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# ICC-ES Evaluation Report

# ESR-2784

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Reissued 04/2018

This report is subject to renewal 04/2020.

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

**SECTION: 07 21 00—THERMAL INSULATION**

**REPORT HOLDER:**

**BASF CORPORATION**

**1609 BIDDLE AVENUE  
WYANDOTTE, MICHIGAN 48192**

**EVALUATION SUBJECT:**

**BASF NEOPOR® EXPANDABLE POLYSTYRENE BEADS F2200, F2300, F2400, F5300  
AND F5300 PLUS**



*“2014 Recipient of Prestigious Western States Seismic Policy Council (WSSPC) Award in Excellence”*



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A Subsidiary of the International Code Council®

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

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

**REPORT HOLDER:**

**BASF CORPORATION**  
1609 BIDDLE AVENUE  
WYANDOTTE, MICHIGAN 48192  
(734) 324-6100  
[www.basf.com](http://www.basf.com)

**EVALUATION SUBJECT:**

**BASF NEOPOR® EXPANDABLE POLYSTYRENE BEADS F2200, F2300, F2400, F5300 AND F5300 PLUS**

**1.0 EVALUATION SCOPE**

**Compliance with the following codes:**

- 2012 and 2009 *International Building Code*® (IBC)
- 2012 and 2009 *International Residential Code*® (IRC)
- 2012 and 2009 *International Energy Conservation Code*® (IECC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)<sup>†</sup>

<sup>†</sup>The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

**Properties evaluated:**

- Physical properties
- Surface-burning characteristics
- Thermal resistance

**2.0 USES**

The BASF expandable polystyrene beads designated as NEOPOR® F2200, NEOPOR® F2300, NEOPOR® F2400, NEOPOR® F5300 and NEOPOR® F5300 Plus are used by independent manufacturers to produce expanded polystyrene (EPS) insulation products.

**3.0 DESCRIPTION**

The BASF NEOPOR® F2200, NEOPOR® F2300, NEOPOR® F2400, NEOPOR® F5300 and NEOPOR® F5300 Plus beads have the same formulation of polystyrene, with the only difference being the diameter of the beads. The EPS insulation products manufactured with the expandable polystyrene beads are produced solely

through the introduction of heat, without other additives. This process expands the beads, which are then molded into insulation products with minimum densities and maximum thickness as specified in Table 1. The end use of the polystyrene beads, including the manufacture of products, is outside the scope of this report and must be addressed in a separate evaluation report.

Boards manufactured from BASF NEOPOR® F2200, NEOPOR® F2300, NEOPOR® F2400, NEOPOR® F5300 and NEOPOR® F5300 Plus beads, at thicknesses and densities no greater than those specified in Table 1 have a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84 / UL 723. Thicknesses of up to 12 inches (304.8 mm) in walls and ceilings are recognized when the EPS is separated from the interior of the building by minimum 5/8-inch-thick (19.1 mm), Type X gypsum board complying with ASTM C1396, attached in accordance with the applicable code.

BASF NEOPOR® F2200, NEOPOR® F2300, and NEOPOR® F2400 expandable polystyrene beads have been qualified in accordance with Section 4.5.15.1.1 of the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12). The expandable beads can be used to produce EPS products that comply with Types II, VIII and IX [1.35, 1.15 and 1.80 pcf (22, 18 and 29 kg/m<sup>3</sup>) minimum densities, respectively] of ASTM C578, 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.

BASF NEOPOR® F5300 and NEOPOR® F5300 Plus expandable polystyrene beads have been qualified in accordance with Section 4.5.15.1.1 of the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12). The expandable beads can be used to produce EPS products that comply with Types I, II, VIII and IX [0.90, 1.35, 1.15 and 1.80 pcf (14, 22, 18 and 29 kg/m<sup>3</sup>) minimum densities, respectively] of ASTM C578 (see Tables 1 and 2), 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.

The R-values noted in Table 3 are only applicable to EPS products produced from BASF NEOPOR® F2200, NEOPOR® F2300, NEOPOR® F2400, NEOPOR® F5300 and NEOPOR® F5300 Plus beads with the EPS products recognized with the noted R-values in a current ICC-ES evaluation report. The products must comply with ICC-ES qualification and labeling requirements, and must be

manufactured under a quality control system meeting both BASF specifications and ICC-ES requirements.

**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 Section 701 of the *International Mechanical Code*<sup>®</sup>.
- g. The EPS type and maximum thickness are as specified in Table 2.

**5.0 CONDITIONS OF USE**

The BASF NEOPOR<sup>®</sup> 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 minimum density and maximum thickness of the foam plastic insulation products manufactured from the expanded beads are as noted in Table 1 of this report.
- 5.2 Products manufactured from the 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 or IRC Section R316.4 or as applicable.
- 5.4 The beads are produced in Ludwigshafen, Germany, under a quality control program with inspections by ICC-ES.

**6.0 EVIDENCE SUBMITTED**

Data in accordance with the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2012 (editorially revised August 2013), including data in accordance with NFPA 286.

**7.0 IDENTIFICATION**

Each container of beads bears a label with the manufacturer's name (BASF SE or BASF Company Ltd.) and address; the bead identification (series); the evaluation report number (ESR-2784).

**TABLE 1—MINIMUM INSULATION BOARD DENSITY AND MAXIMUM THICKNESS**

NEOPOR <sup>®</sup> GRADE DESIGNATION	ASTM C578 EPS TYPE	MINIMUM DENSITY (pcf)	MAXIMUM THICKNESS (INCHES)
F5300,F5300 Plus	I	0.90	6
F2200,F2300, F2400, F5300, F5300 Plus	VIII	1.15	6
F2200,F2300, F2400, F5300, F5300 Plus	II	1.35	6
F2200,F2300, F2400, F5300, F5300 Plus	IX	1.80	6

For SI: 1 inch = 25.4 mm, 1 pcf = 16.02 kg/m<sup>3</sup>.  
<sup>1</sup>Except as noted in Section 3.0.

**TABLE 2—TYPE AND MAXIMUM THICKNESS FOR EPS PRODUCTS USED IN ATTICS OR CRAWL SPACES**

NEOPOR <sup>®</sup> GRADE DESIGNATION	ASTM C578 EPS TYPE	MAXIMUM THICKNESS (INCHES)
F5300,F5300 Plus	I	4.0
F2200, F2300, F2400, F5300, F5300 Plus	VIII	3.2
F2200, F2300, F2400, F5300, F5300 Plus	II	2.66
F2200, F2300, F2400, F5300, F5300 Plus	IX	2

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

**TABLE 3—MINIMUM DENSITY AND R-VALUE**

ASTM C578 EPS TYPE	MINIMUM DENSITY (pcf)	R-VALUE (°F-ft <sup>2</sup> -h/Btu) 75°F MEAN TEMP.	R-VALUE (°F-ft <sup>2</sup> -h/Btu) 40°F MEAN TEMP.
I	0.90	4.3	4.7
VIII	1.15	4.5	4.8
II	1.35	4.5	4.9
II	1.45	4.6	4.9
IX	1.80	4.6	4.9

For SI: 1 inch = 25.4 mm, 1 pcf = 16.02 kg/m<sup>3</sup>, 1 °F-ft<sup>2</sup>-h/Btu = 0.176 m<sup>2</sup>-K/W.