polar-R Insulation Boards (ASTM C578 Types I, VIII, II, and IX):

Polar-R is used as nonstructural insulation on the interior or exterior of above grade walls, on the interior or exterior of below grade walls, below concrete slabs, and around concrete slab edges, or as roof insulation. Installation shall be in accordance with Section 6.2 of this report.

The insulation may be used on walls in attics and crawl spaces when installation is in accordance with Section 6.2.3.

The insulation may be used as an alternative to the water-resistive barrier specified in IBC Section [1404.2](#) and IRC Section [R703.2](#) when installation is in accordance with Section 6.2.4.

The insulation may be used as an air barrier to limit air infiltration in accordance with IECC Section [C402.4.1.2.1](#) when installation is in accordance with Section 6.2.4.

4.2 Polar Fold Insulation Boards (ASTM C578 Types I, VIII, II, and IX):

Polar Fold is used as nonstructural insulation on the interior or exterior of above grade walls, on the interior or exterior of below grade walls, below concrete slabs, and around concrete slab edges, or as roof insulation. Installation shall be in accordance with Section 6.2 of this report.

The insulation may be used on walls in attics and crawl spaces when installation is in accordance with Section 6.2.3.

The insulation may be used as an air barrier to limit air infiltration in accordance with IECC Section [C402.4.1.2.1](#) when installation is in accordance with Section 6.2.4.

5. PRODUCT DESCRIPTION

5.1 General:

Polar-R and Polar Fold Insulation Boards described in 5.2, and 5.3 are film-faced 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 inches, when tested in accordance with UL723 (ASTM E84) as required by Section [2603.3](#) of the IBC or Section [316.3](#) of the IRC, as applicable.

Polar-R and Polar Fold include laminated polypropylene or polyethylene film on both faces. The facers may also be a metalized polypropylene or polyethylene film

The following products are treated for termite resistance in accordance with Section [2603.9](#), exception 2 of the IBC or Section [318.4](#), exception 2 of the IRC, as applicable:

- Polar-R with Perform Guard Insulation Boards
- Polar Fold with Perform Guard Insulation Boards

5.2 Polar-R and Polar Fold Insulation Boards (Types I, VIII, II, and IX):

Polar-R Insulation Boards have been found to comply with ASTM C578. The boards are manufactured at minimum densities of 0.90, 1.15, 1.35, and 1.80 lbs/ft³ and have ASTM C578 designations of Type I, Type VIII, Type II, and Type IX, respectively. See excerpt from ASTM C578, Table 1 below:

Table 1 – Thermal Resistance of Polar-R and Polar Fold Insulation Boards

ASTM C578 Type	DENSITY, min., lb/ft ³	THERMAL RESISTANCE ¹ , min., °F-ft ² -h/Btu
I	0.90	3.6
VIII	1.15	3.8
II	1.35	4.0
IX	1.80	4.2

¹Thermal resistance (R) values are based on tested values at 1 inch thickness and 75°F mean temperature and must be multiplied by the installed thickness for thicknesses greater than 1 inch.

Polar-R Insulation Boards are manufactured in thicknesses from 1.0 to 4.0 inches.

Polar Fold Insulation Boards are manufactured in thicknesses of 3/8 and 1/2 inch. Polar Fold Insulation Boards are provided in a fanfold configuration with a fold break every 2 ft.

6. INSTALLATION

6.1 General:

Polar-R and Polar Fold 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.

6.2 Polar-R and Polar Fold Insulation Boards:

Polar-R and Polar Fold Insulation Boards must be attached to the structure in a manner that will hold the insulation securely in place. The insulation boards must not be used structurally to resist transverse, axial or shear loads.

The interior of the building must be separated from the Polar-R or Polar Fold Insulation Boards with a thermal barrier as required by Section [2603.4](#) of the IBC or Section [R316.4](#) of the IRC, as applicable.

Polar-R and Polar Fold Insulation Boards may be used as vapor retarders based on perm values described in Tables 3, when required in accordance with the applicable sections of the IBC, IRC and IECC. Vapor retarders are classified as follows:

Class I: 0.1 perm or less Class II: 0.1 <perm ≤ 1.0 Class III: 1.0 <perm ≤ 10 perm

Table 3 – Water Vapor Permeance of Polar-R and Polar Fold

ASTM C578 Type	DENSITY, min., lb/ft³	PERMEANCE¹, max., perms
I	0.90	3.6
VIII	1.15	3.8
II	1.35	4.0
IX	1.80	4.2

¹ Water vapor permeance values are based on 1 inch thickness when tested in accordance with ASTM C578 and ASTM E96. Actual water vapor permeance values vary based on insulation thickness.

6.2.1 Polar-R and Polar Fold Insulation Boards used on the exterior of above grade walls:

Polar-R and Polar Fold Insulation Boards are used on the exterior of above grade walls as follows:

- Exterior Walls of One- and Two-Family Dwellings in accordance with the 2015 IRC,

- Exterior walls of one story buildings of Types I, II, III, or IV construction in accordance with Section [2603.4.1.4](#) of the IBC, or
- Exterior walls of Type V construction in accordance with Section [2603.2](#), [2603.3](#), and [2603.4](#) of the IBC

6.2.2 Polar-R and Polar Fold Insulation Boards Used in Roofing:

Polar-R and Polar Fold Insulation Boards are used as a roofing insulation as part of a UL Classified Class A, B or C roof-covering assembly in accordance with UL790.

6.2.3 Polar-R and Polar Fold Used in Attics and Crawl Spaces:

Polar-R and Polar Fold Insulation Boards may be used on walls of attics and crawl spaces, without the coverings listed in Section [2603.4.1.6](#) of the IBC or Sections [R316.5.3](#) and [R316.5.4](#) of the IRC, as follows:

1. Entry to the attic or crawl space is limited to service of utilities, and no storage is permitted. Utilities include, but are not limited to, mechanical equipment, electrical wiring, fans, plumbing, gas or electric hot water heaters, and gas or electric furnaces.
2. There are no interconnected crawl space areas
3. Air in the attic or crawl space is not circulated to other parts of the building.
4. Under-floor (crawl space) ventilation is provided when required by Section [1203.3](#) of the IBC or Section [R408.1](#) IRC, as applicable.
5. Combustion air is provided in accordance with IMC Section [701](#) (2015 IMC).
6. Polar-R Insulation boards are limited to a maximum thickness of 4 inches (102 mm) for Type I, or a maximum thickness of 3-1/4 inches (82.6 mm) for Type VIII, or a maximum thickness of 2-2/3 inches (67.8 mm) for Type II, or a maximum thickness of 2 inches (51 mm) for Type IX.

6.2.4 Polar-R Used as a Water-Resistive Barrier

Polar-R with a minimum of 1 inch (25.4 mm) thickness may be used as an alternative to the water-resistive barrier required by IBC Section [1404.2](#) and IRC Section [R703.2](#) when installed in accordance with this Section.

Polar-R must be installed directly to framing members spaced a maximum of 24 inches (610 mm) on center. Polar-R must be installed horizontally with tongue edges facing upward or installed vertically with no horizontal joints. Vertical joints must be backed by framing members.

Polar-R is attached with 1 inch (25.4 mm) wide crown No. 16 gage corrosion-resistant staples spaced 6 inches (152mm) on center. Fastener crowns and joints between boards must be covered with Polar-R Tape. A minimum 0.019 inch (0.48 mm) corrosion-resistance weep screed with a vertical attachment flange measuring a minimum of 3-1/2 inches (89mm) must be provided at the bottom of the wall. The installation of the weep screed must be in accordance with IBC Section [2512.1.2](#) or IRC Section [R703.6.2.1](#).

Flashing of flanged window penetrations must be installed in accordance with IBC Section [1405.4](#). The flashing tape must completely cover the framing sill and extend a minimum of 8 inches (203 mm) up the sides of the opening and 6 inches (152 mm) onto the face of the Polar-R at the front of the window opening.

Flashing of small penetrations (e.g. pipes) must be with a silicone sealant complying with ASTM C920.

7. CONDITIONS OF USE

The Polar-R and Polar Fold 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 Polar-R and Polar Fold 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", Polar-R and Polar Fold Insulation Boards without the Perform Guard treatment must be installed in accordance with Section [2603.9](#) of the IBC or Section [R318.4](#) of the IRC, as applicable.

The use of Polar-R and Polar Fold Insulation Boards with the Perform Guard 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 Polar-R and Polar Fold Insulation Boards must be separated from the building interior with a thermal barrier, such as ½ in. gypsum board, as required by Section [2603.4](#) of the IBC or Section [R316.4](#) of the IRC, as applicable.

7.3 Manufacturing Locations:

The products are manufactured at the locations described in Table 6 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 6 – Manufacturing Locations

LISTEE	LOCATION	PLANT ID NO.
ACH Foam Technologies, Inc.	111 West Fireclay Avenue Murray, Utah 84107	U-2
ACH Foam Technologies, Inc.	1400 North 3rd St. Kansas City, Kansas 66101	U-8

8. SUPPORTING EVIDENCE

8.1 Polar-R and Polar Fold Insulation Boards:

8.1.1 Data in accordance with ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2012.

8.1.2 Data in accordance with ICC-ES Acceptance Criteria for Termite Resistant Foam Plastics (AC239), dated October 2008.

8.1.3 Data in accordance with ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels used as Water Resistive Barriers (AC71), dated February 2003.

8.1.4 Data in accordance with the following standards:

- UL723 (ASTM E84)
- ASTM C578
- UL790 (ASTM E108)
- ASTM C2178

8.1.5 Documentation of quality system elements described in AC10.

9. IDENTIFICATION

The Polar-R and Polar Fold Insulation Boards described in this evaluation report are identified by a marking bearing the report holder's name, the plant identification, the product name, the ASTM Type designation, the UL Classification Mark, and the evaluation report number UL ER11812-2. 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

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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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