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ESR-3463

Valid: 08/14 to 08/16

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® RIGID FOAM INSULATION BOARDS



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ICC-ES Evaluation Report

ESR-3463*

Reissued August 2014

This report is subject to renewal August 2016.

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

Section: 07 21 00—Thermal Insulation

REPORT HOLDER:

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www.basf.com

EVALUATION SUBJECT:

BASF NEOPOR® RIGID FOAM INSULATION BOARDS

ADDITIONAL LISTEE:

OPCO, INC.
POST OFFICE BOX 101
205 WEST HARRISON AVENUE
LATROBE, PENNSYLVANIA 15650
(724) 244-0411
www.opcodirect.com

Properties evaluated:

- Physical properties
- Surface-burning characteristics
- Thermal resistance
- Attic installation
- Crawl space installation

2.0 USES

The BASF NEOPOR® rigid foam insulation boards are expanded polystyrene foam plastic boards, produced using BASF NEOPOR® EPS Bead Grades 5300, 2200, 2300 and 2400, for use as nonstructural thermal insulation material in wall assemblies, door cavities, and ceiling/floor assemblies, and on the outside faces of exterior walls. The BASF NEOPOR® rigid foam insulation boards may also be used on walls and ceilings in attics and crawl spaces without the ignition barrier required by the applicable code, when installed in accordance with Section 4.2.

The BASF NEOPOR® rigid foam insulation boards may be used as the core of sandwich panels when ASTM C578 Type I, VIII, II, II (1.45 pcf) or IX EPS is specifically recognized in a current ICC-ES evaluation report on the sandwich panel.

The BASF NEOPOR® rigid foam insulation boards may be used as part of exterior wall assemblies in Types I, II, III, IV and V construction when installed in accordance with Section 4.3.

The BASF NEOPOR® rigid foam insulation boards may be used as exterior perimeter insulation around concrete slab edges, on foundation walls, or under flat concrete slab on grade construction, except in areas where the probability of termite exposure is "very heavy" as defined in 2012 IBC Section 2603.9 (2009 IBC Section 2603.8) and IRC Section R318.4.

3.0 DESCRIPTION

3.1 General:

The BASF NEOPOR® rigid foam insulation boards are Type I, VIII, II, II (1.45 pcf) and IX boards complying with ASTM C578, and have minimum densities of 0.90 pcf (14.4 kg/m³), 1.15 pcf (18.4 kg/m³), 1.35 pcf (21.6 kg/m³), 1.45 pcf (23.2 kg/m³), and 1.8 pcf (28.8 kg/m³), respectively. BASF NEOPOR® rigid foam insulation boards must be separated from the interior of the building

by an approved 15-minute thermal barrier as required in IBC Section 2603.4 or IRC Section R316.4 attached in accordance with the requirements of the applicable code. See Table 1 for the maximum thicknesses allowed based

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)

***Revised February 2015**

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on the thickness and type of gypsum wallboard thermal barrier

The BASF NEOPOR® rigid foam insulation boards are manufactured using BASF NEOPOR® 5300, BASF NEOPOR® 2200, BASF NEOPOR® 2300, and BASF NEOPOR® 2400 expandable polystyrene beads produced by BASF SE in Germany, as detailed in ICC-ES [ESR-2784](#).

For purposes of this report, where the term BASF NEOPOR® rigid foam insulation boards appears, the attributes described also apply to the additional listee's products noted in Table 4.

3.2 Thermal Resistance:

The BASF NEOPOR® rigid foam insulation boards have thermal resistance (*R*-values) at mean temperatures of 75°F (24°C) and 40°F as shown in Table 3.

3.3 Surface Burning Characteristics:

The BASF NEOPOR® rigid foam insulation boards 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 at the densities and maximum thickness listed in Table 1.

4.0 INSTALLATION

4.1 General:

BASF NEOPOR® rigid foam insulation boards are installed in accordance with the manufacturer's published installation instructions and this evaluation report. The manufacturer's published installation instructions and this report must be strictly adhered to, and a copy of the instructions must be available at all times on the jobsite during installation.

Except as described in Sections 4.2 and 4.3, the interior of the building must be separated from the insulation boards with an approved thermal barrier as required in IBC Section 2603.4 or IRC Section R316.4, as applicable. If required, a vapor retarder must be installed in accordance with IBC Section 1405.3 or 2012 IRC Sections R702.7 and N1102.2.10 (2009 IRC Sections R601.3 and N1102.2.9), as applicable. Protection against condensation in exterior wall assemblies must be provided in accordance with IBC Section 1403.2 or IRC Section R703. For cementitious exterior wall coating applications, fasteners for insulation boards thicker than 1½ inches (38 mm) must be considered for lateral resistance to ensure support for the exterior wall coatings. 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 must be structurally adequate to resist horizontal forces perpendicular to the wall. All walls must be braced in accordance with IBC Section 2308.9.3 or IRC Section R602.10, as applicable.

4.2 Special Uses: Attics and Crawl Spaces:

BASF NEOPOR® rigid foam insulation boards may be used on walls and ceilings in attics and crawl spaces with no covering applied to the attic or crawl space side of the foam plastic provided all of the following conditions are met:

- Entry to the attic or crawl space is limited to service of utilities, and no storage is permitted. Utilities include, but are not limited to, mechanical equipment, electrical wiring, fans, plumbing, gas or electric hot water heaters, and gas or electric furnaces.
- 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 Section 701 of the *International Mechanical Code*®.
- The insulation boards are limited to the EPS types and maximum thicknesses specified in Table 2.

4.3 Special Uses: Exterior Insulating Finish Systems (Types I, II, III, IV Construction):

When used as part of an exterior insulation finishing system, NEOPOR® 1.45 pcf (18.8 kg/m³) rigid foam insulation must be installed in accordance with BASF Senergy Senerflex requirements noted in ICC-ES [ESR-1878](#), Finestone Pebbletex requirements noted in ICC-ES [ESR-2186](#), SonoWall FlexWall WM requirements noted in ICC-ES [ESR-2187](#) or Acrocrete Acrowall-ES requirements noted in ICC-ES [ESR-2188](#).

The maximum thickness of BASF NEOPOR® Type II 1.45 pcf (23.2 kg/m³) rigid foam insulation is limited to 7.8 inches (198 mm), determined as equivalent fuel load to recognized Type I 0.90 pcf (14.4 kg/m³) EPS insulation in the applicable ICC-ES evaluation reports. Where use is as part of a fire-resistance-rated assembly, the maximum allowed thickness of NEOPOR® Board at 1.45 pcf density is 3.1 inches (78.7 mm).

When used as part of a cementitious exterior wall system, BASF NEOPOR® 1.45 pcf (23.2 kg/m³) rigid foam insulation must be installed at a maximum thickness in accordance with BASF StuccoBase requirements noted in ICC-ES ESR-1064.

5.0 CONDITIONS OF USE

The BASF NEOPOR® rigid foam insulation described in this report complies with, or is an acceptable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- Installation must comply with this report and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacturer's published installation instructions, this report governs.
- Exterior walls must be protected by a water-resistive barrier complying with IBC Section 1404.2 or IRC Section R703.2, as applicable, and by wall coverings that provide the necessary structural resistance to wind and seismic forces in spanning between wall framing members.
- Insulation boards must not be used as a nailing base for exterior siding materials. All nailing must be made through the insulation into the wall framing or structural sheathing as required by the siding manufacturer's instructions or the applicable code.
- The insulation boards must be separated from the interior of the building with a thermal barrier complying with IBC Section 2603.4 or IRC Section R316.4, as applicable.
- For structures required to comply with the IBC or IRC, use of the foam plastic insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with IBC Section 2603.8 or IRC Section R318.4.

5.6 Except as noted in Sections 4.2 and 4.3, the minimum density and maximum thickness of the insulation boards must be as noted in Table 1 of this report.

5.7 The foam plastic boards are produced by the manufacturer shown in Table 4, 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).

7.0 IDENTIFICATION

The insulation boards must be packaged in bundles wrapped in opaque poly film or cardboard bearing a label

with the BASF NEOPOR® trademark; the product name (see Table 4); the manufacturing facility location (see Table 4); the date of manufacture; the evaluation report number (ESR-3463); and the thermal resistance (*R*-value).

In addition, a stamp bearing the manufacturer's name and address and the evaluation report number (ESR-3463) appears along one edge of each board and on both faces of one board in each bundle.

TABLE 1—BASF NEOPOR® RIGID INSULATION BOARD PROPERTIES

ASTM C578 TYPE	MINIMUM DENSITY (pcf)	MAXIMUM THICKNESS (inches) WITH MINIMUM 1/2-INCH THICK GYPSUM WALLBOARD THERMAL BARRIER	MAXIMUM THICKNESS (inches) WITH 5/8-INCH-THICK TYPE X GYPSUM WALLBOARD
I	0.90	6	12
VIII	1.15	6	12
II	1.35	6	12
II	1.45	6	12
IX	1.80	6	12

For SI: 1 inch = 25.4 mm, 1 pcf = 16.02 kg/m³.

TABLE 2—TYPE AND MAXIMUM THICKNESS FOR BASF NEOPOR® RIGID INSULATION PRODUCTS USED IN ATTICS OR CRAWL SPACES

ASTM C578 EPS TYPE	MAXIMUM THICKNESS (inches)
I	4.0
VIII	3.2
II	2.66
II (1.45 pcf)	2.76
IX	2

For SI: 1 inch=25.4 mm, 1 pcf=16.02 kg/m³.

TABLE 3—BASF NEOPOR® RIGID INSULATION THERMAL RESISTANCE (*R*-VALUE)

ASTM C578 TYPE	MINIMUM DENSITY (pcf)	THERMAL RESISTANCE (per 1 inch thickness at 75°F mean temperature) (°F-ft ² -f/Btu)	THERMAL RESISTANCE (per 1 inch thickness at 40°F mean temperature) (°F-ft ² -f/Btu)
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/m³, 1 °F-ft²-f/Btu = 0.176 m²-K/W.

TABLE 4—PRODUCT MANUFACTURER

MANUFACTURER/ADDITIONAL LISTEE	LOCATION	PLANT ID NO.	PRODUCT NAME	APPROVED TYPES
OPCO Inc.	205 West Harrison Avenue Latrobe, PA 15650	B-1	OpCore	I, VIII, II, II (1.45), IX