

# ICC-ES Evaluation Report

**ESR-1798\***

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**DIVISION: 07 00 00—THERMAL AND MOISTURE  
PROTECTION**
**Section: 07 21 00—Thermal Insulation**
**REPORT HOLDER:**

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**EVALUATION SUBJECT:**
**EXPANDABLE POLYSTYRENE (EPS) BEADS**
**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- 2009 *International Building Code*® (IBC)
- 2009 *International Residential Code*® (IRC)
- Other Codes (see Section 8.0)

**Properties evaluated:**

- Surface-burning characteristics
- Physical properties
- Attic and crawl space evaluation

**2.0 USES**

The NOVA Chemicals Inc. expandable polystyrene beads are used by independent manufacturers to produce expanded polystyrene (EPS) insulation products.

**3.0 DESCRIPTION**

The expandable polystyrene beads are designated as resin Types 33M, 35M, M77, and M97. The EPS insulation products manufactured from the beads are produced through the introduction of steam, without additives. This process expands the beads, which are then molded into insulation products, with maximum thicknesses and densities as noted in Table 1. At densities and thicknesses no greater than those specified in Table 1, EPS insulation products produced from the beads have a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84. The end use of the EPS beads, including the manufacture of the EPS products, is outside the scope of this report and must be addressed in a separate evaluation report.

Type 33M, 35M, and M77 EPS beads can be used to produce EPS products that comply with Types I, II, VIII and IX [1.0, 1.5, 1.25, and 2.0 pcf (16, 24, 20, and 32 kg/m<sup>3</sup>) nominal densities, respectively] of ASTM C 578. Type M97 can be used to produce EPS products that comply with Types II, VIII and IX [1.5, 1.25 and 2.0 pcf (24, 20 and 32 kg/m<sup>3</sup>) nominal densities, respectively] of ASTM C 578. Type 33M beads can be used to produce EPS products that comply with Type XIV [2.4 pcf (38 kg/m<sup>3</sup>) nominal density] of ASTM C 578. Type M77 beads can be used to produce EPS products that comply with Types XIV and XV [2.4 pcf (38 kg/m<sup>3</sup>) and 2.85 pcf (46 kg/m<sup>3</sup>) nominal densities, respectively] of ASTM C 578. The products have been qualified in accordance with Section 4.5.15.1.1 of the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12). The beads can be used to produce EPS products that comply with ASTM C 578, for the types specified in Table 1, provided the final product is recognized in a current ICC-ES evaluation report and has been qualified in accordance with Section 4.5.15.1.2 of AC12.

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

Installation must be as noted in the corresponding current ICC-ES evaluation report on the EPS insulation product, or as otherwise permitted by the code official under Section 2603 of the IBC; or Section R316 of the IRC, as applicable.

**4.2 Attics and Crawl Spaces:**

EPS insulation products produced from the EPS beads of the resin type, density, and thickness shown in Table 2 of this report can be used on walls in attics and crawl spaces without 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.
- e. Under-floor (crawl space) ventilation is provided when required by IBC Section 1203.3, or IRC Section R408.1, as applicable.
- f. Combustion air is provided in accordance with IMC Section 701.

\*Revised December 2011

- g. Maximum thickness and density are limited to values stated in Table 2.

**5.0 CONDITIONS OF USE**

The expandable polystyrene beads 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 maximum density and thickness of the EPS insulation boards produced from the expanded beads must be as noted in Tables 1 and 2 of this report.
- 5.2 Products manufactured from the EPS beads must be recognized in a current ICC-ES evaluation report.
- 5.3 Except as noted in Section 4.2 of this report, the EPS insulation products produced from the EPS beads must be separated from the building interior by a thermal barrier complying with IBC Section 2603.4, IRC Section R316.4, as applicable.
- 5.4 The beads are manufactured in Monaca, Pennsylvania, and Painesville, Ohio, under a quality control program with inspections by Underwriters Laboratories Inc. (AA-668).

**6.0 EVIDENCE SUBMITTED**

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

**7.0 IDENTIFICATION**

Each container of beads must bear a label with the NOVA Chemicals Inc. name and address, the bead type, the lot number, the name of the inspection agency (Underwriters Laboratories Inc.), and the evaluation report number (ESR-1798).

**8.0 OTHER CODES**

In addition to the codes referenced in Section 1.0, the products described in this report were found to comply, just as described in Sections 2.0 through 7.0, with the requirements of the following codes:

- 2006 *International Building Code*®
- 2006 *International Residential Code*®
- 2003 *International Building Code*®
- 2003 *International Residential Code*®

**TABLE 1—MAXIMUM EPS PRODUCT DENSITY AND THICKNESS WHEN MADE WITH NOVA CHEMICALS BEADS**

EPS TYPE	NOMINAL DENSITY (pcf)	MAXIMUM THICKNESS (inches)			
		33M	35M	M77	M97
I	1.0	5	5	6	—
VIII	1.25	5	5	6	6
II	1.5	6	6	6	6
IX	2.0	5	5	6	6
XIV	2.4	6	—	6	—
XV	2.85	—	—	6	—

For SI: 1 inch = 25.4 mm, 1 pcf = 16.02 kg/m<sup>3</sup>.

**TABLE 2—MAXIMUM DENSITY FOR EPS PRODUCTS USED IN ATTICS OR CRAWL SPACES**

NOMINAL DENSITY (pcf)	MAXIMUM THICKNESS (inches)			
	33M	35M	M77	M97
1.0	4	4	4	—
2.0	2	2	2	2

For SI: 1 inch = 25.4 mm, 1 pcf = 16.02 kg/m<sup>3</sup>.