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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 21 00—Thermal Insulation

REPORT HOLDER:

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REPORT SUBJECT:

Bayseal® CC X (Includes CC X and CC XP)
Spray-Applied Polyurethane Foam 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® CC X insulation has been evaluated for the following properties:

- Physical properties
- Surface-burning characteristics
- Air permeability
- Moisture vapor permeance
- Thermal resistance (R-values)
- Alternatives to water resistive barriers
- Alternatives to thermal barriers
- Alternatives to ignition barriers
- Use in Types I, II, III and IV construction
- Use in Type V construction

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

NOTE: The body of this report references 2015 Code sections. See Table 1 for a cross reference with other editions of the Code.

2.0 USES

Bayseal® CC X insulation has been evaluated for the properties noted in Section 1.0 and Table 1.

Bayseal® CC X insulation is intended for use as nonstructural thermal insulating materials on or in interior and exterior walls, floors, and the underside of roofs, in all types of construction under the IBC and dwellings under the IRC.

The insulation may be used as air-impermeable insulation as described in Section 3.2.2.

The insulation may be used as a moisture vapor retarder as described in Section 3.2.4.

The insulation may be used in attics and crawl spaces without the use of a prescriptive ignition barrier when installed as described in Section 4.4.2. The insulation may be applied without the use of a prescriptive thermal barrier when installed as described in Section 4.3.2.

When used in exterior walls of Types I, II, III, or IV construction, the construction must be as described in Section 4.6.

3.0 DESCRIPTION

3.1 Materials:

3.1.1 Insulation: Bayseal® CC X is a two-component, closed-cell, foam plastic insulation. The insulation is produced in the field by combining an isocyanate (Component A) with a proprietary resin (Component B), resulting in insulation with a nominal density of 2.15 pcf. The insulation components have a shelf life of six months when stored at temperatures between 50°F and 80°F before installation.



In this report, all references and recognitions for Bayseal® CC X are also applicable to Bayseal® CC XP.

3.1.2 Intumescent Coatings:

3.1.2.1 DC315: DC315 intumescent coating, manufactured by International Fireproof Technology Inc., is a single-component, water-based, liquid-applied intumescent coating. The coating is supplied in 5-gallon pails and 55-gallon drums, and has a shelf life of 24 months when stored in factory-sealed containers at temperatures between 41°F and 95°F. DC315 complies with ICC-ES AC456 as recognized in Intertek CCRR-1076.

3.1.2.2 TPR² Fireshell® BMS-TC: Fireshell® BMS-TC intumescent coating is a proprietary water-based, one-part, nonflammable coating manufactured by TPR² Corporation. The coating is supplied in 5-gallon pails and 55-gallon drums and has a shelf life of 12 months when stored in factory-sealed containers at temperatures above 50°F. Fireshell® BMS-TC complies with ICC-ES AC456 as recognized in ICC-ES ESR-3997.

3.2 Performance Characteristics:

3.2.1 Surface-burning Characteristics: The insulation, at a maximum thickness of 4 inches, 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. Bayseal® CC X can be installed at greater thicknesses as described in Sections 4.3 and 4.4.2. 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. Under the 2015 IRC, a thermal barrier of minimum 23/32 inch thick wood structural panel is also permitted and the thickness is not limited.

3.2.2 Air Permeability: The insulation, at a minimum thickness of 3/4 inch, is considered air-impermeable insulation in accordance with 2015 IBC Section 1203.3 [not applicable in the 2012 and 2009 IBC], or IRC Section R806.5 based on testing in accordance with ASTM E283.

3.2.3 Thermal Resistance (R-value): The insulation has thermal resistance (R-value), at a mean temperature of 75°F, as shown in Table 2.

3.2.4 Moisture Vapor Permeance: The insulation has a moisture vapor permeance of less than 1 perm, and qualifies as a Class II vapor retarder, when applied at a minimum of 7/8 inch thickness, based on testing in accordance with ASTM E96.

4.0 INSTALLATION

4.1 General:

The insulation must be installed in accordance with the manufacturer's published installation instructions, the applicable Code, and this Research Report. The installation requirements in Sections 4.1 through 4.5 apply to all types of construction.

The insulation must be stored at temperatures between 50°F and 80°F and must not be used in areas that have a maximum service temperature greater than 180°F. The foam plastic insulation must not be used in electrical outlet or junction boxes, or in contact with rain or water. The substrate must be free of moisture, frost or ice, loose scales, rust, oil, and grease. The insulation must be protected from the weather during and after application, unless approved specifically by Accella Polyurethane Systems LLC.

The manufacturer's published installation instructions must be available on the jobsite at all times during installation.

4.2 Application:

The insulation is spray-applied on the jobsite using spray equipment specified in Accella Polyurethane Systems LLC's published installation instructions. Bayseal® CC X is installed in one or more passes, up to 2 inches per pass, as necessary to achieve the specified thickness, subject to the thickness limitations identified in this report.

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier: The insulation must be separated from the interior of the building by an approved thermal barrier of 1/2 inch thick gypsum wallboard or an equivalent 15-minute thermal barrier complying with IBC Section 2603.4 or IRC Section R316.4, as applicable, except where installation is in an attic or crawl space as described 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. Under the 2015 IRC, a thermal barrier of minimum 23/32 inch thick wood structural panel is also permitted and the thickness is not limited.

4.3.2 Application without a Prescriptive Thermal Barrier:

Bayseal® CC X may be installed without the 15-minute thermal barrier prescribed in the IBC Section 2603.4 and IRC Section R316.4, as described in this section and Table 3. The insulation may be spray-applied to the interior surface of walls, the underside of roof sheathing and in crawl spaces provided the assembly conforms to one of the assemblies described in Table 3. The insulation and coating may be left exposed as an interior finish without the prescriptive thermal or ignition barrier in assemblies as indicated in Table 3.

When an intumescent coating is used, it must be applied to all surfaces in accordance with the respective coating manufacturer's installation instructions. The coating must be applied when ambient and substrate temperatures are above 50°F unless otherwise permitted by the coating manufacturer's installation instructions. Surfaces to be coated must be clean, dry, and free of loose dirt, loose debris, and any other substances that could interfere with the adhesion of the coating.

4.4 Attics and Crawl Spaces:

4.4.1 Application with a Prescriptive Ignition Barrier:

Where Bayseal® CC X is installed within attics or crawl spaces, and where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 or IRC Sections R316.5.3 and 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 that the foam plastic insulation is not exposed. The insulation, as specified in this section, may be installed in unvented attics and unvented enclosed rafter assemblies in accordance with 2015 IBC Section 1203.3 or IRC Section R806.5.

4.4.2 Application without a Prescriptive Ignition Barrier:

Bayseal® CC X insulation may be installed in attics and crawl spaces, as described in this section and Table 4, 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 crawlspace 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 is not circulated to other parts of the building.
- d. Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806.1, as applicable, except when insulation is permitted in unvented attics in accordance with 2015 IBC Section 1203.3 [not applicable under the 2012 or 2009 IBC], or IRC Section R806.5.
- e. Under-floor (crawl space) ventilation is provided in accordance with IBC Section 1203.5 or IRC Section R408.1, as applicable.
- f. Combustion air is provided in accordance with IMC (International Mechanical Code®) Section 701.

In attics, the insulation may be spray-applied to the underside of roof sheathing or roof rafters, and/or vertical surfaces provided the assembly conforms to one of the assemblies described in Table 4. In crawl spaces, the insulation may be spray-applied to the underside of floors and/or vertical surfaces provided the assembly conforms to one of the assemblies described in Table 4.

The insulation may be installed in unvented attics as described in this section and in accordance with IBC Section 1203.3 or IRC Section R806.5.

4.4.3 Use on Attic Floors: Bayseal® CC X insulation may be installed between and over joists in attic floors in accordance with this section, conditions a. through f. of Section 4.4.2, and Table 4 based on testing in accordance with AC377, Appendix X. The insulation must be separated from the interior of the building by an approved thermal barrier. The ignition barrier required in IBC Section 2604.4 and IRC R316.5.3 may be omitted.

4.5 Water-Resistive Barrier: Bayseal® CC X insulation may be used as an alternative to the water-resistive barrier prescribed in IBC Section 1404.2 and IRC Section R703.2, when installed on exterior walls as described in this section. The insulation must be spray-applied to the exterior side of the sheathing, masonry, or other suitable exterior wall substrates to form a continuous layer of 1-1/2





inches minimum thickness. All construction joints and penetrations must be sealed with Bayseal® CC X insulation. The insulation must be covered with an exterior wall covering within the time specified in the Accella Polyurethane Systems LLC's installation instructions.

4.6 Exterior Walls of Type I, II, III, and IV Construction:

Bayseal® CC X may be installed on or in exterior walls of buildings of Type I, II, III, and IV construction complying with IBC Section 2603.5 and as described in this section. The maximum thickness of the insulation is described in Section 4.6.2.1 or Section 4.6.2.2, as applicable. The potential heat of Bayseal® CC X spray-applied insulation is 2079 Btu/ft² per inch of thickness. The tested wall assemblies were extended through a third-party engineering analysis to include additional wall constructions.

4.6.1 Base Wall:

4.6.1.1 Framing: Nominally 3-5/8 inches deep, No. 20 gauge galvanized steel studs, spaced 24 inches on center, are fastened to No. 20 gauge galvanized steel floor and ceiling tracks using 1/2 inch self-tapping pan-head framing screws.

4.6.1.2 Exterior Face: One layer of 5/8 inch Georgia Pacific DensGlass® Gold Exterior Sheathing is installed parallel to steel studs exterior face and attached using 1-1/4 inch self-drilling drywall screws spaced 8 inches on center around the perimeter and 12 inches in the field. Vertical joints of the sheathing must be offset a minimum of 24 inches from the vertical joints of the interior Type X gypsum board face described in Section 4.6.2.3. Horizontal joints of the sheathing must be offset a minimum of 24 inches from the horizontal joints of the interior Type X gypsum board face described in Section 4.6.2.3. The stud cavity is filled with Bayseal® CC X insulation to a maximum nominal thickness of 3-1/4 inches.

4.6.1.3 Interior Face: Type X gypsum board, 5/8 inch thick and complying with ASTM C1396 is applied to the interior face of the steel studs with the long edge parallel to studs, and secured using 1-1/4 inch self-drilling drywall screws spaced 8 inches on center around the perimeter and 12 inches on center in the field. The gypsum board joints are treated to minimum Level 2 finish as described in GA-214 Recommended Levels of Gypsum Board Finish (published

by the Gypsum Association) consisting of vinyl or casein, dry or premixed, joint compound applied in two coats to cover all exposed screw heads and gypsum board butt joints. A minimum 2 inch wide paper, plastic, or fiberglass tape is embedded in the first layer of compound over butt joints of the gypsum board.

4.6.2 Insulation: Bayseal® CC X insulation may be installed on or in the exterior wall assembly as described in Section 4.6.2.1 or Section 4.6.2.2.

4.6.2.1 Exterior Insulation Installation: Bayseal® CC X insulation may be installed to the exterior of the base wall exterior face described in Section 4.6.1.2 to a maximum thickness of 3-1/4 inches.

4.6.2.2 Stud Cavity Insulation Installation: Bayseal® CC X insulation may be installed within the stud cavity, formed by the framing in Section 4.6.1.1 and exterior sheathing in Section 4.6.1.2, to a maximum thickness of 1-3/4 inches.

4.6.3 Exterior Wall Covering: Details of the exterior wall covering must be provided to the Code official by the report holder, designer, or specifier with an engineering analysis demonstrating that (1) the exterior wall covering conforms to ASTM E136 and (2) the addition of the wall covering to the assembly described in Section 4.6 does not negatively affect conformance of the assembly with the requirements of IBC Section 2603.5.

5.0 CONDITIONS OF USE

The Bayseal® CC X spray-applied 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 The 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 of the building by an approved 15-minute thermal barrier, as described in Section 4.3.1, excepted as described in Section 4.3.2 and Section 4.4.





5.3 The insulation thickness must not exceed that noted in Sections 3.2, 4.3, 4.4, and 4.6.

5.4 The insulation must be applied by professional spray polyurethane foam installers approved by Accella Polyurethane Systems LLC or accredited by the Spray Polyurethane Foam Alliance (SPFA) for the installation of spray polyurethane foam insulation.

5.5 The insulation must be protected from the weather during and after application as specified in the manufacturer's instructions.

5.6 A vapor barrier must be installed when required by the applicable Code.

5.7 Use of the 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, as applicable.

5.8 Jobsite certification and labeling of the insulation must comply with IRC Section N1101.10 and IECC Section C303.1 or R303.1, as applicable.

5.9 The insulation components are produced 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 E96, ASTM E283, ASTM E84 and NFPA 259, NFPA 285 and NFPA 286.

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

April 2016; including reports of tests in accordance with Appendix X.

6.3 Research Reports for evaluation of data in accordance with ICC-ES Acceptance Criteria for Fire-protective Coatings Applied to Spray-applied Foam Plastic Insulation Installed without a Code-prescribed Thermal Barrier (AC456), dated October 2015.

6.4 Intertek Listing Report [Bayseal® CC X](#).

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 trade name (Bayseal® CC X or CC XP), the product type (A or B component), the mixing instructions, the density, the flame-spread and smoke-developed indices, the shelf life and date of manufacture, the Intertek Mark, and the Code Compliance Research Report number (CCRR-1071).

8.0 OTHER CODES

This section is not applicable.

9.0 CODE COMPLIANCE RESEARCH REPORT USE

9.1 The approval of building products is the responsibility of the Authority Having Jurisdiction.

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

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

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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
Alternative to thermal barrier/ignition barrier	2603.4	R316.4	Not applicable
Air permeability	1203.3 [1301]	R806.5 [R806.4]	C402.4 R402.4
Vapor permeance	202, 1405.3	202, R702.7 [R601.3]	Not applicable
Alternative to water-resistive barrier	1404.2	R703.2	Not applicable
Exterior walls in Types I-IV construction	2603.5	Not applicable	Not applicable
Thermal resistance	1301	N1101.10 N1102 [N1101.1, N1101.12]	C303.1.1 C303.1.4 R303.1.1 R303.1.4 [303.1]

¹ Section numbers refer to the 2015 Codes with 2012 and 2009 Codes in parentheses, if different.

TABLE 2 – Bayseal® CC X and CC XP THERMAL RESISTANCE (R Values)^{1,2,3}

THICKNESS (inches)	R-VALUE (°F.ft ² .h/Btu)
1.0	6.9
2.0	14
3.0	21
3.5	24
4.0	28
5.0	34
5.5	38
6.0	41
7.0	48
7.25	50
8.0	55
9.0	62
10.0	69
11.0	76
11.25	78

¹ R-values are calculated based on tested k-factors at 1 inch and 3-1/2 inches thicknesses.

² R-values less than 10 are rounded to the nearest 1/10th; greater than 10 are rounded to the nearest whole number.

³ To determine R-values for thicknesses not listed: between 1 inch and 3-1/2 inch are calculated through linear interpolation or greater than 3-1/2 inch are calculated based on R = 6.90/inch.





TABLE 3 – USE OF INSULATION WITHOUT A PRESCRIPTIVE THERMAL BARRIER

INSULATION TYPE	MAXIMUM THICKNESS (in) (Wall Cavities and Attic Floor)	MAXIMUM THICKNESS (in) (Underside of Roof Sheathing/Rafters and Floors)	INTUMESCENT COATING, MINIMUM THICKNESS & TYPE (Applied to all Exposed Foam Surfaces)	MINIMUM APPLICATION RATE OF INTUMESCENT COATING	MAY BE LEFT EXPOSED AS AN INTERIOR FINISH	TEST SUBMITTED (AC377)
CC X, CC XP	7-1/4	9-1/4	TPR ² Fireshell® BMS-TC 26 wet mils (14 dry mils)	1.62 gal / 100 ft ²	Yes	NFPA 286
	7-1/2	9-1/2	DC315 20 wet mils (13 dry mils)	1.25 gal / 100 ft ²	Yes	NFPA 286

For **SI**: 1 inch = 25.4 mm; 1 mil = 0.0254 mm; 1 gallon = 3.38 L; 1 ft² = 0.93 m²

TABLE 4 – USE OF INSULATION IN ATTICS AND CRAWL SPACES WITHOUT A PRESCRIPTIVE IGNITION BARRIER

INSULATION TYPE	MAXIMUM THICKNESS (in) (Wall Cavities and Attic Floor)	MAXIMUM THICKNESS (in) (Underside of Roof Sheathing/Rafters and Floors)	INTUMESCENT COATING, MINIMUM THICKNESS & TYPE (Applied to all Exposed Foam Surfaces)	MINIMUM APPLICATION RATE OF INTUMESCENT COATING	TEST SUBMITTED (AC377)
CC X, CC XP	7-1/4	11-1/4	None	N/A	Appendix X

For **SI**: 1 inch = 25.4 mm; 1 mil = 0.0254 mm; 1 gallon = 3.38 L; 1 ft² = 0.93 m²