

ICC-ES Evaluation Report

ESR-1272

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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:****POWERFOAM INSULATION DIVISION OF
METL-SPAN I LTD.****550 MURRAY STREET@ HWY. 287****MIDLOTHIAN, TEXAS 76065****(972) 299-5556**www.powerfoam.netajpeders@metlspan.com**EVALUATION SUBJECT:****POWERFOAM EPS INSULATION****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)
- Other Codes (see Section 8.0)

Properties evaluated:

- Surface burning characteristics
- Elimination of thermal barrier (roofing)
- Thermal resistance (*R*-values)
- Attic and crawl space applications

2.0 USES

Powerfoam polystyrene insulation boards are expanded polystyrene (EPS) foam plastic insulation complying with ASTM C 578, and are used as nonstructural thermal insulation sheathing and as components of a Class A, B, or C roof covering installed on steel decks, when installed in accordance with this report. The insulation is for use in wall cavities and ceiling assemblies, at the exterior of foundations and basements, as architectural shapes, or in roof assemblies or on the outside faces of exterior walls. The insulation may be used as roof insulation when specifically recognized in a current ICC-ES evaluation report for the roof covering system, or when installed as described in Section 4.2 of this report.

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

3.0 DESCRIPTION

Powerfoam EPS insulation boards are 4 feet (1219 mm) wide and 4 or 8 feet (1219 or 2438 mm) long and up to 5 inches (127 mm) thick, and are produced in the types and minimum densities specified in Table 1. The insulation boards have a maximum flame-spread index of 25 and a maximum smoke-developed index of 450 when tested in accordance with ASTM E 84 at a maximum 5-inch thickness (127 mm). Thermal resistance values (*R*-value) for the different EPS types are shown in Table 1.

4.0 DESIGN AND INSTALLATION**4.1 General:**

Installation of the Powerfoam EPS insulation boards must comply with the manufacturer's published installation instructions, this report and the applicable code.

The interior of the building must be separated from the insulation boards with a thermal barrier complying with IBC Section 2603.4 IRC Section R316.6, as applicable, except as described in Sections 4.2, 4.3 and 5.4 of this report. Under the IRC, a vapor retarder must be installed in accordance with IRC Section R601. Under the IBC, protection against condensation in exterior wall assemblies must be in accordance with IBC Section 1403.2. The insulation board is permitted to 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 wall coverings. The attachment of finish materials over the insulation board must provide a minimum 1-inch (25.4 mm) penetration of the fasteners into wood framing. Wall covering over the insulation must be structurally adequate to resist the required horizontal forces perpendicular to the wall. All walls must be braced in accordance with IBC Section 2308.9.3 or IRC Section R602.10.

Insulation boards must be attached to supports in a manner that will secure the insulation in place. Insulation boards must not be used as a nailing base for exterior siding materials. All fastening must be made through the sheathing and either into the wall framing or into structural sheathing, as required by the siding manufacturer's instructions, or in accordance with the IBC or IRC.

The insulation boards may be used in an exterior insulation and finish system (EIFS) when such use is specifically recognized in a current ICC-ES evaluation report. The insulation boards may also 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 current ICC-ES evaluation report on the roof covering assembly.

4.2 Special Uses:

4.2.1 Application Directly to Steel Roof Decks without a Thermal Barrier:

4.2.1.1 General: The Powerfoam EPS 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).

4.2.1.2 Materials:

4.2.1.2.1 Steel Deck: Steel roof decking shall be minimum No.22 gage [0.030 inch (0.76 mm)], 1¹/₂-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.

4.2.1.2.2 Insulation: The Powerfoam EPS insulation boards are loosely laid over the steel deck in single or multiple layers, to a maximum total thickness of 9 inches (229 mm) for 1 pcf density (16 kg/m³) (Type I) boards; 7.2 inches (182.9 mm) for 1.25 pcf density (20 kg/m³) (Type VIII) boards; 6 inches (152 mm) for 1.5 pcf density (24 kg/m³) (Type II) boards; or 4.5 inches (114 mm) for 2.0 pcf density (32kg/m³) (Type IX) boards. The top layer of insulation must be placed so that the panel identification required in Section 7.0 is facing up.

4.2.1.2.3 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. The cover board, described in Section 4.2.2.2 (if used), 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 4.2.2.3 of this report.

4.2.1.2.4 Roof Covering: The roof covering membrane must be mechanically attached, fully adhered or ballasted EPDM or 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 one of the following assemblies as the only components of the classified roof covering assembly permitted under the conditions of this report:

1. A generic EPS insulation board, having the same density and installed thickness as the Powerfoam EPS insulation recognized in this report; one of the two cover boards described in Section 4.2.2.3 of this report; and the roof covering membrane described in this section (Section 4.2.2.4), installed over a steel deck described in Section 4.2.2.1.

2. A generic EPS insulation board, having the same density and installed thickness as the Powerfoam EPS insulation recognized in this report; the roof covering membrane described in this section (Section 4.2.2.4); and stone ballast; installed on a steel deck described in Section 4.2.2.1 of this report.

4.2.1.2.5 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. The existing roof covering membrane and, if necessary, the cover board shall be removed before new roofing materials, having characteristics specifically described in this report, can be installed.

4.2.2 Attics and Crawl Spaces: Powerfoam insulation boards for use in attic and crawl space applications have a nominal density of 1 pcf (16 kg/m³) and a maximum thickness of 4 inches (102 mm); or a nominal density of 2 pcf (32 kg/m³) and a maximum thickness of 2 inches (51 mm). Powerfoam insulation boards are permitted to be installed exposed in attics and crawl spaces without a covering applied to the attic or crawl space side of the foam plastic, provided all of the following conditions are met:

- a. Entry to the attic or crawl space is only to service utilities, and no storage is permitted.
- b. There are no interconnected attic or crawl space areas.
- c. Air in the attic or crawl space is not circulated to other parts of the building.
- d. 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.
- e. Combustion air is provided in accordance with IMC Section 701.
- f. Insulation boards are labeled as described in Section 7.3.

5.0 CONDITIONS OF USE

The Powerfoam EPS insulation described in this report complies with those codes specifically listed in Section 1.0 of this report, subject to the following conditions:

5.1 The foam plastic insulation boards must be manufactured, identified, and 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 When installation is on walls, the following conditions apply:

5.2.1 The insulation board must be covered by an approved wall covering, including a water-resistive barrier complying with IBC Sections 1404.2 or 2510.6 or IRC Sections R703.2 or R703.6.3. The wall covering must provide the necessary structural resistance to wind and seismic forces in spanning between wall framing members.

5.2.2 The walls must be braced in accordance with IBC Sections 2308.9.3 of the IBC, and 2308.12.4 or IRC Section R602.10.3.

- 5.3 The foam plastic insulation board must be separated from the interior of the building with a thermal barrier complying with IBC Section 2603.4 or IRC Section R316.6, except as noted in Sections 4.2 and 5.4 of this report.
- 5.4 When the boards are installed directly to a steel roof deck without a thermal barrier, the following conditions apply:
 - 5.4.1 The foam plastic insulation boards are part of a Class A, B, or C roof covering assembly described in Section 4.2 of this report. The boards are permitted to be installed without a thermal barrier as addressed in Section 2603.4.1 of the IBC.
 - 5.4.2 Reroofing must be applied as described in Section 4.2.2.5 of this report.
- 5.5 Use of the insulation boards in areas of “very heavy” termite infestation must be in accordance with IBC Section 2603.8 or IRC Section R318.4, as applicable.
- 5.6 The foam plastic insulation is manufactured in Midlothian, Texas, under a quality control program with inspections by RADCO (AA-650).

6.0 EVIDENCE SUBMITTED

- 6.1 Reports of tests in accordance with UL 1256-02 Standard for Fire Test of Roof Deck Construction
- 6.2 Data in accordance with the Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2009, including data in accordance with Appendix B.

7.0 IDENTIFICATION

7.1 General:

The boards are packaged in bundles and bear a label that includes the name and address of the Powerfoam Insulation Division of Metl-Span I Ltd.; the date of manufacture; the evaluation report number (ESR-1272); the density; the name of the inspection agency (RADCO); the surface burning characteristics; and thermal-resistance data.

7.2 Application Directly to Steel Decks without a Thermal Barrier:

When the insulation boards are used in roof covering assemblies applied directly to steel decks under Section 4.2.1 of this report, in addition to the labeling noted above, the edge of each EPS insulation board is be marked with

the name of the Powerfoam Insulation Division of Metl-Span I Ltd.; the name of the inspection agency (RADCO); the surface burning characteristics; and the name “DirectDeck EPS.” Additionally, printed on one face of each insulation board, or included on a permanent label affixed to one face of each board, shall be the words: “When used in reroofing applications, limits exist for cover board and membrane. See ESR-1272 before reroofing.” There shall also be the words, “THIS SIDE UP.”

7.3 Attics and Crawl Spaces:

Additionally, the insulation boards used for installation in attic and crawl spaces, as described in Section 4.2.2 of this report, must be identified as being produced from “BASF”, “Flint Hills”, “NOVA” or “Styrochem” beads.

8.0 OTHER CODES

In addition to the codes referenced in Section 1.0, the products described in this report were evaluated for compliance with the requirements of the following codes:

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

The products comply with the above-mentioned codes as described in Sections 2.0 through 7.0 of this report, except as noted below:

- **Uses:** See Section 2.0 except use in foam-filled exterior doors and foam-filled garage doors must be in accordance with Sections R314.5.5 and R314.5.6, respectively, of the 2006 IRC.
- **Installation:** See Section 4.1 except the interior of the building must be separated from the insulation boards with a thermal barrier complying with Section R314.4 of the 2006 IRC, and a vapor barrier must be installed in accordance with Section R318.1 of the 2006 IRC.
- **Special Uses—Attics and Crawl Spaces:** See Section 4.2.2 except combustion air is provided in accordance with Sections 701 and 703 of the 2006 *International Mechanical Code*®.
- **Conditions of Use:** See Section 5.0 except use of the insulation boards in areas of “very heavy” termite infestation must be in accordance with 2006 IRC Section R320.5.

TABLE 1—THERMAL RESISTANCE OF EPS FOAM PLASTIC INSULATION

EPS TYPE	MINIMUM DENSITY (pcf)	R-VALUE PER INCH OF THICKNESS [(°F)(ft. ²)(hr.)/Btu]
I	0.90	3.6
VIII	1.15	3.8
II	1.35	4.0
IX	1.80	4.2

For SI: 1 pcf = 16.018 kg/m³; (°F)(ft.²)(hr.)/Btu = 0.176 110 (m²)(K)/W; 1 inch = 25.4 mm.