UL Evaluation Report

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DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION Sub-level 2: 07 20 00 - Thermal Protection Sub-level 3: 07 21 00 - Thermal Insulation

COMPANY:

BASF CORP STYRENIC FOAMS DIV 1609 BIDDLE AVE WYANDOTTE, MI 48192 http://www.neopor.basf.us

1. SUBJECT:

Polystyrene beads designated Neopor 2200, F2200, 2300, F2300, 2400, F2400 and Neopor 5300, F5300, 5300 Plus, F5300 Plus

2. SCOPE OF EVALUATION

- 2012, 2009 and 2006 International Building Code ® (IBC)
- 2012, 2009 and 2006 International Residential Code ® (IRC)
- 2012 International Green Construction Code ® (IgCC)
- ICC-ES Acceptance Criteria for Foam Plastic



Underwriters Laboratories Inc. 333 Pfingsten Road, Northbrook, IL 60062-2096 USA T: 847.272.8800 / F: 847.272.8129 / W: UL.com ■ ICC ES Acceptance Criteria for Quality Documentation (AC10), Dated December 2012

The products were evaluated for the following properties:

- Surface Burning Characteristics (ANSI/UL723, ASTM E84)
- Physical Properties (ASTM C578)
- Flammability Testing for Use in Attics and Crawl Spaces (AC12, App. A and B)
- Material Emissions (UL2818 and California Department of Public Health, CDPH/EHLB/Standard Method V.1.1)

Throughout this report, unless specifically indicated otherwise, the reference to NEOPOR Expandable Polystyrene Resins will apply to all EPS Resins described above.

3. REFERENCED DOCUMENTS

- ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2012
- ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated December 2012
- ANSI/UL723 (ASTM E84), Test for Surface Burning Characteristics of Building Materials
- ASTM C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation
- UL2818, GREENGUARD Certification Program for Chemical Emissions for Building Materials, Finishes and Furnishings
- California Department of Public Health, CDPH/EHLB/Standard Method V.1.1)

4. USES

The expandable polystyrene resins designated as BASF NEOPOR are used by independent manufacturers to produce expanded polystyrene (EPS) insulation products. See section 10 for a list of molders under the BASF Neopor Brand Marketing Agreement that utilize BASF NEOPOR resins in their UL Certified end-use products.

5. PRODUCT DESCRIPTION

EPS insulation products manufactured with expandable polystyrene resins are produced through the introduction of heat, without other additives. The process expands the resins, which are then molded into insulation products at the densities and thicknesses specified in this report. Finished boards manufactured from these resins at the maximum densities and thicknesses indicated in Table 1 are qualified to bear a label with a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ANSI/UL723 (ASTM E84), provided the finished boards are listed and labeled by an approved agency.

NEOPOR expandable polystyrene resins have been qualified in accordance with Section 4.5.15.1.1 of the ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12). The resins can be used to produce EPS insulation products that comply with the ASTM C578 properties described in Table 2, provided the finished EPS insulation products are listed and labeled by an approved agency.

NEOPOR expandable polystyrene resins have been found to comply with IgCC Section 806.6 for insulation for material emissions and Section A108.5 Total VOC limit project elective. Refer to UL's <u>GREENGUARD GOLD</u> certification of these products.

Table 1 – Maximum Insulation Board Density and Thickness for UL723

BEAD TYPE	MAXIMUM DENSITY (Ib/ft ³)	MAXIMUM THICKNESS (IN)
Neopor 2200, F2200, 2300, F2300, 2400, F2400 and Neopor 5300, F5300, 5300 Plus, F5300 Plus	2.0	5

BEAD TYPE	Flame Spread	Smoke Developed
Neopor 2200, 2300, 2400, and Neopor 5300, 5300 Plus,	15	300
Neopor F2200, F2300, F2400 and Neopor F5300, F5300 Plus	5	25

Table 2 – ASTM C578 Physical Property Requirements ⁽¹⁾

Bead Type	Type I	Type VIII	Type II	Type II – High Density ⁽²⁾	Type IX
Neopor 2200, F2200, 2300, F2300, 2400, F2400		х	х	Х	Х
Neopor 5300, F5300, 5300 Plus, F5300 Plus	Х	Х	Х	Х	Х
Compressive Resistance, min, psi	10.0	13.0	15.0	20.0	25.0
Flexural Strength, min, psi	25.0	30.0	35.0	40.0	50.0
Water Vapor Permeance of 1.00 in. thickness, max. perm	5.0	3.5	3.5	3.5	2.5
Water Absorption by total immersion, max, volume %	4.0	3.0	3.0	3.0	2.0
Dimensional Stability (change in dimensions), max, %	2.0	2.0	2.0	2.0	2.0
Oxygen Index, min, volume %	24.0	24.0	24.0	24.0	24.0
Density, min, lb/ft ³	0.90	1.15	1.35	1.45	1.80

(1) Refer to the Standard, ASTM C578 for further information on the requirements for Rigid, Cellular Polystyrene Thermal Insulation

(2) This Type II is not in ASTM C578 but is marketed as a higher density material of the ASTM C578 Type II by the manufacturer.

Table 3 – Minimum Density and R-Value

ASTM C578 EPS TYPE	MINIMUM DENSITY (pcf)	<i>R-VALUE</i> (F•ft2•h/Btu) Mean temperature: 75° (minimum)	<i>R-VALUE</i> (F•ft2•h/Btu) Mean temperature: 40° (minimum)
I	0.90	4.3	4.7
VIII	1.15	4.5	4.8
II	1.35	4.5	4.9
II – High Density	1.45	4.6	4.9
IX	1.80	4.6	4.9

6. INSTALLATION

6.1 General:

Installation of finished EPS insulation products manufactured from NEOPOR expandable polystyrene resins must be installed in accordance with the finished EPS manufacturer's installation instructions and in accordance with <u>IBC Section 2603</u> of the 2012, 2009 or 2006 code, <u>IRC Section R316</u> of the 2012 and 2009 code, and/or Section R314 of the 2006 code, as applicable.

6.2 Attics and Crawl Spaces:

Finished EPS insulation boards produced from NEOPOR resins may be used on walls of attics and crawl spaces without the coverings specified in <u>IBC Section 2603.4.1.6</u> of the 2012, 2009 or 2006 code, or <u>IRC Sections R316.5.3</u> or <u>R316.5.4</u> of the 2012 and 2009 code or R314.5.3 or R314.5.4 of the 2006 code, as applicable, provided all of the following conditions are met:

- Entry to the attic or crawl space is only for service utilities, and no storage is permitted.
- There are no interconnected attic or crawl space areas.
- Air in the attic or crawl space must not be circulated to other parts of the building.
- Attic ventilation is provided when required by <u>IBC Section 1203.2</u> of the 2012, 2009 or 2006 code or <u>IRC Section R806</u> of the 2012, 2009 or 2006 code, as applicable. Under-floor (crawl space) ventilation is provided when required by <u>IBC Section 2304.11.9</u> of the 2012, 2009 or 2006 code or, <u>IRC Section R408.1</u> of the 2012, 2009 or 2006 code, as applicable.
- Combustion air is provided in accordance with <u>Section 701</u> of the 2012 and 2009 IMC or Sections 701 and 703 of the 2006 IMC.

NEOPOR GRADE DESIGNATION	ASTM C578 EPS TYPE	MAXIUMUM THICKNESS (INCHES)
5300, 5300 PLUS, F5300, F5300 PLUS	I	4.0
F2200, 2200,F2300, 2300, F2400, 2400, 5300, 5300 PLUS, F5300, F5300 PLUS	VIII	3.2
F2200, 2200,F2300, 2300, F2400, 2400, 5300, 5300 PLUS, F5300, F5300 PLUS	II	2.66
F2200, 2200,F2300, 2300, F2400, 2400, 5300, 5300 PLUS, F5300, F5300 PLUS	IX	2.0

Table 4 – Type and Maximum Thickness for EPS Products Used in Attics and Crawl Spaces

6.3 Exterior Insulation and Finish Systems (EIFS):

Finished EPS insulation boards produced from NEOPOR resins may be used as a component of the BASF Corporation – Wall Systems <u>Senerflex Platinum CI</u>, <u>Pebbletex Platinum CI</u> and <u>Acrotex Platinum CI</u> EIFS when installed in compliance with IBC Section <u>1408</u> of the 2012 and 2009 code or IRC Section <u>R703.9</u> of the 2012 and 2009 code, as applicable.

6.4 Stucco with Continuous Insulation

Finished EPS insulation boards produced from NEOPOR resins may be used as a component of the BASF Corporation – Wall Systems <u>Senergy</u>, <u>Finestone</u> and <u>Acrocrete</u> Platinum CI Stucco, Platinum CI Stucco Plus and Platinum CI Stucco Ultra systems when evaluated for that purpose.

7. CONDITIONS OF USE

The BASF NEOPOR expandable polystyrene resins described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 2 of this report, subject to the following conditions:

- **7.1** The density and thickness of the insulation boards must be as noted in Sections 5 and 6 of this report.
- **7.2** Finished EPS insulation products manufactured from the resins must be listed and labeled by an approved agency.
- **7.3** Except as noted in Section 6.2 of this report, finished insulation products manufactured from the resins must be separated from the building interior by a thermal barrier complying with <u>IBC</u> <u>Section 2603.4</u> of the 2012, 2009 or 2006 code, <u>IRC Section R316.4</u> of the 2012 and 2009 code and/or Section R314.4 of the 2006 IRC, as applicable.
- 7.4 See UL Online Certifications Directory for Foamed Plastic Component (BRYX2).
- 7.5 See UL GREENGUARD Certification, <u>Greenguard Neopor</u>
- **7.6** The resins are produced by BASF SE in Ludwigshafen, Germany under the UL LLC Recognition and Follow-Up Service Program, which includes regular audits in accordance with quality elements of ICC-ES Acceptance Criteria for Quality Documentation, AC 10.

8. SUPPORTING EVIDENCE

- **8.1** Data in accordance with ICC-ES Acceptance Criteria for Foam Plastic Insulation (AC12), dated June 2012, including data in accordance with Appendix A and B of AC12.
- 8.2 Data in accordance with ANSI/UL 723 (ASTM E84) and ASTM C578.
- **8.3** UL Component Recognition for EPS unexpanded resins. See Product Certification Category, Foamed Plastic Component (<u>BRYX2</u>).
- **8.4** GREENGUARD Certification for Material Emissions. See UL GREENGUARD Certification, Greenguard Neopor.
- 8.5 Documentation of quality system elements described in AC10.

9. IDENTIFICATION

The BASF NEOPOR expandable polystyrene resins described in this evaluation report are identified by a marking bearing the report holder's name (BASF Corp), the plant identification, the UL Component Recognition Mark, and the evaluation report number UL ER5817-02. The validity of the evaluation report is contingent upon this identification appearing on the product.

10. BASF AND MOLDER NEOPOR BRAND MARKETING AGREEMENT

The following are approved molders under the BASF Neopor Brand Marketing Agreement that utilize BASF NEOPOR resins in their UL Certified end-use products:

Manufacturer	Product	UL Evaluation Report
Insulfoam, A Div of Carlisle Construction Materials Inc 19727 57 th Ave E Puyallup, WA 98375 USA	Insulfoam Platinum Insulation Products	ER14313-01

11. USE OF UL EVALUATION REPORT

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- **11.2** UL Evaluation Reports shall not be used in any manner that implies an endorsement of the product, material or system by UL.
- **11.3** The current status of this report, as well as a complete directory of UL Evaluation Reports may be found at UL.com via our On-Line Certifications Directory:

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