



**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION**

**Section: 07 21 00—Thermal Insulation**

**Section: 07 25 00—Water-resistive Barriers/Weather Barriers**

**REPORT HOLDER:**

**POLAR INDUSTRIES**

**EVALUATION SUBJECT:**

**POLAR INDUSTRIES TYPE XI, I, VIII, II AND IX, DYNAGUARD™, POLARGUARD®, AND WEATHERALL® INSULATION BOARDS**

**1.0 EVALUATION SCOPE**

**Compliance with the following codes:**

- 2018, 2015, 2012 and 2009 *International Building Code*® (IBC)
- 2018, 2015, 2012 and 2009 *International Residential Code*® (IRC)
- 2018, 2015, 2012 and 2009 *International Energy Conservation Code*® (IECC)

**Property evaluated:**

- Physical properties
- Surface burning characteristics
- Thermal performance (*R*-value)
- Attic and crawl space installation
- Water-resistive barrier

**2.0 USES**

**2.1 Polar Industries Type XI, I, VIII, II and IX Insulation Boards:**

Polar Industries Types XI, I, VIII, II and IX insulation boards are expanded polystyrene foam plastic boards used as nonstructural thermal insulation, including for installation in wall cavities; as a component of classified roof assemblies; or for installation on the exterior side of exterior walls of Type V-B construction or structures in accordance with IRC. The insulation boards may be also used as the core of structural insulated panels (SIPs), when specifically recognized in an ICC-ES evaluation report for the SIP showing compliance with the ICC-ES Acceptance Criteria for Sandwich Panels (AC04).

**2.2 DynaGuard™ and PolarGuard® Insulation Boards:**

DynaGuard™ and PolarGuard® insulation boards are faced expanded polystyrene foam plastic boards used as

nonstructural thermal insulation, including for installation in wall cavities; or for installation on the exterior side of exterior walls of Type V-B construction or structures in accordance with IRC. See Table 1 for product names, types, densities and facer options.

DynaGuard™ insulation boards are also available in fan-fold options.

**2.3 WeatherAll® Insulation Boards:**

WeatherAll® insulation boards are faced expanded polystyrene foam plastic boards used as nonstructural thermal insulation, including for installation in wall cavities; or for installation on the exterior side of exterior walls of Type V-B construction or structures in accordance with IRC. WeatherAll® insulation boards may also be used as an alternative to the water-resistive barrier required by 2018 IBC Section 1403.2 (2015, 2012 and 2009 IBC Section 1404.2) and IRC Section R703.2. See Table 1 for product names, types, densities and facer options.

**3.0 DESCRIPTION**

**3.1 General:**

Polar Industries Types XI, I, VIII, II and IX insulation boards, DynaGuard™ and PolarGuard® insulation boards and WeatherAll® insulation boards have a flame-spread index not exceeding 25 and a smoke-developed index not exceeding 450 when tested in accordance with ASTM E84 (UL 723) at a maximum thickness of 4 inches (152 mm).

**3.2 Polar Industries Type XI, I, VIII, II and IX Insulation Boards:**

Polar Industries Types XI, I, VIII, II and IX insulation boards are Types XI, I, VIII, II and IX boards, complying with ASTM C578, and have minimum densities of 0.70, 0.90, 1.15, 1.35 and 1.80 pcf (12, 15, 18, 22, 29 kg/m<sup>3</sup>).

**3.3 DynaGuard™ and PolarGuard® Insulation Boards:**

DynaGuard™ and PolarGuard® insulation boards consist of ½- to 4-inch-thick (12.7 to 102 mm) expanded polystyrene (EPS) foam plastic boards laminated with clear or metalized polyolefin film. See Table 1 for product names, types, densities and facer options. DynaGuard™ and PolarGuard® insulation boards are available in 2-foot-by-8-foot (610 mm by 2438 mm) and 4-foot-by-8-foot (1219 mm by 2438 mm) sizes.

DynaGuard™ fan-fold insulation boards consist of a ¼- to ½-inch-thick (6.4 mm and 12.7 mm) expanded polystyrene (EPS) foam plastic boards laminated with clear or metalized polyolefin film. See Table 1 for product names, types, densities and facer options. DynaGuard™ fan-fold insulation boards are available in 2-foot-by-4-foot (610 mm by 1219 mm) sizes with a fold break every 2 feet (610 mm).

### 3.4 WeatherAll® Insulation Boards:

WeatherAll® insulation boards consist of ½- to 4-inch-thick (12.7 to 102 mm) expanded polystyrene (EPS) foam plastic boards laminated with clear or metalized polyolefin film. See Table 1 for product names, types, densities and facer options.. WeatherAll® insulation boards are available in 4-foot-by-8-foot (1219 mm by 2438 mm) size.

### 3.5 3M ALL WEATHER FLASHING TAPE 8067:

3M All Weather Flashing Tape 8067 (ESR-2797) is used when WeatherAll boards are used as an alternative water-resistive barrier as described in Section 4.2 to seal all vertical and horizontal joints. The tape is a pressure-sensitive tape consisting of a proprietary multilayer film with an acrylic adhesive. The tape is backed with a release paper that serves to protect the tape adhesive and to prevent self-adhesion of the material. The tape is nominally 9.9 mils (0.25 mm) thick and is produced in rolls with a minimum width of 2 inches (51 mm) and of varying lengths.

## 4.0 INSTALLATION

### 4.1 General:

Installation of Polar Industries Type XI, I, VIII, II and IX Insulation Boards, DynaGuard™, PolarGuard® and WeatherAll® boards must comply with this report and the manufacturer's installation instructions. The interior of the building must be separated from the insulation boards with an approved thermal barrier as required by the IBC Section 2603.4 or IRC Section R316.4. Where the probability of termite infestation is "very heavy", installation must comply with the 2018, 2015 and 2009 IBC Section 2603.8 (2012 IBC Section 2603.9) or IRC Section R318.4. The insulation boards have not been evaluated as a vapor retarder, so a vapor retarder must be installed in accordance with 2018 IBC Section 1404.3 (2015, 2012 and 2009 IBC Section 1405.3) or 2018, 2015 and 2012 IRC Section R702.7 (2009 IRC Section R601).

The insulation boards may be applied to exterior faces of walls to a maximum thickness of 1½ inches (38 mm), except insulation board thicknesses greater than 1½ inches (38 mm) may be permitted if such installation is recognized in a current ICC-ES evaluation report on a wall covering. The insulation boards must not be used as a nailing base for exterior siding materials. All nailing must be made through the insulation into the wall framing or structural sheathing as required by the siding manufacturer's installation instructions or the applicable code. When the insulation boards are applied over open framing, vertical butt joints must be over framing members. For cementitious exterior wall coating systems, unbacked joints are permitted only when specified in the ICC-ES evaluation report on the cementitious exterior wall coating system.

The attachment of finish materials over the insulation board must allow for a minimum 1-inch (25.4 mm) penetration of fasteners into wood framing. Sheathing or wall coverings must be structurally adequate to resist horizontal forces perpendicular to the wall. All walls must be braced in accordance with 2018 and 2015 Section 2308.6.1 (2012 and 2009 IBC Section 2308.9.3) or 2018, 2015 and 2012 IRC Section R602.10.2 (2009 IRC Section R602.10.1).

### 4.2 WeatherAll® Insulation Boards Used as Alternative Water-resistive Barriers:

**4.2.1 General:** The WeatherAll® insulation boards must be installed in accordance with this report and the manufacturer's published installation instructions. This report and the manufacturer's published installation

instruction must be available at the jobsite during installation.

When installed in accordance with this section, the WeatherAll® insulation boards may be used as an alternative to the water-resistive barrier specified in 2018 IBC Section 1403.2 (2015, 2012 and 2009 IBC Section 1404.2) and IRC Section R703.2. The boards must be covered with an approved exterior wall covering.

The insulation boards are installed horizontally or vertically with edge joints in contact with one another. The insulation boards must be installed directly on framing members spaced a maximum of 16 inches (406 mm) on center. The insulation boards must be attached with nails spaced a maximum of 24 inches (610 mm) on center in the field and on the perimeter. The fasteners must be long enough to penetrate the framing members a minimum of 1 inch (25.4 mm). Fastener crowns, joints between boards, and joints at corners made with the boards must be covered with WeatherAll® Tape centered over the joint. The WeatherAll® insulation board receiving the Tape must be clean and dry.

**4.2.2 Openings and Penetrations:** Windows must be of the flanged type. Flashing of flange-type window penetrations, when WeatherAll® insulation boards are used as an alternative water-resistive barrier, is accomplished by installation of flashing complying with the ICC-ES Acceptance Criteria for Flashing Materials (AC148) covered under a current ICC-ES evaluation report. The flashing tape must completely cover the framing sill and extending a minimum of 6 inches (152 mm) up the sides of the opening and 1 inch (25.4 mm) beyond the edge of the foam board at the front of the window opening. The sill flashing must be flush with the inside edge of the framing members on the inside of the wall. The flashing extending outside of the WeatherAll boards must be folded over the front face of the foam board. The flange-type window must then be installed in accordance with the window manufacturer's installation instructions. Jamb flashings must be installed prior to the installation of the head flashing. All jamb and head flashing must completely cover the window flanges. See Figure 1 for typical installation details.

Flashing of pipe penetrations must be accomplished by sealing around the pipe with flashing tape complying with AC148 with minimum 2 inch (50.8 mm) overlap. Flashing of other penetrating items must be in accordance with the wall covering manufacturer's installation instructions.

**4.3 Special Use – Attics and Crawl Spaces:** Polar Industries Types I, VIII, II and IX 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 IRC Sections R316.5.3 and R316.5.4, under all of the following conditions:

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 attic or basement areas.
3. Air in the attic or crawl space is not circulated to other parts of the building.
4. Attic ventilation is provided in accordance with 2018 IBC Section 1202.2.1 (2015, 2012 and 2009 IBC Section 1203.2) or IRC Section R806, as applicable.
5. Under-floor ventilation is provided in accordance with IBC Section 1203.3 or IRC Section R408.1 as applicable.

6. Combustion air is provided in accordance with Section 701 of the *International Mechanical Code*<sup>®</sup> (IMC).
7. Insulation boards are limited to the EPS types and maximum thicknesses specified in Table 2.

## 5.0 CONDITIONS OF USE

The Polar Industries Types XI, I, VIII, II and IX insulation boards, DynaGuard™ and PolarGuard® insulation boards and WeatherAll® insulation boards described in this report comply with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The EPS insulation boards must be installed in accordance with this report, the manufacturer's published installation instructions and the applicable code. In the event of a conflict between this report and the manufacturer's instructions, this report governs.
- 5.2 Walls must be braced in accordance with the applicable code.
- 5.3 The insulation boards must not be used as a nailing base for exterior siding materials. All nailing must be made through the boards into the wall framing or structural sheathing as required by the siding manufacturer's installation instructions or the applicable code.
- 5.4 The insulation boards must be separated from the interior of the building with a thermal barrier complying with IBC Section 2603.4 or IRC Section R316.4, as applicable.
- 5.5 Exterior walls must include an approved exterior wall covering, including a water-resistive barrier complying with 2018 IBC Section 1403.2 (2015, 2012 and 2009 IBC Section 1404.2) and IRC Section R703.2 as applicable. WeatherAll® insulation boards may be used as an alternative water-resistive barrier when installed in accordance with Section 4.2.
- 5.6 WeatherAll® insulation boards may not be used as a water-resistive barrier with Portland cement plaster where two layers of a water-resistive barrier complying with ASTM E2556, Type I as required in accordance with the 2018 or 2015 IBC or two layers of Grade D paper as required in accordance with 2012 and 2009 IBC Section 2510.6 or IRC Section R703.6.3, except as described in a current ICC-ES evaluation report on an exterior wall covering.
- 5.7 Use of the foam plastic insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with 2018, 2015 and 2009 IBC Section 2603.8 (2012 IBC Section 2603.9) and IRC Section R318.4, as applicable.
- 5.8 Use of the insulation boards as an air-barrier or vapor retarder, is outside the scope of this report.
- 5.9 A vapor retarder must be installed in accordance with the applicable code.

5.10 For buildings in which the WeatherAll® insulation board described in this report are used as an alternative water-resistive barrier, all plans must be accompanied by drawings, consistent with the illustrations in this report, that include the following:

- a) Insulation details at all openings, corners and insulation board terminations.
- b) Location, configuration and method of sealing of joints between boards and at corners.
- c) Typical cross section, showing all components of the wall.
- d) Typical wall pipe and window penetration.

5.11 Jobsite certification and labeling of the insulation must comply with 2018 and 2015 IRC Section N1101.10.11, 2018 and 2015 IECC Section C303.1.1.1 or R303.1.1.1, 2012 IRC Section N1101.12.11, 2012 IECC Section C303.1.1.1 or R303.1.1.1, 2009 IRC Section N1101.4 and 2009 IECC Section 303.1.1, as applicable.

5.12 Polar Industries Types XI, I, VIII, II and IX insulation boards, DynaGuard™ and PolarGuard® insulation boards and WeatherAll® insulation boards are manufactured by Polar Industries locations in Prospect, Connecticut, specified in Table 1, under a quality-control program with inspections by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2015 (editorially revised October 2017).
- 6.2 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Sheathing Panels Used as Weather-resistive Barriers (AC71), dated February 2003 (editorially revised January 2018).

## 7.0 IDENTIFICATION

7.1 Polar Industries Types XI, I, VIII, II and IX insulation boards, DynaGuard™ and PolarGuard® insulation boards and WeatherAll® insulation boards are identified by a label bearing the company name (Polar Industries), product name, plant address, EPS type, density, flame spread index and smoke developed index, and evaluation report number ESR-3522.

In addition to the labeling noted above, insulation boards used for installations in attics and crawl spaces as described in Section 4.3 and Table 2 must be identified as being produced from Nexkemia, Lotte, Styropek, BASF, Flint Hills Resources LP, Nova or Styrochem resin beads.

7.2 The report holder's contact information is the following:

**POLAR INDUSTRIES**  
**32 GRAMAR AVENUE**  
**PROSPECT, CONNECTICUT 06712**  
**(203) 758-6651**  
[www.polarcentral.com](http://www.polarcentral.com)

**TABLE 1—POLAR INDUSTRIES PRODUCTS AND MANUFACTURING LOCATIONS**

PRODUCT NAME	ASTM TYPE	R-VALUE PER INCH OF THICKNESS (°F•ft <sup>2</sup> •h/Btu)	MINIMUM DENSITY (pcf)	FACER OPTIONS:	GRAMAR AVENUE	NEW HAVEN ROAD
Polar Industries Types XI Insulation Board	Type XI	3.1	0.70	-	X	-
Polar Industries Types I Insulation Board	Type I	3.6	0.90	-	X	X
Polar Industries Types VIII Insulation Board	Type VIII	3.8	1.15	-	X	X
Polar Industries Types II Insulation Board	Type II	4.0	1.35	-	X	X
Polar Industries Types IX Insulation Board	Type IX	4.2	1.80	-	X	-
DynaGuard™ XL PolarGuard® XL WeatherAll® XL	Type XI	3.1	0.70	Interior: 1-mil Clear Film or 1.2-mil Metalized Film Exterior: 1-mil Clear Film or 1.2-mil Metalized Film	X	-
DynaGuard™ Pro PolarGuard® Pro WeatherAll® Pro	Type XI	3.1	0.70	Interior: 1-mil Clear Film or 1.2-mil Metalized Film Exterior: 1-mil Clear Film or 1.2-mil Metalized Film	X	-
DynaGuard™ Pro PolarGuard® Pro WeatherAll® Pro	Type I	3.6	0.90	Interior: 1-mil Clear Film or 1.2-mil Metalized Film Exterior: 1-mil Clear Film or 1.2-mil Metalized Film	X	X
DynaGuard™ GPS PolarGuard® GPS WeatherAll® GPS	Type VIII	3.8	1.15	Interior: 1-mil Clear Film or 1.2-mil Metalized Film Exterior: 1-mil Clear Film or 1.2-mil Metalized Film	X	X
DynaGuard™ HD PolarGuard® HD WeatherAll® HD	Type II	4.0	1.35	Interior: 1-mil Clear Film or 1.2-mil Metalized Film Exterior: 1-mil Clear Film or 1.2-mil Metalized Film	X	X

For SI: 1-mil = 0.001 inch, 1 inch = 25.4 mm, 1 pcf = 16.02 kg/m<sup>3</sup>, 1°F•ft<sup>2</sup>•hr/Btu = 0.176 m<sup>2</sup>•K/W, 1°F = 1.8°C+32.

**TABLE 2—ASTM C578 TYPE AND MAXIMUM THICKNESS FOR USE IN ATTICS AND CRAWL SPACES**

ASTM TYPE	MAXIMUM BOARD THICKNESS WITH NEXKEMIA (ESR-2949) OR LOTTE (ESR-2195) EPS RESINS (inches)	MAXIMUM BOARD THICKNESS WITH STYROPEK (ESR-1498) EPS RESINS (inches)	MAXIMUM BOARD THICKNESS WITH BASF (ESR-2784), FLINT HILLS (ESR-1634), NOVA (ESR-1798) OR STYROCHEM (ESR-3155) EPS RESINS (inches)
Type I	3	6	4
Type VIII	3	5.20	3.2
Type II	3	4.33	2.66
Type IX	3	3.25	2

For SI: 1 inch = 25.4 mm.

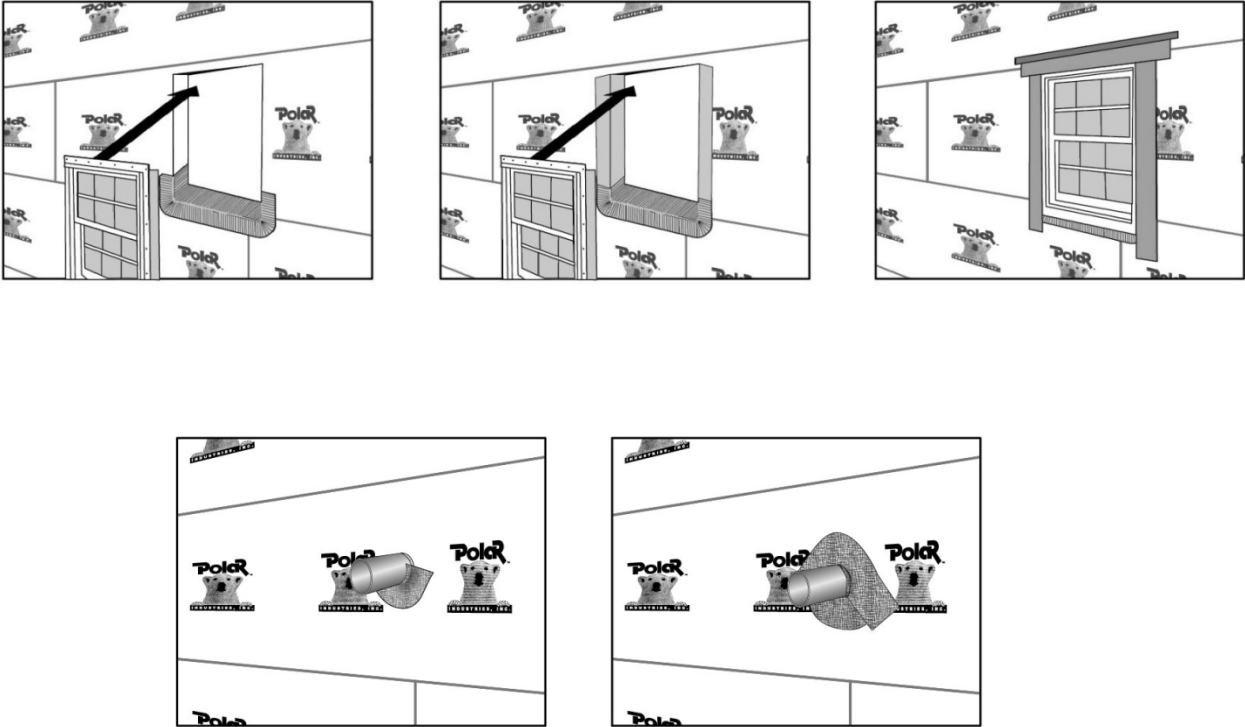


FIGURE 1—TYPICAL FLASHING DETAILS