Code Compliance Research Report
CCRR-1049

Issue Date: 01-21-2016
Revision Date: 02-16-2018
Renewal Date: 01-01-2019

DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION
Section: 07 21 00 – Thermal Insulation

REPORT HOLDER:
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REPORT SUBJECT:
Bayseal OCX Spray-applied Polyurethane Insulation

1.0 SCOPE OF EVALUATION

This Research Report addresses compliance with the following Codes:

- 2015, 2012, and 2009 *International Building Code®* (IBC)
- 2015, 2012, and 2009 *International Residential Code®* (IRC)
- 2015, 2012, and 2009 *International Energy Conservation Code®* (IECC)

Bayseal OCX insulation has been evaluated for the following properties:

- Surface-burning characteristics
- Physical properties
- Thermal resistance
- Air permeability
- Water vapor permeability
- Alternatives to Ignition Barriers

See Table 1 for applicable Code sections related to these properties.

NOTE: This report references 2015 Code sections with [2012] and [2009] Code sections shown in brackets where they differ.

2.0 USES

Bayseal OCX spray-applied polyurethane foam insulation is used as a nonstructural thermal insulating material on or in interior and exterior walls, floors, ceilings, and roofs. Under the IRC, the insulation may be used as air-impermeable insulation when installed in accordance with Section 3.2.3.

3.0 DESCRIPTION

3.1 Bayseal OCX:

Bayseal OCX insulation is a semi-rigid, open cell, polyurethane foam plastic. The insulation is a two-component spray foam plastic with a nominal in-place density of 0.6 pcf. The insulation is produced in the field by combining a polymeric isocyanate (A component) with a resin (B component). The insulation liquid components are supplied in 55-gallon drums and 250-gallon totes, and must be stored at temperatures between 50ºF and 80ºF. The resin should be warmed to 70ºF before use. Refer to the manufacturer's Application Guidelines for further information. The resin (B component) must be protected from freezing temperatures and has a shelf life of 6 months.

3.2 Performance Characteristics:

3.2.1 Surface-burning Characteristics: Bayseal OCX insulation, at a maximum thickness of 4 inches and a nominal density of 0.6 pcf, has a flame-spread index of 25 or less and a smoke-developed index of 450 or less, when tested in accordance with ASTM E84. When the insulation is separated from the interior living space of the building with minimum 1/2 inch thick gypsum board, the maximum thickness is not limited.

3.2.2 Thermal Resistance, R-values: Bayseal OCX insulation has thermal resistance (R-value) at a mean temperature of 75ºF as shown in Table 2.

3.2.3 Air Permeability: Bayseal OCX insulation, at a minimum thickness of 3-1/2 inches, has tested values of less than 0.02 L/s-m^2. Therefore, it is considered air-impermeable insulation in accordance with Section 1203.3 of the 2015 IBC [not applicable in the 2012 and 2009 IBC] or Section R202 and R806.5 [2009 - R806.4] of the IRC, based on testing in accordance with ASTM E283.

3.2.4 Water Vapor Permeability: Bayseal OCX has a vapor permeance of less than 10 perms at a minimum thickness of 3-1/2 inches and may be used where a Class III vapor retarder is required by the applicable Code.

4.0 INSTALLATION

4.1 General:

Bayseal OCX insulation must be installed in accordance with the manufacturer's published installation instructions, the applicable Code, and this Research Report. A copy of the manufacturer's instructions must be available on the jobsite during installation.

4.2 Application:

Bayseal OCX insulation is spray-applied on the jobsite using a volumetric positive displacement pump as identified in the manufacturer's application instructions. The insulation must be applied when the ambient temperature is between 40ºF and 120ºF. Refer to the manufacturer's Application Guidelines for further information. The insulation must not be used in areas that have a maximum in-service temperature greater than 180ºF. The foam plastic must not be used in electrical outlet or junction boxes, or in contact with water, rain, or soil. The foam plastic must not be sprayed onto a substrate that is wet, or covered with frost or ice, loose scales, rust, oil, or grease. Substrates with high heat absorption properties (such as concrete and metals) must be warmed to approximately 60-70ºF prior to foam application. The insulation must be protected from the weather during and after application. The insulation may be applied to a maximum thickness of 6 inches per pass. Allow for full expansion of the previous pass before applying an additional pass. Where the insulation is used as an air-impermeable insulation, such as in unvented attic assemblies under IRC Section R806.5 [2009 - R806.4], the insulation must be installed at a minimum thickness of 3-1/2 inches.

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier: Bayseal OCX insulation must be separated from the interior living space of the building by an approved thermal barrier of 1/2 inch thick gypsum board or an equivalent 15-minute thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section R316.4, as applicable. Exceptions are provided in Section 4.4.

When the insulation is separated from the interior living space of the building with minimum 1/2 inch thick gypsum board, the maximum thickness is not limited.

4.4 Attics and Crawl Spaces:

Bayseal OCX insulation may be applied in attics and crawl spaces as described in either 4.4.1 or 4.4.2. When the insulation is installed in an attic or crawlspace in accordance with this section, a thermal barrier is not required between the insulation and the attic or crawlspace, but is required between the insulation and the interior living space.

4.4.1 Application with a Prescriptive Ignition Barrier: When Bayseal OCX insulation is installed within attics and crawl spaces where entry is made only for service of utilities, the ignition barrier must be installed in accordance with IBC Section 2603.4.1.6, or IRC Section R316.5.3 or R316.5.4, as applicable. The ignition barrier must be consistent with the requirements for the type of construction required by the applicable Code, and must be installed in a manner so the foam plastic insulation is not exposed. The insulation as described in this section may be installed in unvented attics in accordance with IRC Section R806.5 [R806.4] at a minimum thickness of 3-1/2 inches.

4.4.2 Application without a Prescriptive Ignition Barrier: Bayseal OCX insulation may be installed in attics and crawl spaces, without the ignition barrier prescribed in IBC Section 2603.4.1.6 and IRC Sections R316.5.3 and R316.5.4, subject to the following conditions:

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. Under-floor (crawl space) ventilation is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.
e. Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with IRC Section R806.5 [R806.4].
f. Combustion air is provided in accordance with IMC (International Mechanical Code) Section 701 [2009 - Sections 701 and 703].

Bayseal OCX insulation may be applied to the underside of roof sheathing and rafters in attics and to the underside of wood floors and floor joists in crawl spaces, and to walls in both attics and crawl spaces. The thickness of the foam plastic must not exceed 12 inches on walls and 16 inches on the underside of roofs and wood floors. The insulation may be installed without the prescriptive ignition barrier required by IBC Section 2603.4.1.6 or IRC Sections R316.5.3 and R316.5.4, or a fire protective coating.

The insulation may be installed in unvented attics as described in this section in accordance with 2015 IBC Section 1203.3 or IRC Section R806.5 [R806.4], when applied at a minimum thickness of 3.5 inches.

4.4.3 Use on Attic Floors: Bayseal OCX insulation may be installed exposed (no coating) at a maximum thickness of 12 inches between and over the joists in attic floors. The insulation must be separated from the interior living space by an approved thermal barrier. The insulation may be installed without the prescriptive ignition barrier.

5.0 CONDITIONS OF USE

The Bayseal OCX spray-applied foam plastic insulation described in this Research Report complies with, or is a suitable alternative to, what is specified in those Codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 Installation must comply with this Research Report, the manufacturer's published installation instructions, and the applicable Code. In the event of a conflict between the manufacturer's instructions and this report, this report governs.

5.2 The insulation must be separated from the interior living space of the building by a thermal barrier as described in Section 4.3, except as described in Section 4.4.

5.3 The insulation must not exceed the thicknesses noted in Sections 4.3 and 4.4, as applicable.

5.4 The insulation must be applied by contractors accredited by Accella Polyurethane Systems LLC.

5.5 Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with IRC Section R318.4 or IBC Section 2603.8 [2603.9], as applicable.

5.6 Jobsite certification and labeling of the insulation must comply with IRC Section N1101.10 [N1101.14] and IECC Sections R303.1, R403.1 and C303.1 [2009 – 303.1 and 401.3], as applicable.

5.7 The insulation is produced at the Accella Polyurethane Systems LLC, manufacturing facilities in Spring, Texas and Cartersville, Georgia, under a quality control program with inspections by Intertek Testing Services NA, Inc. (AA-647).

6.0 SUPPORTING EVIDENCE

6.1 Reports of tests in accordance with ASTM C518, ASTM E84, ASTM E96, and ASTM E283.

6.2 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC 377), dated April 2016, including reports of test in accordance with Appendix X.

6.3 Intertek Listing Report Bayseal® OCX.

7.0 IDENTIFICATION

The A and B components of the insulation are identified with the manufacturer's name (Accella Polyurethane Systems LLC), address and telephone number, the product name (Bayseal OCX), use instructions, the flame-spread and smoke-development indices, the lot number, the Intertek Mark, and the Code Compliance Research Report number (CCRR-1049).

8.0 OTHER CODES

This section is not applicable.

9.0 CODE COMPLIANCE RESEARCH REPORT USE

9.1 Approval of building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.

9.2 Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Intertek.

9.3 Reference to https://bpdirectory.intertek.com is recommended to ascertain the current version and status of this report.

TABLE 1 – PROPERTIES EVALUATED

PROPERTY	IBC SECTION[1]	IRC SECTION[1]	IECC SECTION[1]
Physical properties	Not required	Not required	Not required
Surface-burning characteristics	2603.3	R316.3	Not applicable
Thermal barrier/ignition barrier	2603.4	R316.4	Not applicable
Air permeability	1301	R806.5 [R806.4]	C402.4 R402.4
Thermal resistance	1301	N1101.10 N1102 [N1101.1]	C303.1.1 C303.1.4 R303.1.1 R30301.4 [102.1.1 102.2.11]

[1] Section numbers refer to the 2015 codes with 2012 and 2009 code sections in parentheses where different.

TABLE 2 – THERMAL RESISTANCE (R Values) [1,2,3]

THICKNESS (inches)	R-VALUE (°F.ft^2.h/Btu)
1	3.9
2	7.4
3	11
3.5	13
4	14
5	18
5.5	20
6	22
7	25
8	29
9	32
10	36
11	40
11.5	42
12	43

[1] R-values are calculated based on tested K-values at 1 inch and 4 inch thicknesses.
[2] R-values greater than 10 are rounded to the nearest whole number.
[3] To determine R values for thickness not listed:
a. Between 1 inch and 4 inch can be determined through linear interpolation or
b. Greater than 4 inches can be calculated based on R= 3.61 /inch