ICC-ES Evaluation Report

ESR-2629

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

REPORT HOLDER:

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EVALUATION SUBJECT:

FOAM-LOK FL2000 (ALSO KNOWN AS AIR TIGHT CC OR GUARDFOAM 55 CC) SPRAY FOAM INSULATION

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2009 *International Building Code*® (IBC)
- 2009 *International Residential Code*® (IRC)
- 2009 *International Energy Conservation Code*® (IECC)
- Other Codes (see Section 8)

Properties evaluated:

- Surface-burning characteristics
- Physical properties
- Thermal resistance
- Attic and crawl space installation
- Air permeability
- Vapor retardance

2.0 USES

Foam-Lok FL2000 (also known as Air Tight CC or GuardFoam 55 CC) spray foam insulation is used as a nonstructural thermal insulating material in Type V-B construction under the IBC and dwellings under the IRC. The insulation is for use in wall cavities, floor assemblies or ceiling assemblies, and in attic and crawl space applications as described in Section 4.4.

3.0 DESCRIPTION

3.1 General:

Foam-Lok FL2000 spray foam insulation is medium-density, semirigid, cellular polyurethane foam plastic that is installed as a nonstructural component of floor/ceiling assemblies, wall assemblies and attic and crawl spaces. The material is a two-component, closed-cell, one-to-one-by-volume spray foam with a nominal density of 2.0 pcf (32 kg/m^3). The polyurethane foam is produced in the field by combining a polymeric isocyanate (A) component and a resin (B) component. The products have a shelf life of six months when stored in factory-sealed containers at temperatures between 50°F and 80°F (10°C and 27°C). The insulation liquid components are supplied in nominally 55-gallon (208 L) drums.

Foam-Lok FL2000 spray foam insulation is considered air-impermeable in accordance with IRC Section R806.4 based on testing in accordance with ASTM E 283.

3.2 Surface-burning Characteristics:

The insulation at a maximum thickness of 4 inches (102 mm) and a nominal density of 2.0 pcf (32 kg/m^3) has a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84. Thicknesses up to 12 inches (305 mm) in wall cavities and 12 inches (305 mm) in ceiling cavities are recognized based on room corner testing in accordance with NFPA 286. Thicknesses up to $10^1/_2$ inches (267_mm) for wall cavities and $11^1/_2$ inches (292 mm) for ceiling cavities in attics and crawl spaces are recognized based on diversified fire tests.

3.3 Thermal Resistance *R*-values:

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

3.4 Vapor Retarder:Vapor Retarder:

Foam-Lok FL2000 spray foam insulation has a vapor permeance of less than 1 perm ($5.7x10^{-11}$ kg/Pa-s-m^2) when applied at a minimum thickness of 2 inches (51 mm), and may be used where a vapor retarder is required by the applicable code.

4.0 INSTALLATION

4.1 General:

Foam-Lok FL2000 spray foam insulation must be installed in accordance with the manufacturer's published installation instructions, the applicable code and this report. A copy of the manufacturer's published installation instructions must be available at all times on the jobsite during installation.

4.2 Application:

The insulation is spray-applied on the jobsite using a volumetric positive displacement pump as identified in the LaPolla application instructions. The insulation may be used for application to wood, metal, concrete, masonry and gypsum surfaces. The Foam-Lok FL2000 resin "B" component must be stored at temperatures between 50°F (10°C) and 80°F (27°C). The insulation must be used in

areas where the maximum ambient temperature is equal to or less than 180°F (82°C). The foam plastic must not be used in electrical outlet or junction boxes or in contact with water. 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.

The insulation must be applied at a minimum thickness of 1 inch (25.4 mm) per pass, and a maximum thickness of 2 inches (51 mm) per pass, up to the maximum thicknesses as specified in Sections 3.2, 4.3 and 4.4.

4.3 Thermal Barrier:

The Foam-Lok FL2000 spray foam insulation must be separated from the interior of the building by an approved thermal barrier of minimum $^1/_2$-inch-thick (12.7 mm) gypsum wallboard 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, except when installation is in attics and crawl spaces as described in Section 4.4. Thicknesses of up to 12 inches (305 mm) for ceiling cavities and 12 inches (305 mm) for wall cavities are recognized, based on room corner fire testing in accordance with NFPA 286.

4.4 Attics and Crawl Spaces:

4.4.1 Application with a Prescriptive Ignition Barrier: When Foam-Lok FL2000 spray foam 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 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 the foam plastic insulation is not exposed. Foam-Lok FL2000 may be left exposed in areas where the code calls for prescriptive ignition barriers based on testing in accordance with Appendix of AC377, in maximum thicknesses specified in Section 4.4.2. Foam-Lok FL2000 spray foam insulation as described in this section may be installed in unvented attics in accordance with IRC Section R806.4.

4.4.2 Application without a Prescriptive Ignition Barrier: Where Foam-Lok FL2000 spray foam insulation is installed without a prescriptive ignition barrier in attics and crawl spaces in accordance with this section, the following conditions apply:

- Entry to the attic or crawl space is only to service utilities and no storage is permitted.
- 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.
- Under-floor (crawl space) ventilation is provided in accordance with IBC Section 1203.3 or IRC Section R408.1, as applicable.
- 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 Section R806.4 of the IRC.
- The foam plastic insulation is limited to the maximum thickness and density [2.0 pcf (32 kg/m^3)] tested.
- Combustion air is provided in accordance with IMC Sections 701 and 703.

Foam-Lok FL2000 spray foam insulation may be spray-applied to the underside of roof sheathing and/or rafters, and the underside of wood floors and/or floor joists in crawl spaces as described in this section. The thickness of the foam plastic applied to the underside of the wood floor and roof sheathing must not exceed $11^1/_2$ inches (292 mm). The spray foam insulation applied to vertical wall surfaces in attics and crawl spaces must not exceed $10^1/_2$ inches (267 mm). Foam-Lok FL2000 spray foam insulation, as described in this section, may be installed in unvented attics in accordance with IRC Section R806.4.

4.4.3 Use on Attic Floors:

Foam-Lok FL2000 spray foam insulation may be installed exposed at a maximum thickness of $10^1/_2$ inches (267 mm) between and over the joists in attic floors. The insulation must be separated from the interior of the building by an approved thermal barrier. The ignition barrier required IBC Section 2603.4.1.6 and IRC Section R316.5.3 may be omitted.

5.0 CONDITIONS OF USE

The Foam-Lok FL2000 spray foam 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 The Foam-Lok FL2000 spray foam insulation must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. The instructions within this report govern if there are any conflicts between the manufacturers' published installation instructions and this report.

5.2 The insulation must be separated from the interior of the building by an approved 15-minute thermal barrier, except when installation is in attics and crawl spaces as described in Section 4.4.

5.3 The insulation must not exceed the density and thicknesses noted in Sections 3.2, 4.3 and 4.4 of this report.

5.4 The insulation must be protected from the weather during and after application.

5.5 The insulation must be applied by contractors certified by LaPolla Industries, Inc.

5.6 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.

5.7 The insulation has been evaluated only for use in Type V-B construction under the IBC and non-fire-resistance rated assemblies in dwellings under the IRC.

5.8 Jobsite certification and labeling of the insulation must comply with IRC Section N1101.4 and IECC Section 102.1.1, and IECC Sections 303.1.1 and 303.1.2, as applicable.

5.9 The insulation is produced in Houston, Texas, under a quality control program with inspections by Intertek Testing Services NA Ltd. (AA-657).

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated June 2009, including reports of tests in accordance with Appendix X of AC377.

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

6.3 Reports of room corner fire testing in accordance with NFPA 286.

7.0 IDENTIFICATION

Components for the Foam-Lok FL 2000 spray foam insulation are identified with the manufacturer's name (LaPolla Industries, Inc.), address and telephone number; the product trade name (Foam-Lok FL2000); use instructions; the density; the flame-spread and smoke-development indices; the evaluation report number (ESR-2629); and the name of the inspection agency (Intertek Testing Services NA Ltd.)

8.0 OTHER CODES

8.1 Evaluation Scope:

In addition to the codes listed in Section 1.0, the products recognized in this report have been evaluated for compliance with the following codes:

- 2006 *International Building Code*® (2006 IBC)
- 2006 *International Residential Code*® (2006 IRC)
- 2006 *International Energy Conservation Code*® (2006 IECC)
- BOCA® *National Building Code*/1999 (BNBC)
- 1999 *Standard Building Code*© (SBC)
- 1997 *Uniform Building Code*™ (UBC)

8.2 Uses:

See Section 2.0.

8.3 Description:

See Section 3.0.

8.4 Installation:

8.4.1 General: See Section 4.1.

8.4.2 Application: See Section 4.2.

8.4.3 Thermal Barrier: See Section 4.3.

8.4.4 Attics and Crawl Spaces: See Section 4.4, except attic ventilation must be in accordance with the applicable code.

8.5 Conditions of Use:

The Foam-Lok FL2000 insulation described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 8.1 of this report, subject to the following conditions:

8.5.1 See Sections 5.1 through 5.5 and 5.9 of this report.

8.5.2 In jurisdictions adopting the SBC, use of the insulation system in areas where the probability of termite infestation is "very high" must be in accordance with SBC Section 2304.1.4.

8.5.3 The insulation has been evaluated only for use in Type V-B construction under the IBC and dwellings under the IRC, Type VI construction under SBC, Type V-N construction under UBC and Type 5-B construction under the BNBC.

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

THICKNESS (INCH)	*R*-VALUE (°F.ft^2.h/Btu)
ASTM C 518 TESTED VALUES	
1	6
4	24
CALCULATED *R*-VALUES[1]	
2	12
3	18
3.5	21
5	32
6	38
7	44
8	51
9	57
10	63
10.5	66.6
11	70
11.5	73
12	76

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

[1]Calculated *R*-values greater than 4 inches are based on tested K values at a 4-inch thickness.