

ICC-ES Evaluation Report**ESR-1006**

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**DIVISION: 07 00 00—THERMAL AND MOISTURE
PROTECTION****Section: 07 21 00—Thermal Insulation****Section: 07 22 00—Roof and Deck Insulation****REPORT HOLDER:****AFM CORPORATION**
17645 JUNIPER PATH, SUITE 260
LAKEVILLE, MINNESOTA 55044
www.foam-control.com**EVALUATION SUBJECT:****FOAM-CONTROL® EPS BOARDS, FOAM-CONTROL®
EPS WITH PERFORM GUARD® BOARDS AND FOAM-
CONTROL® EPS WITH PERFORM GUARD² BOARDS****ADDITIONAL LISTEES:****ACH FOAM TECHNOLOGIES, LLC****BIG SKY INSULATIONS, INC.****BRANCH RIVER PLASTICS, INC.****HENRY PRODUCTS, INC.****MID-ATLANTIC FOAM****NOARK ENTERPRISES, INC.****PACIFIC ALLIED PRODUCTS, LTD.****POLIESTIRENO ALFA-GAMMA S.A. de C.V.****POLY-FOAM INC.****TEAM INDUSTRIES, INC.****THERMA FOAM, LLC****THERMAL FOAMS, INC.****UBS FOAM****1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2009 *International Building Code*® (IBC)

- 2009 *International Residential Code*® (IRC)

- 2009 *International Energy Conservation Code*® (IECC)

Properties evaluated:

Foam-Control EPS Boards:

- Surface-burning characteristics
- Physical properties/thermal resistance (*R*-values)
- Attic and crawl space installation
- Fire resistance (D2D Foam-Control®)

Foam-Control EPS with Perform Guard Boards and Foam-Control EPS with Perform Guard² Boards:

- Surface-burning characteristics
- Physical properties/thermal resistance (*R*-values)
- Termite resistance

2.0 USES**2.1 Foam-Control EPS Boards (Types I, VIII, II, and IX):**

Foam-Control expanded polystyrene (EPS) insulation boards are used as nonstructural insulation in wall cavities, door cavities, ceiling assemblies, and roof covering assemblies, or on the outside faces of exterior walls. The insulation boards may be used on walls in attics and crawl spaces without a covering when installation is in accordance with Section 4.2.2.

The insulation boards may be used as the core of sandwich panels when specifically recognized in a current evaluation report.

The insulation boards may be used as exterior perimeter insulation around concrete slab edges, on foundation walls, or under flat concrete slab on grade construction, except in areas where the probability of termite exposure is “very heavy” as defined in IBC Section 2603.8 and IRC Section R318.4.

The insulation boards may be used as components of Class A, B, and C roof covering systems installed on steel decks, when installation is in accordance with Section 4.4. The insulation boards may be used as a roof insulation when recognized in an ICC-ES evaluation report on the roof covering system.

2.2 Foam-Control EPS Boards (Type I-WSG):

Foam-Control EPS boards designated as Type I-WSG may be used as components of a wall covering system when recognized in an ICC-ES report.

2.3 Foam-Control EPS Boards (Types I-D2D, VIII-D2D, II-D2D, and IX-D2D):

Foam-Control EPS boards designated as Type I-D2D, VIII-D2D, II-D2D or IX-D2D may be used as components of a Class A, B, or C roof covering system installed directly to steel decks, when installation is in accordance with Section 4.4 of this report.

2.4 Foam-Control EPS with Perform Guard Boards (Types I, VIII, II, and IX):

Foam-Control EPS with Perform Guard boards are used as nonstructural insulation. The boards are recognized for installation below grade in areas subject to termites in accordance with Section 4.5 of this report. When installation is in areas where the probability of termite infestation is "very heavy" as described in IBC Section 2603.8, or IRC Section R316.7, use is limited to areas exposed to the *Reticulitermes* species.

The insulation boards may be used in wall cavities or on the outside faces of exterior walls. The insulation boards may be used as exterior perimeter insulation around concrete slab edges, on foundation walls, or under concrete slab on grade construction.

2.5 Foam-Control EPS with Perform Guard² Boards (Types I, VIII, II, and IX):

Foam-Control EPS with Perform Guard² boards are used as nonstructural insulation. The boards are recognized for installation below grade in areas subject to termites in accordance with Section 4.6 of this report.

The insulation boards may be used in wall cavities or on the outside faces of exterior walls. The insulation boards may be used as exterior perimeter insulation around concrete slab edges, on foundation walls, or under concrete slab on grade construction.

3.0 DESCRIPTION

3.1 General:

The Foam-Control insulation boards described in Sections 3.2 through 3.5 are molded, closed-cell expanded polystyrene boards complying with ASTM C 578, have a flame-spread index not exceeding 25 and a smoke-developed index not exceeding 450 when tested at a thickness of 6 inches (152 mm) in accordance with ASTM E 84, and have thermal resistance values noted in Table 1. Maximum thickness is 9 inches (229 mm) when used in roofing applications where a thermal barrier is provided, and 9 inches (229 mm) when used as described in Section 4.4; for other uses, maximum thickness is 6 inches (152 mm).

3.2 Foam-Control EPS Boards (Types I, VIII, II, and IX):

Foam-Control EPS boards are manufactured at minimum densities of 0.90, 1.15, 1.35 and 1.80 pcf (14.4, 18.4, 21.6, 28.8 kg/m³) and have designations Type I, Type VIII, Type II, and Type IX, respectively.

3.3 Foam-Control EPS Boards (Type I-WSG):

Type I-WSG Foam-Control EPS boards are manufactured at a minimum density of 0.90 pcf (14.4 kg/m³). Type I-WSG boards comply with ASTM E 2430.

3.4 Foam-Control EPS Boards (Types I-D2D, VIII-D2D, II-D2D, and IX-D2D):

D2D Foam-Control EPS boards are manufactured at minimum densities of 0.90, 1.15, 1.35 and 1.80 pcf (14.4, 18.4, 21.6, 28.8 kg/m³), corresponding to designations Type I, Type VIII, Type II and Type IX, respectively.

3.5 Foam-Control EPS with Perform Guard Boards (Type I, VIII, II, and IX):

Foam-Control EPS with Perform Guard boards are factory-treated for termite resistance. The boards are manufactured at minimum densities of 0.90, 1.15, 1.35 and 1.80 pcf (14.4, 18.4, 21.6, 28.8 kg/m³), corresponding to designations Type I, Type VIII, Type II, and Type IX, respectively.

3.6 Foam-Control EPS with Perform Guard² Boards (Type I, VIII, II, and IX):

Foam-Control EPS with Perform Guard² boards are factory-treated for termite resistance. The boards are manufactured at minimum densities of 0.90, 1.15, 1.35 and 1.80 pcf (14.4, 18.4, 21.6, 28.8 kg/m³), corresponding to designations Type I, Type VIII, Type II, and Type IX, respectively.

4.0 INSTALLATION

4.1 General:

Foam-Control EPS boards, Foam-Control EPS with Perform Guard boards and Foam-Control EPS with Perform Guard² 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 must be available at all times on the jobsite during installation.

4.2 Foam-Control EPS Boards:

4.2.1 General: Foam-Control EPS boards must be attached to supports in a manner that will hold the insulation securely in place. The insulation boards must not be used structurally to resist transverse, vertical or in-plane loads except when this is specifically recognized in a separate evaluation report. The boards must not be used as exterior stud wall bracing. Wall bracing must be provided in accordance with IBC Sections 2308.9.3 and 2308.12.4 or IRC Section R602.10.

The insulation board 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 an ICC-ES evaluation report on a wall covering. The insulation boards must not be used as a nailing base for exterior finish materials. The attachment of finish materials over the insulation boards must provide a minimum of 1-inch (25.4 mm) penetration of the fasteners into wood framing members or into structural sheathing, as required by the finish material manufacturer's published instructions, or in accordance with the applicable code. Finish materials over the insulation boards must be structurally adequate to resist the required horizontal forces perpendicular to the wall.

The interior of the building must be separated from the insulation boards with a thermal barrier as required by IBC Section 2603.4 or IRC Section R316.4, except when installation is in accordance with Section 4.2.2 of this report.

In areas where the probability of termite infestation is defined as "very heavy" and when foam plastic insulation is used with wood construction, the foam plastic must be installed in accordance with IBC Section 2603.8 or IRC Section R318.4. Areas of very heavy termite infestation must be determined in accordance with IBC Figure 2603.8 and IRC Figure R301.2 (6), as applicable.

Insulation boards for use as roof insulation must be installed in accordance with Section 4.4 or as recognized in an ICC-ES evaluation report on a roof covering system.

The insulation board may be used as the core material for doors that do not require a fire-resistance rating, when installed in accordance with IBC Sections 2603.4.1.7, 2603.4.1.8, and 2603.4.1.9 or IRC Sections R316.5.5 and R316.5.6.

4.2.2 Special Use—Attics and Crawl Spaces: Foam-Control EPS 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 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*[®] (IMC).
7. Insulation boards are limited to a maximum nominal density of 1 pcf (16 kg/m³) and a maximum thickness of 4 inches (102 mm); or maximum nominal density of 2 pcf (32 kg/m³) and maximum thickness of 2 inches (51 mm); or maximum nominal density of 1.5 pcf (24 kg/m³) and maximum thickness of 2²/₃ inches (67.8 mm).

4.3 Foam-Control EPS Boards (Type I-WSG):

Type I-WSG Foam-Control EPS boards must be installed as part of an exterior cementitious wall covering, an EIFS system or other proprietary wall system, when installation is in accordance with an ICC-ES evaluation report on the wall covering system

4.4 D2D Foam-Control EPS Boards (Type I, VII, II, and IX):

4.4.1 Application Directly to Steel Roof Decks without a Thermal Barrier: D2D Foam-Control EPS roof insulation may be used as a component of a Class A, B, or C roof covering installed on steel decks without a thermal barrier, when installation is in accordance with Sections 4.4.2, 4.4.3 and 4.4.4.

4.4.2 Materials:

4.4.2.1 Steel Deck: Steel roof decking must be minimum No. 22 MSG [0.030 inch (0.76 mm)], 1¹/₂-inch-deep (38 mm), unperforated, painted or galvanized steel decking, with flutes spaced a maximum of 6 inches (152 mm) on center. The deck must be welded or mechanically fastened to structural supports in accordance with the applicable code.

4.4.2.2 Foam Plastic Insulation: The D2D Foam-Control EPS insulation boards may have a maximum thickness as follows: up to 9.0 inches (229 mm) for Type I, 7.2 inches (183 mm) for Type VIII, 6.0 inches (152 mm) for Type II, and 4.5 inches (114 mm) for Type IX.

4.4.2.3 Cover Board: When used, the cover board in the roof covering assembly is ¹/₄-inch-thick (6.4 mm) Dens-Deck[®] Roof Board, manufactured by Georgia-Pacific Corporation, or ¹/₂-inch-thick (12.7 mm) wood-fiber board complying with ASTM C 208.

4.4.2.4 Roof Covering: The roof covering membrane must be a mechanically attached, fully adhered or ballasted EPDM or thermoplastic membrane listed in an ICC-ES evaluation report as part of a Class A, B, or C roof covering assembly. Thermoplastic membranes include polyvinyl chloride (PVC), modified PVC, chlorosulphonated polyethylene (CSPE), and thermoplastic polyolefin (TPO). The membrane is limited to a maximum nominal thickness of 0.045 inch (1.1 mm). The evaluation report on the roof covering assembly must specify one of the following assemblies as the only components of the classified roof covering assembly permitted under the conditions of this report:

- a. A generic EPS insulation board having the same density and installed thickness as the Foam-Control EPS roof insulation listed in Table 1 of this report, the cover board described in Section 4.4.2.3, and the roof covering membrane described in this section (Section 4.4.2.4), installed over a steel deck as described in Section 4.4.2.1.
- b. A generic EPS insulation board having the same density and installed thickness as the Foam-Control EPS roof insulation listed in this report, the roof covering membrane described in this section (Section 4.4.2.4), and stone ballast, installed over a steel deck as described in Section 4.4.3 of this report.

4.4.3 Installation: The Foam-Control EPS roof insulation boards are loosely laid directly over the steel deck in single or multiple layers, to a maximum total thickness and density as noted in Section 4.4.2.2. The top layer of insulation must be placed so that the labeling required in Section 7.0 is facing up. Tapered EPS foam boards may be installed, provided the maximum allowable thickness is not exceeded. The cover board described in Section 4.4.2.3, when required, is laid over the insulation.

The method of attaching the roof covering, cover boards, and insulation boards to the steel roof deck must be in accordance with the ICC-ES evaluation report on the roof covering membrane, and as described in Section 4.4.2.4 of this report.

4.4.4 Reroofing: New roofing must not be applied over existing roof covering assemblies. Additional EPS foam insulation may be added over the existing EPS foam insulation, provided inspection in accordance with IBC Section 1510 or IRC Section R907 indicates the existing EPS is sound material, the density of the EPS being added is equal to the density of the existing EPS, the existing EPS meets the requirements of this report, and the total thickness of the existing EPS plus the new EPS being added conforms to Section 4.4.2.2. The existing roof covering and, if necessary, the cover board must be removed before new roofing materials, having characteristics specifically described in this report, can be installed.

4.5 Foam-Control EPS with Perform Guard Boards:

Foam-Control EPS with Perform Guard boards is installed as specified in Section 4.2.1 of this report, except that use is not restricted in areas where the probability of termite infestation is defined as “very heavy” under Section 2603.8 of the IBC or IRC Section R318.4.

4.6 Foam-Control EPS with Perform Guard² Boards:

Foam-Control EPS with Perform Guard² is installed as specified in Section 4.2.1 of this report, except that use is not restricted in areas where the probability of termite infestation is defined as “very heavy” under IBC Section 2603.8 or IRC Section R318.4.

5.0 CONDITIONS OF USE

The Foam-Control EPS boards, Foam-Control EPS with Perform Guard boards, and Foam-Control EPS with Perform Guard² boards described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The 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.
- 5.2 The insulation boards must be separated from the building interior with a thermal barrier complying with the applicable code, such as 1/2-inch (12.7mm) gypsum wallboard installed in accordance with the applicable code, except as described in Sections 4.2.2 and 4.4 of this report.
- 5.3 Exterior walls must be protected by a water-resistive barrier complying with IBC Section 1404.2 or IRC Section R703.2, and by wall coverings that provide the necessary structural resistance to wind and seismic forces in spanning between wall framing members.
- 5.4 In areas where the probability of termite infestation is defined as "very heavy", the foam plastic must be installed in accordance with IBC Section 2603.8 or IRC-Section R318.4, except as permitted for Foam-Control Perform Guard EPS in Section 4.5 or for Foam-Control Perform Guard EPS² in Section 4.6.
- 5.5 Walls on which the boards are applied must be braced in accordance with the applicable code.
- 5.6 When Foam-Control EPS D2D insulation boards are installed directly to a steel roof deck without a thermal barrier for structures regulated under the IBC, the following conditions apply:
 - 5.6.1 The insulation boards must be part of a Class A, B, or C roof covering system as described in Section 4.4 of this report. The insulation boards may be installed without a thermal barrier as addressed in IBC Section 2603.4.1.5.
 - 5.6.2 Reroofing must be in accordance with Section 4.4.4.
 - 5.6.3 Permanent placards bearing the following words are attached to roof hatches and where other roof access is located: "This roof covering includes foam plastic insulation applied directly to a steel deck. The existing roofing membrane, slip sheets, and cover boards must be removed before reroofing. Limits also exist for cover boards and membranes. See ICC-ES evaluation report ESR-1006 before reroofing."

5.7 Maximum thickness is as noted in Section 3.1 of this report.

5.8 The products are manufactured by the listees at the locations specified in Table 2 under a quality control program with inspections by UL LLC (AA-668).

6.0 EVIDENCE SUBMITTED

6.1 Foam-Control EPS Boards:

6.1.1 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated February 2011, including reports of tests in accordance with Appendix B.

6.1.2 Data in accordance with UL1256.

6.1.3 Test reports of room corner fire tests in accordance with UBC Standard 26-3.

6.2 Foam-Control EPS with Perform Guard and Foam-Control EPS with Perform Guard²:

6.2.1 Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated February 2011.

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

7.0 IDENTIFICATION

Foam-Control EPS Boards, Foam-Control EPS with Perform Guard boards, and Foam-Control EPS with Perform Guard² boards are marked on each board with the report holder's name (AFM); the plant ID number; the ASTM type; the name of the inspection agency (UL LLC); and the evaluation report number (ESR-1006). Additionally, an inspection agency certificate, including the flame-spread index, the smoke-developed index, and the thermal-resistance (*R*-value), is provided with each shipment of insulation boards.

Bundles of insulation include instructions regarding *R*-value required by ASTM C 578.

In addition to the marking noted above, each Foam-Control EPS D2D insulation board has the following wording: "When used in reroofing applications, limits exist for cover board and membrane. See ICC-ES evaluation report ESR-1006 before reroofing."

In addition to the foam plastic EPS board markings noted above, Foam-Control EPS insulation boards for use under Section 4.2.2, in attics and crawl spaces, are labeled with one of the following: "BASF," "Flint Hills," "Nova," or "StyroChem."

TABLE 1—THERMAL RESISTANCE VALUES¹

ASTM TYPE	MINIMUM DENSITY (pcf)	THERMAL RESISTANCE (per 1 inch thickness) (°F-ft ² -h/Btu)
Type I	0.90	3.60
Type VIII	1.15	3.80
Type II	1.35	4.00
Type IX	1.80	4.20

For SI: 1 pcf = 16.018 kg/m³, 1°F-ft²-h/Btu = 0.176 m²-K/W.

¹Thermal resistance (R) values are based on tested values between 1 and 4 inches and must be multiplied by the installed thickness for thicknesses greater than 1 inch (25 mm). Maximum foam plastic thickness recognized in this report is 9 inches.

TABLE 2—MANUFACTURING LOCATIONS

LISTEE	LOCATION	PLANT ID NO.
ACH Foam Technologies, LLC	5250 North Sherman Street Denver, Colorado 80216	U-1
ACH Foam Technologies, LLC	111 West Fireclay Avenue Murray, Utah 84107	U-2
ACH Foam Technologies, LLC	2731 White Sulfur Road Gainesville, Georgia 30503	U-4
ACH Foam Technologies, LLC	775 Waltham Way, Suite 105 McCarran, Nevada 89434	U-53
ACH Foam Technologies, LLC	1400 North 3rd St. Kansas City, Kansas 66101	U-8
ACH Foam Technologies, LLC	1418 Cow Palace Road Newton, Kansas 67114	U-41
ACH Foam Technologies, LLC	90 Trowbridge Drive Fond Du Lac, Wisconsin 54936-0669	U-37
ACH Foam Technologies, LLC	809 East 15th Street Washington, Iowa 52353	U-55
ACH Foam Technologies, LLC	3751 Sunset Avenue Waukegan, Illinois 60087	U-57
Big Sky Insulations, Inc.	15 Arden Drive Belgrade, Montana 59714	U-30
Branch River Plastics, Inc.	15 Thurber Boulevard Smithfield, Rhode Island 02917	U-6
Henry Products, Inc.	302 South 23 rd Avenue Phoenix, AZ 85009	U-62
Mid Atlantic Foam	326 McGhee Road Winchester, Virginia 22603	U-14
Mid Atlantic Foam	57 Joseph Drive Fredericksburg, Virginia 22404	U-63
Noark Enterprises, Inc.	10101 Highway 70 East North Little Rock, Arkansas 72117	U-24
Pacific Allied Products, Ltd.	91-110 Kaomi Loop Kapolei, Hawaii 96707	U-17
Poliestireno Alfa-Gamma S.A. de C.V.	Maquiladoras #331 Int A y B Tijuana, Baja California Mexico	U-60
Poly-Foam, Inc.	116 Pine Street South Lester Prairie, Minnesota 55354	U-22
Team Industries, Inc.	4580 Airwest Drive SE Grand Rapids, Michigan 49512	U-12
Therma Foam, LLC	1240 Hwy 77 N Hillsboro, Texas 76645	U-25
Thermal Foams, Inc.	2101 Kenmore Ave. Buffalo, NY 14207	U-26
UBS Foam	2725 Henkle Drive Lebanon, Ohio 45036	U-58