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DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07210—Building Insulation

REPORT HOLDER:

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EVALUATION SUBJECT:

BAYSEAL™ OC SPRAY-APPLIED POLYURETHANE INSULATION

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- 2006 *International Energy Conservation Code*® (IECC)
- Legacy Codes (see Section 8.0)

Properties evaluated:

- Surface-burning characteristics
- Physical properties
- Thermal transmission
- Fire resistance

2.0 USES

The Bayseal™ OC insulation is used as a nonstructural thermal insulating material in Type III and V construction (IBC) and dwellings under the IRC. The insulation is for use in wall cavities, floor assemblies, ceiling assemblies or attics and crawl spaces when installed in accordance with Section 4.0. The insulation may be used in wall assemblies in fire-resistive-rated-construction as described in Sections 3.6 and 4.4.

3.0 DESCRIPTION

3.1 General:

Bayseal™ OC is a spray-applied cellular polyurethane foam plastic insulation that is installed in stud wall assemblies, ceilings, floors, crawlspaces and cavities of roofs. The foam plastic insulation is a two-component, open-cell, one-to-one by volume spray foam system with a nominal density of 0.5 pcf (8 kg/m^3). The insulation is produced in the field by combining a polymeric isocyanate (A component) with a polymeric resin blend (B component). The insulation is applied in passes having a maximum thickness of 5 inches per pass. Multiple passes are applied to obtain the desired thickness, not exceeding a total thickness of 12 inches (305 mm) for wall cavities and 16 inches (406 mm) for ceiling cavities. The insulation components have a shelf life of six months when stored at temperatures between 65°F (18°C) and 85°F (29°C) before installation. The insulation must not be used in areas that have a maximum service temperature greater than 180°F (82°C).

3.2 Surface-burning Characteristics:

The insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 0.5 pcf (8 kg/m^3), has a flame spread index of less than 25 and a smoke-developed index of less than 450 when tested in accordance with ASTM E 84. Thicknesses up to 12 inches (305 mm) for wall cavities and 16 inches (406 mm) for ceiling cavities are recognized based on room corner fire testing in accordance with NFPA 286, when covered with minimum ½-inch-thick (13 mm) gypsum board or an equivalent thermal barrier complying with and installed in accordance with the applicable code.

3.3 Thermal Transmission (*R*-values):

The insulation has thermal resistance (*R*-value), at a mean temperature of 75°F (24°C), as shown in Table 1.

3.4 Vapor Retarder:

The Bayseal™ OC insulation is not a vapor retarder. Therefore, when required by IRC Section R318 or IECC Sections 402.5 and 502.5, a vapor retarder must be provided.

3.5 Bayseal™ IC Coating:

Bayseal™ IC intumescent coating is manufactured by BaySystems and is a water-based latex coating with a specific gravity of 1.31. Bayseal™ IC is supplied in 5-gallon (19 L) pails and 55-gallon (208 L) drums and has a shelf life of 12 months when stored in a factory-sealed container at temperatures between 50°F (10°C) and 100°F (38°C).

3.6 Fire Resistance:

Bayseal™ OC spray-applied foam insulation is recognized for use in a limited load-bearing, one-hour, fire-resistance-rated wall assembly when installed as described in Section 4.4.

4.0 INSTALLATION

4.1 General:

Bayseal™ OC insulation must be installed in accordance with the manufacturer's published installation instructions and this report. A copy of the instructions must be available at all times on the jobsite during installation.

The substrates to which the insulation is applied must be clean, dry and free of frost, ice, loose debris, or contaminates that will interfere with adhesion of the spray foam insulation.

The insulation must be applied when the ambient and substrate temperature is between 50°F (10°C) and 120°F (49°C) and must be protected from the weather during and after application. The insulation must not be applied in electrical boxes.

4.2 Thermal Barrier:

The Bayseal™ OC insulation, with a maximum nominal thickness of 12 inches (305 mm) for wall cavities and 16 inches (406 mm) for ceiling cavities, must be separated from the interior of the building by an approved thermal barrier of ½-inch-thick (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier complying with and installed in accordance with the applicable code. Exception: within an attic or crawl space, installation must be in accordance with Section 4.3.

4.3 Attics and Crawl Spaces:

4.3.1 Application with a Prescriptive Ignition Barrier: When Bayseal™ OC insulation is installed within attics or crawl spaces where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 and IRC Section R314.5.4, 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 that the foam plastic insulation is not exposed. Bayseal™ OC insulation, as described in this section, may be installed in unvented conditioned attics in accordance with IRC Section R806.4.

4.3.2 Application with Intumescent Coating: In attics, Bayseal™ OC insulation may be spray-applied to the underside of roof sheathing or roof rafters; and in crawl spaces, Bayseal™ OC insulation may be spray-applied to the underside of floors as described in this section. The thickness of the foam plastic applied to the underside of the top space must not exceed 10 inches (254 mm). The thickness of the foam plastic applied to vertical surfaces must not exceed 6 inches (152 mm). The foam plastic must be covered with a minimum nominally 10-mil (0.25 mm) dry film thickness of Bayseal™ IC intumescent coating described in Section 3.5. The Bayseal™ IC intumescent coating must be applied over the Bayseal™ OC insulation in accordance with the manufacturer's instructions and this report. Surfaces to be coated must be dry, clean, and free of dirt, loose debris and any other substances that could interfere with adhesion of the coating. The Bayseal™ IC coating is applied with a medium-size nap roller, soft brush or conventional airless spray equipment at a rate of 1 gallon (3.8 L) per 100 square feet (9.2 m^2), and a second coat, if needed, is applied to obtain the required minimum dry film thickness of 10 mils (0.25 mm). The coating must be applied when ambient and substrate temperatures are above 50°F (10°C) and requires a 24-hour curing time after application. Bayseal™ OC insulation, as described in this section, may be installed in unvented conditioned attics in accordance with IRC Section R806.4.

4.3.3 Use on Attic Floors: Bayseal™ OC insulation may be installed at a maximum thickness of 10 inches (254 mm) between joists in attic floors. The Bayseal™ OC insulation must be separated from the area beneath the attic by an approved thermal barrier. An ignition barrier in accordance with IBC Section 2603.4.1.6 and IRC Section R314.5.3 must be installed.

4.4 One-hour Fire-resistance-rated Wall Assemblies (Limited Load-bearing):

4.4.1 Interior Face: One layer of $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard must be applied parallel to the interior face of 2-by-6 wood studs spaced a maximum of 16 inches (406 mm) on center. The gypsum boards must be attached using Type S, $1^5/_8$-inch-long (41 mm) screws spaced 8 inches (203 mm) on center. The interior cavity is filled with Bayseal™ OC spray-applied foam insulation.

4.4.2 Exterior Face: One layer of $^5/_8$-inch-thick (15.9 mm) Type X gypsum wallboard must be applied in the same manner as for the interior face.

4.4.3 Axial Load Design: Axial loads applied to the wall assembly must be limited to the lesser of the following:

1. 2,756 pounds (122 642 N) per stud.
2. A maximum of 51 percent of the load calculated in accordance with Sections 3.6 and 3.7 of the ANSI/AF&PA NDS.

5.0 CONDITIONS OF USE

The Bayseal™ OC insulation described in this 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 This evaluation report and the manufacturer's published installation instructions, when required by the code official, must be submitted at the time of permit application.

5.2 Bayseal™ OC insulation and Bayseal™ IC intumescent coating must be installed in accordance with the manufacturer's published installation instructions, this report and the applicable code. The instructions within this report govern if there are any conflicts between the manufacturer's published installation instructions and this report.

5.3 Bayseal™ OC insulation must be separated from the interior of the building by an approved 15-minute thermal barrier, as described in Section 4.2, except as noted in this report.

5.4 Bayseal™ OC insulation must be protected from the weather during application.

5.5 Bayseal™ OC insulation must be applied by installers certified by BaySystems North America LLC.

5.6 Bayseal™ OC insulation has been evaluated only for use in Type VB construction and dwellings under the IRC. When installed in wall assemblies in fire-resistance-rated Type III and V construction, installation must be as described in Section 4.4.

5.7 Use of Bayseal™ OC insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with IBC Section 2603.8 or IRC Section R320.5.

5.8 Jobsite certification and labeling of the insulation must comply with IRC Sections N1101.4 and N1101.4.1 and IECC Sections 102.1.1 and 102.1.11, as applicable.

5.9 Bayseal™ OC insulation is produced in Phoenix, Arizona, under a quality control program with inspections by Underwriters Laboratories Inc. (AA-668).

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated October 2007.

6.2 Reports of room corner tests in accordance with NFPA 286.

6.3 Reports of air leakage tests in accordance with ASTM E 283.

6.4 Reports of comparative crawl space fire tests.

7.0 IDENTIFICATION

Components for Bayseal™ OC insulation are identified with the manufacturer's name (BaySystems North America, LLC), address and telephone number; the product trade name (Bayseal™ OC); product type (A or B component); use instructions; the density; the flame-spread and smoke-developed indices; the evaluation report number (ESR 1655); and the name of the inspection agency (Underwriters Laboratories Inc.).

8.0 LEGACY CODES:

In addition to the codes referenced in Section 1.0, the spray-applied foam insulation was evaluated for compliance with the requirements of the 1999 *Standard Building Code*© (SBC).

8.1 Uses:

See Section 2.0.

8.2 Description:

8.2.1 General: See Section 3.1.

8.2.2 Surface Burning Characteristics: See Section 3.2.

8.2.3 Thermal Transmission: See Section 3.3.

8.2.4 Vapor Retarder: See Section 3.4.

8.2.5 Bayseal™IC Coating: See Section 3.5.

8.2.6 Fire Resistance: See Section 3.6.

8.3 Installation:

8.3.1 General: See Section 4.1.

8.3.2 Thermal Barrier: The spray-applied insulation must be separated from the interior of the building by an approved thermal barrier of ½-inch (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier complying with SBC Section 2603.5, except where installed in attics or crawl spaces as described in Section 8.3.3.

8.3.3 Attics and Crawl Spaces:

8.3.3.1 Application with a Prescriptive Ignition Barrier: When Bayseal™ OC insulation is installed within attics or crawl spaces where entry is made only for service of utilities, an ignition barrier must be installed in accordance with SBC Section 2603.5.1.6. 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 that the foam plastic insulation is not exposed.

8.3.3.2 Application without a Prescriptive Ignition Barrier: See Section 4.3.2.

8.3.3.3 Application with Intumescent Coating: See Section 4.3.1.

8.3.4 Use on Attic Floors: Bayseal™ OC insulation may be installed at a maximum thickness of 10 inches (254 mm) between joists in attic floors. The Bayseal™ OC insulation must be separated from the interior of the building by an approved thermal barrier. An ignition barrier in accordance with SBC Section 2603.5 must be installed.

8.3.5 Fire Resistance: See Section 4.4.

8.4 Conditions of Use:

The Bayseal™ OC spray-applied polyurethane foam insulation described in this report complies with, or is a suitable alternative to what is specified in, the SBC, subject to the following conditions:

8.4.1 See Section 5.1.

8.4.2 The Bayseal™ OC insulation must be separated from the interior of the building by an approved 15-minute thermal barrier, as described in Section 8.3.2, except where installation is in an attic or crawl space as described in Section 8.3.3.

8.4.3 See Section 5.4.

8.4.4 See Section 5.5.

8.4.5 See Section 5.6.

8.4.6 Bayseal™ OC insulation is limited to use in Type VI construction under the SBC, except when installed in fire-resistance-rated construction as described in Section 8.3.5.

8.4.7 In jurisdictions that have adopted the SBC, and when the spray-applied insulation is installed in buildings of wood construction, the installation must not be on the exterior of foundation walls or below floor slabs on the ground or in contact with the ground. The insulation must have a clearance above grade and exposed earth of 6 inches (152 mm) or greater.

8.4.8 See Section 5.9.

8.5 Evidence Submitted:

See Section 6.0.

8.6 Identification:

See Section 7.0.

TABLE 1—THERMAL RESISTANCE (*R*-VALUES)

THICKNESS (inches)	*R*-VALUE (°F.ft^2.h/Btu)
ASTM C 518 TEST VALUES	
1	3.8
2	7.5
3	11
3.5	12
3.5*	13
4	14
CALCULATED VALUES[1]	
5	17
5.5	19
6	21
6.5	22
7	24
7.5	26
8	27
9	31
10	34
11	38
12	41
13	45
14	48
15	51
16	54

For SI: 1 inch = 25.4 mm; 1°F.ft^2.h/Btu = 0.176 110 °k.m^2/W.

[1]Calculated *R*-values are based on tested *k*-values at a 3.5-inch thickness.
*Values are applicable when application is in multiple passes.