Code Compliance Research Report
CCRR-1009

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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:
GacoFireStop2 F5001 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)

GacoFireStop2 F5001 insulation has been evaluated for the following properties:

- Surface-burning characteristics
- Physical properties
- Thermal resistance
- Attic and crawl space installation
- Air permeability
- Alternatives to Thermal Barriers
- 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 showed in brackets where they differ.

2.0 USES

GacoFireStop2 F5001 spray-applied polyurethane foam insulation is used as a nonstructural thermal insulating material on or in interior and exterior walls, floors, ceilings and roofs. When used in exterior walls of buildings constructed under the IBC, its use is limited to Type V-B construction. Under the IRC, the insulation may be used as air-impermeable insulation when installed in accordance with Section 3.1.3.

3.0 DESCRIPTION

3.1 GacoFireStop2 F5001:

GacoFireStop2 F5001 insulation is a semi-rigid, open cell, low-density, polyurethane foam plastic. The insulation is a two-component spray foam plastic with a nominal in-place density of 0.5 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/or 250-gallon totes and must be stored at temperatures between 50ºF and 100ºF. The resin (B component) must be protected from freezing temperatures. GacoFireStop2 F5001 has a shelf life of 1 year on the polymeric isocyanate (A component) and 6 months on the resin (B component) when stored in factory-sealed containers at these temperatures.

3.1.1 Surface-burning Characteristics:

The insulation, at a maximum thickness of 4 inches and a nominal density of 0.5 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. Based on large scale tests in accordance with NFPA 286, GacoFireStop2 F5001 can be installed at greater thicknesses as described in Sections 4.3 and 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.

3.1.2 Thermal Resistance, R-values:

The insulation has thermal resistance (R-value) at a mean temperature of 75ºF as shown in Table 2.

3.1.3 Air Permeability:

GacoFireStop2 F5001 insulation, at a minimum thickness of 1 inch, is considered air-impermeable insulation in accordance with 2015 IBC Section 1203.3 [not applicable in the 2012 and 2009 IBC] or IRC Sections R202 and R806.5 [2009 - R806.4] of the IRC, based on testing in accordance with ASTM E283.

3.2 DC 315 Intumescent Coating:

DC 315 intumescent coating is a water-based coating manufactured by IFTI, Paint to Protect, and is supplied in 5-gallon pails and 55-gallon drums. The coating material has a shelf life of 24 months when stored in factory-sealed containers at temperatures between 41°F and 95°F.

4.0 INSTALLATION

4.1 General:

GacoFireStop2 F5001 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:

GacoFireStop2 F5001 insulation is spray-applied on the jobsite using a volumetric positive displacement pump as identified in the Gaco Western application instructions. The insulation must be applied when the ambient temperature is greater than 32ºF. The insulation must not be used in areas that have a maximum in-service temperature greater than 200ºF. 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. The insulation must be protected from the weather during and after application. The insulation may be applied to the maximum thickness in a single pass. Where insulation is used as an air-impermeable insulation, such as in unvented attic assemblies under 2015 IBC Section 1203.3 or IRC Section R806.5 [2009 - R806.4], the insulation must be installed at a minimum thickness of 1 inch.

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier:

GacoFireStop2 F5001 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 Sections 4.3.2 and 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.

4.3.2 Application without a Prescriptive Thermal Barrier:

Gaco FireStop2 F5001 insulation may be installed without the 15-minute thermal barrier prescribed in IBC Section IBC Section 2603.4 and IRC Section R316.4, when installed as described in this section. The thickness of the foam plastic insulation applied to the underside of the roof sheathing, floors and walls must not exceed 18 inches. The foam plastic must be covered on all surfaces with one coat of DC 315 coating at an application rate of 88 square feet per gallon [18 mils nominal wet film thickness, 12 mils dry film thickness]. The coating must be applied over the insulation in accordance with the coating manufacturer's instructions and this report. Surfaces to be coated must be dry, clean, and free of dirt, loose debris and other substances that could interfere with adhesion of the coating. The coating is applied with low-pressure airless spray equipment.

4.4 Attics and Crawl Spaces:

The insulation may be applied in attics and crawlspaces as described in either 4.4.1 or 4.4.2. When foam insulation installed in an attic or crawlspace in accordance with this section, a thermal barrier is not required between the foam 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 GacoFireStop2 F5001 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. GacoFireStop2 F5001 insulation as described in this section may be installed in unvented attics in accordance with IBC Section 1203.3 or IRC Section R806.5 [R806.4] at a minimum thickness of 1 inch (25.4 mm).

4.4.2 Application without a Prescriptive Ignition Barrier:

4.4.2.1 General:

GacoFireStop2 F5001 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 1203.4 [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 2015 IBC Section 1203.3 [not applicable under the 2012 or 2009 IBC] or IRC Section R806.5 [2009 - R806.4].

f. Combustion air is provided in accordance with IMC (International Mechanical Code) Section 701 [Sections 701 and 703].

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 1 inch.

4.4.2.2 Application of Insulation without an Intumescent Coating:

In attics and crawlspaces GacoFireStop2 F5001 insulation may be applied to horizontal, sloped and vertical surfaces including sheathing and structural members. The thickness of the foam plastic must not exceed 15 inches (381 mm). The insulation may be installed without prescriptive ignition barrier required by IBC Section 2603.4.1.6 or IRC Sections R316.5.3 and R316.5.4, or a protective coating.

4.4.2.3 Use on Attic Floors:

The GacoFireStop2 F5001 insulation may be installed exposed (no coating) at a maximum thickness of 15 inches between and over the joists in attic floors. The insulation must be separated from the interior of the building by 1/2 inch gypsum or an approved thermal barrier. The insulation may be installed without prescriptive ignition barrier required by IBC Section 2603.4.1.6 or IRC Section R316.5.3 and R316.5.4 or a protective coating.

5.0 CONDITIONS OF USE

GacoFireStop2 F5001 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.

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 approved by Gaco Western, LLC.

5.5 The insulation must be installed with a vapor retarder when required by the applicable code.

5.6 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 [2012 - 2603.9] [2009 - 2603.8], as applicable.

5.7 Jobsite certification and labeling of the insulation must comply with IRC Section N1101.10 [2012 – N1101.12] [2009 – N1101.4] and IECC Sections C303.1 or R303.1 [2009 – 303.1] as applicable.

5.8 The insulation is produced in Waukesha, Wisconsin, under a quality control program with inspections by Intertek Testing Services NA, Inc. (AA-647).

6.0 EVIDENCE SUBMITTED

6.1 Reports of tests in accordance with ASTM C518, ASTM E84, ASTM E283, and NFPA 286.

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 "GacoFireStop2 F5001 Spray-Applied Polyurethane Foam Insulation".

7.0 IDENTIFICATION

The A and B components of the insulation are identified with the manufacturer's name (Gaco Western, LLC), address and telephone number, the product name (GacoFireStop2 F5001); use instructions; the flame spread and smoke-development indices; the lot number; the Intertek Mark and the Code Compliance Research Report number (CCRR-1009).

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
Thermal barrier/ignition barrier	2603.4	R316.4	Not applicable
Air permeability	1203.3[1301]	R806.5 [2009 - R806.4]	C402.4 R402.4
Thermal resistance	1301	N1101.10 N1102 [N1101.1, N1101.12]	C303.1.1 C303.1.4 R303.1.1 R30301.4 [303.1.1 and 303.1.2]

[1] Section numbers refer to 2015 Codes with 2012 and 2009 Codes in parentheses where different

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

THICKNESS (inches)	R-VALUE (°F.ft^2.h/Btu)
1	4.1
3.3	13
3.5	14
3.8	15
4	16
5	20
5.5	22
6	24
7	28
7.25	29
7.6	30
8	32
9	35
9.25	36
9.6	38
10	39
11	43
12	47
12.4	49
13	51
14	55
15	59
15.2	60
16	63

[1] R-values are calculated based on tested K-values at 1 inch and 3.5 inches 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 3.5 inches can be determined through linear interpolation or
b. Greater than 3.5 inches can be calculated based on R= 3.94/inch