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# ICC-ES Report

## ESR-1946

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Reissued 09/2015  
This report is subject to renewal 09/2017.

**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION**  
**SECTION: 07 21 00—THERMAL INSULATION**

**REPORT HOLDER:**

**HOUSTON FOAM PLASTICS, INC.**

**2019 BROOKS STREET  
HOUSTON, TEXAS 77026-7297**

**EVALUATION SUBJECT:**

**HOUSTON FOAM PLASTICS EXPANDED POLYSTYRENE (EPS) INSULATION BOARD**



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**DIVISION: 07 00 00—THERMAL AND MOISTURE  
PROTECTION****Section: 07 21 00—Thermal Insulation****REPORT HOLDER:****HOUSTON FOAM PLASTICS INC.**  
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[www.houstonfoam.com](http://www.houstonfoam.com)**ADDITIONAL LISTEE:****ALAMO FOAM, A DIVISION OF HFP**  
11115 OSGOOD STREET  
SAN ANTONIO, TEXAS 78233  
(210) 646-8288**EVALUATION SUBJECT:****HOUSTON FOAM PLASTICS EXPANDED POLYSTYRENE  
(EPS) INSULATION BOARD****1.0 EVALUATION SCOPE****Compliance with the following codes:**

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- 2006 *International Energy Conservation Code*® (IECC)

**Properties evaluated:**

- Physical properties
- Surface-burning characteristics
- Attic and crawl space installation
- Thermal resistance (*R*-values)

**2.0 USES**

Houston Foam Plastics EPS insulation is an expanded polystyrene foam plastic board used as nonstructural thermal insulation in wall cavities and ceiling assemblies, as a component of classified roof covering assemblies, as a covering on the exterior perimeter of foundations and basements, as architectural shapes, or on the outside face of exterior walls of buildings of Type V-B (IBC) construction or on structures constructed in accordance with the IRC. The insulation board may also be used on walls in attics and crawl spaces without the ignition barrier required by the applicable code, or as the core material for nonfire-resistance-rated doors, when installed as noted in Section 4.2.2 of this report. The insulation boards may be used as

the core of sandwich panels when recognized for such use in a current ICC-ES evaluation report. The insulation boards may be used as roof insulation when recognized for such use in a current ICC-ES evaluation report for a roof covering system, or when installed as described in Section 4.2.3 of this report.

**3.0 DESCRIPTION**

Houston Foam Plastic EPS insulation boards are available with flat faces and square edges, in various lengths and widths and in thicknesses up to 6 inches (152 mm). The insulation boards are Type I, VIII, II and IX boards complying with ASTM C578, and have minimum densities of 0.9, 1.15, 1.35, and 1.8 pcf (14.4, 18.4, 21.6 and 28.8 kg/m<sup>3</sup>), respectively. The foam plastic boards have a flame-spread index not greater than 25 and a smoke-developed index not greater than 450, when tested in accordance with ASTM E84. The foam plastic boards have the thermal resistance (*R*-values) listed in Table 1.

**4.0 INSTALLATION****4.1 General**

Installation of the insulation boards must comply with this report, the manufacturer's published installation instructions and the applicable code. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.

Except as noted in Section 4.2, the interior of the building must be separated from the foam plastic boards with an approved thermal barrier as required by IBC Section 2603.4 or IRC Section R314.4. A vapor retarder must be installed in wall and ceiling assemblies in accordance with IBC Section 1403.2 or IRC Sections R318.1 and N1102.5, as applicable. The insulation board may be applied to exterior faces of walls to a maximum thickness of 1½ inches (38 mm), except that 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 attachment of finish materials over the insulation board must allow for a minimum 1-inch (25.4 mm) penetration of the fasteners into wood framing. Sheathing or a wall covering over the insulation board must be structurally adequate to resist transverse loads. All walls must be braced in accordance with IBC Sections 2308.9.3 and 2308.12.4 or IRC Section R602.10.3, as applicable.

Insulation boards must not be used as a nailing base for exterior siding materials. All nailing must be made through the insulation board into the wall framing or structural sheathing as required by the siding manufacturer's published installation instructions or the applicable code.

The insulation boards may be used as part of an exterior insulation and finish system (EIFS) when specifically recognized for such use in a current ICC-ES evaluation report.

The insulation boards may be used in roof assemblies when such use is specifically recognized in a current ICC-ES evaluation report on Class A, B or C roof assemblies in accordance with IBC Section 1505.1 or IRC Section R902.1. The method of installing the insulation board must be in accordance with the ICC-ES evaluation report on the roof assembly.

## 4.2 Special Uses:

**4.2.1 Attics and Crawl Spaces:** The insulation board may be used on walls in attics and crawl spaces without a covering applied to the attic or crawl space side of the foam plastic boards, provided all of the following conditions are met:

- Entry to the attic or crawl space is only to service utilities, and no storage is permitted.
- There are no interconnected attic or crawl space areas.
- Air in the attic or crawl space is not circulated to other parts of the building.
- Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806, as applicable. Under-floor (crawl space) ventilation is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.
- Combustion air is provided in accordance with IMC Sections 701 and 703.
- Boards having a nominal 1 pcf (16 kg/m<sup>3</sup>) density are maximum of 4 inches (102 mm) thick, and boards having a nominal 2 pcf (32 kg/m<sup>3</sup>) density are maximum of 2 inches (51 mm) thick. The insulation boards must be produced from beads recognized in an evaluation report and produced by one of these companies: Styropek ([ESR-1498](#)), Flint Hills Resources ([ESR-1634](#)), NOVA Chemicals ([ESR-1798](#)), or Styrochem ([ESR-3155](#)).

**4.2.2 Doors:** The insulation board may be used as the core material for doors that do not require a fire-resistance rating, when the door assembly is in accordance with IBC Sections 2603.4.1.7, 2503.4.1.8, and 2603.4.1.9, or IRC Sections R314.5.5 and R314.5.6.

## 4.2.3 Application Directly to Steel Roof Decks without a Thermal Barrier:

**4.2.3.1 General:** The insulation boards may be used as a component of a Class A, B, or C roof covering installed on steel roof decks without a thermal barrier, when installed in accordance with this section (Section 4.2.3).

### 4.2.3.2 Materials:

**4.2.3.2.1 Steel Deck:** Steel roof decking shall be minimum No. 22 gage [0.30 inch (0.76 mm)], 1<sup>1</sup>/<sub>2</sub>-inch-deep (38 mm), unperforated galvanized steel decking, with flutes spaced a maximum of 6 inches (152 mm) on center. The deck shall be welded or mechanically fastened to structural supports.

**4.2.3.2.2 Insulation:** The EPS insulation boards may have a maximum thickness as follows: up to 9 inches (229 mm) for ASTM C578 Type I, 7.2 inches (183 mm) for ASTM C578 Type VIII, 6 inches (152 mm) for ASTM C578 Type II, and 4.5 inches (114 mm) for ASTM C578 Type IX.

The insulation boards must be produced from beads recognized in an evaluation report and produced by one of these companies: Styropek ([ESR-1498](#)), Flint Hills Resources ([ESR-1634](#)), NOVA Chemicals ([ESR-1798](#)), or Styrochem ([ESR-3155](#)).

**4.2.3.2.3 Cover Board:** When used, the cover board in the roof covering assembly is 1<sup>1</sup>/<sub>2</sub>-inch-thick (12.7 mm) wood-fiber board complying with ASTM C208 or ANSI/AHA A 194, or 1<sup>1</sup>/<sub>4</sub>-inch-thick (6.4 mm) Dens-Deck Roof Board manufactured by George-Pacific Corporation.

**4.2.3.2.4 Roof Covering:** The roof covering membrane must be mechanically attached, fully adhered, ballasted EPDM or a thermoplastic membrane recognized in a current ICC-ES evaluation report as part of a Class A, B, or C roofing assembly. Thermoplastic membranes include polyvinyl chloride (PVC), modified PVC, chloro-sulphonated polyethylene (CSPE), and thermoplastic polyolefin (TPO). The membrane is limited to a maximum nominal thickness of 0.045 inch (1.14 mm). The evaluation report on the roof covering assembly must specify the following assemblies as the only components of the classified roof covering assembly permitted under the conditions of this report:

- A generic EPS insulation board, having the same density and installed thickness as the Houston Foam Plastics EPS insulation recognized in this report; the cover board described in Section 4.2.3.2.3 of this report; and the roof covering membrane described in this section (Section 4.2.3.2.4), installed over a steel deck described in Section 4.2.3.2.1 of this report.
- A generic EPS insulation board, having the same density and installed thickness as the Houston Foam Plastics EPS insulation recognized in this report; the roof covering membrane described in this section (Section 4.2.3.2.4), installed on a steel deck described in Section 4.2.3.2.1 of this report.

**4.2.3.2.5 Installation:** The EPS insulation boards are loosely laid over the steel deck in single or multiple layers, to a maximum total thickness and density as noted in Section 4.2.3.2.2 of this report. The top layer of insulation must be placed so that the labeling required in Section 7.0 of this report is facing up. Tapered insulation boards may be installed, provided that the maximum allowable thickness is not exceeded. The cover board described in Section 4.2.3.2.3, 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.

**4.2.3.2.6 Reroofing:** New roofing must not be applied over existing roof covering assemblies described in this report, since the fire performance of the assemblies is directly affected by the materials covering the foam plastic insulation. The components of the existing roofing that are to remain on the roof deck must be inspected and meet the applicable conditions in accordance with IBC Section 1510 and IRC Section R907. Additional EPS insulation board may be added over the existing EPS insulation, provided that the existing EPS is sound, the density of the added EPS is equal to that of the existing EPS, the existing EPS meets the requirements of the report, and the total thickness of the existing EPS plus the EPS being added does not exceed the requirements of Section 4.2.3.2.2. The existing roof covering membrane and, if necessary, the cover board must be removed before new roofing materials, having characteristics specifically described in this report, can be installed.

**5.0 CONDITIONS OF USE**

The Houston Foam Plastics EPS insulation 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 Houston Foam Plastics insulation boards must be installed in accordance with the manufacturer’s published installation instructions, this evaluation report and the applicable code. If there are conflicts between this report and the manufacturers’ published installation instructions, this report governs.
- 5.2 The insulation has been evaluated only for use in Type V-B construction under the IBC and nonfire-resistance-rated assemblies in dwellings under the IRC.
- 5.3 A vapor retarder must be installed as required by the applicable code.
- 5.4 When used in exterior wall applications, the insulation board must be covered with an approved exterior wall covering, including a water-resistive barrier complying with IBC Section 1404.2 or IRC Section R703.2, as applicable.
- 5.5 Except as noted in Sections 4.2.1, 4.2.2, and 4.2.3, the insulation must be separated from the interior of the building by an approved 15-minute thermal barrier complying with IBC Section 2603.4 or IRC Section R314.4, as applicable.
- 5.6 Use of the insulation boards in areas of “very heavy” termite infestation must be in accordance with IBC Section 2603.8 and IRC Section R320.5.
- 5.7 When the boards are installed directly to a steel roof deck without a thermal barrier, the following conditions apply:
  - 5.7.1 The foam plastic insulation boards are part of a Class A, B, or C roof covering assembly described

in Section 4.2.3 of this report. The boards are permitted to be installed without a thermal barrier as addressed in Section 2603.4.1 of the IBC.

5.7.2 Reroofing must be applied as described in Section 4.2.3.2.6 of this report.

5.8 The insulation boards are produced in Houston, Texas, and San Antonio, Texas, 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 2012, including data in accordance with Appendix B.

6.2 Reports of tests in accordance with UL 1256.

**7.0 IDENTIFICATION**

The insulation boards described in this report must be packaged in bundles bearing a label with the manufacturer’s name (Houston Foam Plastics, Inc., or Alamo Foam, a Division of HFP); the manufacturing facility location; the date of manufacture; the board density and type; the flame-spread and smoke developed indices; the thermal resistance (*R*-value); and the evaluation report number (ESR-1946).

Additionally, package labels identify the beads used to produce the product.

When insulation boards are used in roof covering assemblies applied directly to steel decks under Section 4.2.3 of this report, in addition to the labeling noted above, the following wording shall be printed on one face of each board: “When used in reroofing applications, limits exist for cover board and membrane. See ESR-1946 before reroofing.”

**TABLE 1—INSULATION BOARD PROPERTIES**

EPS TYPE	MINIMUM DENSITY (pcf)	THERMAL RESISTANCE (R-VALUE) <sup>1</sup> BASED ON THICKNESS		
		1 inch	3 inches	6 inches
I	0.90	3.6	10.8	21.6
VIII	1.15	3.8	11.4	22.8
II	1.35	4.0	12.0	24.0
IX	1.80	4.2	12.6	25.2

For SI: 1 inch = 25.4 mm, 1 pcf = 16.02 kg/m<sup>3</sup>, *R* = hft<sup>2</sup>°F/Btu (0.176 m<sup>2</sup>°K/W), °F = 1.8°C+32.

<sup>1</sup>At 75°F (mean temperature).