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FIRESTABLE FS 2.0 CLOSED CELL SPRAY FOAM

CSI Section:
07 21 00 Thermal Insulation

1.0 RECOGNITION

Firestable Insulation Company Firestable FS 2.0 closed cell spray foam recognized in this report has been evaluated for use as thermal insulation. The physical characteristics, surface burning characteristics, thermal resistance properties, and attic and crawl space installations of the spray foam complies with the intent of the provisions of the following codes and regulations:

- 2021, 2018, and 2015 International Building Code® (IBC)
- 2021, 2018, and 2015 International Residential Code® (IRC)
- 2021, 2018, and 2015 International Energy Conservation Code (IECC)
- 2023 and 2020 Florida Building Code, Building (FBC, Building) – attached Supplement
- 2023 and 2020 Florida Building Code, Residential (FBC, Residential) – attached Supplement
- 2023 and 2020 Florida Building Code, Energy (FBC, Energy) – attached Supplement

2.0 LIMITATIONS

Use of the Firestable FS 2.0 closed cell spray foam recognized in this report is subject to the following limitations:

2.1 The Firestable FS 2.0 closed cell spray foam shall be installed in accordance with the applicable code, the manufacturer's published installation instructions, and this report. Where there is a conflict, the most restrictive requirements shall govern.

2.2 The insulation shall not exceed the nominal density and thickness as shown in this report.

2.3 During installation, the insulation and the surfaces to which it is applied shall be protected from exposure to weather.

2.4 The contractors that will be installing the insulation shall be approved by Firestable Insulation Company.

2.5 Use of the insulation in areas of "very heavy" termite infestation shall be in accordance with the IBC Section 2603.8 or IRC Section 318.4, as applicable.

2.6 Labeling and jobsite certification of the insulation and coatings shall comply with IBC Section 2603.2; 2021, 2018 and 2015 IRC N1101.10 and N1101.10.1.1; Sections N1101.12, N1101.12.1, and N1101.4.1; and IECC Sections C303.1.1 and C303.1.2, as applicable.

2.7 Foam plastic used in plenums as interior finish or interior trim shall comply with Section 2603.7 of the IBC.

2.8 Fire-resistance ratings are beyond the scope of this review. Where fire-resistance rated assemblies are required by the IBC or IRC, documentation shall be provided to the building official showing compliance.

2.9 When Firestable FS 2.0 closed cell spray-applied foam plastic insulation is used in exterior walls of Types I through IV construction, documentation shall be provided to the building official to show compliance with Section 2603.5 of the IBC and Section 3.4 of this report.

2.10 The Firestable FS 2.0 closed cell spray-applied foam plastic insulation recognized in this report is produced by Firestable Insulation Company in Essex, Connecticut, and Houston, Texas**.**

3.0 PRODUCT USE

3.1 General: When installed in accordance with Section 3.3 of this report, Firestable FS 2.0 closed cell spray foam insulation can be used in wall cavities, floor assemblies and ceiling assemblies, and in attic and crawl spaces as nonstructural thermal insulation material. The spray-applied foam plastic insulation is used in Types I through V construction under the IBC and in dwellings under the IRC, except as noted in Section 2.8 and 2.9 of this report.

3.2 Design: Firestable FS 2.0 closed cell spray foam insulation shall comply with requirements in IECC Sections C402.1 and R402.

3.2.1 Thermal Resistance (R-Values): Firestable FS 2.0 closed cell spray foam insulation has a thermal resistance (R-Value) at a mean temperature of 75°F (24°C) as shown in Table 1 of this report.

TABLE 1 - Thermal Resistance (R-Values)	
Thickness (inch)	Firestable FS 2.0
	R-Value (°F•ft²•h/Btu)
1	5.0
1.25	6.2
1.5	7.4
1.75	8.7
2	9.9
2.25	11
2.5	12
3	15
3.5	17
4	19
5	24
6	29
7	34
8	38

For **SI:** 1 inch = 25.4 mm, 1°F·ft²·h/Btu = 0.176 110 K·m²/W

3.2.2 Surface Burning Characteristics: At a maximum thickness of 4 inches (102 mm), Firestable FS 2.0 closed cell spray foam insulation 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.

Thicknesses beyond what is allowed for ceiling cavities and wall cavities in Section 3.3.2, shall be covered by a code complying prescriptive thermal barrier, such as minimum ½-inch (12.7 mm) thick gypsum board.

In accordance with IBC Section 803.2, Firestable FS 2.0 can be top-coated with up to 0.036-inch (0.091 mm) maximum thickness of coatings.

3.2.3 Water Vapor Transmission: When tested to the requirements of ASTM E96, water method, at a thickness of 1 inch (2.54 mm), Firestable FS 2.0 closed cell spray foam insulation has a Vapor Retarder Classification of Class I, when installation is in accordance with the 2021 IBC and 2021 IRC.

3.3 Installation:

3.3.1 Installation General: The manufacturer's published installation instructions for Firestable FS 2.0 closed cell spray foam insulation and this report shall be available and strictly adhered to at all times on the jobsite during installation.

The spray foam insulation shall be spray-applied on the jobsite up to the maximum insulation thickness specified in this report, using a volumetric positive displacement pump in accordance with the manufacturer's published installation instructions.

The maximum in-service temperature for all areas shall not exceed 180°F (82°C). The spray-applied foam plastic insulation shall not be used in electrical outlets or junction boxes or in continuous contact with rain or water. The spray-applied foam plastic insulations shall be sprayed onto a substrate that is protected and clean from any debris or weather-related conditions during application.

3.3.2 Installation as an Equivalent Thermal Barrier Material: Firestable FS 2.0 closed cell spray foam may be used as an equivalent thermal barrier material meeting the Temperature Transmission Fire Test and the Integrity Fire Test acceptance criteria of NFPA 275, as required in Section 2603.4 of the IBC, when applied as required in QAI Laboratories listing report B1134-1.

3.4 Use in Exterior Walls of Types I, II, III, and IV Construction:

3.4.1 General: When Firestable FS 2.0 closed cell spray foam insulation is used in exterior walls of Types I, II, III, and IV construction of any height, the insulation shall comply with IBC Section 2603.5 and Section 3.4 of this report.

3.4.2 Complying Exterior Wall Assemblies: Wall assemblies that comply with Section 2603.5.5 of the IBC and this report, that may be used in exterior walls of buildings of Type I, II, III, or IV construction of any height, are described in Table 2 of this report.

3.4.3 Potential Heat of Combustion: When tested to NFPA 259, Firestable FS 2.0 closed cell spray foam insulation has a potential heat of combustion of 8,214 BTU/lb (19.1 MJ/kg) (1,574 BTU/ft² per inch of thickness).

3.5 Use to Increase Fire-Resistance: Firestable FS 2.0 may be used to increase fire resistance when used as part of a calculated fire assembly in Table 722.1.4 (2) of the IBC. The time is assigned based on the thickness of Firestable FS 2.0 as described in Table 3 of this report.

4.0 PRODUCT DESCRIPTION

Firestable FS 2.0 closed cell spray foam insulation is a spray-applied, polyurethane closed cell foam plastic and complies as a medium-density insulation in accordance with Section 3.1.1 and Table 1 of AC377. The insulation is a two-component spray foam plastic with a nominal in-place density of 2.4 pcf +/- 10% (67 kg/m³).

The spray-applied insulation is mixed in the field by combining a polymeric isocyanate (A component) and a resin blend (B component). The liquid components shall be stored in 55-gallon (208 L) drums at temperatures between 50°F and 90°F (10°C and 32°C). When Component A and Component B are stored in factory-sealed containers at the recommended temperatures, the maximum shelf life is six months.

5.0 IDENTIFICATION

Firestable FS 2.0 closed cell spray foam insulation is identified by the Firestable Insulation Company name,

address and phone number; product name, flame spread index and smoke developed index, date of manufacture, and the evaluation report number (ER-857).

The IAPMO Uniform Evaluation Service Mark of Conformity may also be used as shown below:

IAPMO UES ER-857

6.0 SUBSTANTIATING DATA

6.1 Data in accordance with the Acceptance Criteria for Spray-applied Foam Plastic Insulation, ICC-ES AC377, dated April 2020, (editorially revised July 2020).

6.2 Data in accordance with IAPMO ES1000-2020, Building Code Compliance of Spray-Applied Polyurethane Foam.

6.3 Data in accordance with ICC 1100-2019, Standard for Spray-applied Polyurethane Foam Plastic Insulation.

6.4 Reports of testing and evaluation of flame propagation in accordance with NFPA 285.

6.5 Testing to the requirements of NFPA 259.

6.6 Engineering analysis of the fire-resistance testing to determine finish ratings based on thickness.

6.7 Test reports are from laboratories in compliance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on Firestable Insulation Company's Firestable FS 2.0 closed cell spray foam insulation to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification. Products are manufactured at locations noted in Section 2.10 of this report under a quality control program with periodic inspection under the supervision of IAPMO UES.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org

TABLE 2 – NFPA 285 COMPLYING EXTERIOR WALL ASSEMBLIES WITH FIRESTABLE FS 2.0 APPLIED IN WALL STUD CAVITY

Wall Component	Material Description
Base Wall	Steel Stud Wall - 1 layer of ⅝-inch minimum Type X gypsum wallboard installed on the interior side of minimum 3⅝-inch deep No. 20 gauge steel studs spaced a maximum of 24 inches on center – lateral bracing optional.
Fire-Stopping in Stud Cavity at Floor Lines	4-inch 4 pcf mineral wool (friction fit or installed with Z-Clips)
Cavity Insulation	Firestable FS 2.0 up to full cavity stud cavity fill ($3^{5}/_{8}$-inch maximum foam thickness with $3^{5}/_{8}$ -inch stud depth)
Exterior Sheathing Use Item 1 or 2	1) 5/8-inch minimum Type X Exterior Gypsum sheathing meeting ASTM C1396/1396M or Type X glass mas gypsum sheathing meeting ASTM C1177. 2) 5/8-inch minimum DensElement with DensDefy joint sealant.
Exterior Insulation Use Item 1 or 2	1) None. 2) Minimum 2-inch, minimum 4 pcf noncombustible mineral wool.
NFPA 285 Complying System over Base Wall	Any NFPA 285 tested/approved exterior wall design (WRB/insulation/cladding). Note- When the exterior sheathing is Item 2 above (DensElement) or sheathing Ite 1 or 2, covered with insulation #2 (mineral wool), then the claddings below (Item 1, a-c) or Item 2(a-i) may be used. Note – If exterior insulation Item #2 is used (mineral wool), then any WRB may cover exterior sheathing Item 1.
Exterior Cladding Use any cladding listed in 1 or 2. Item 1 – max air gap cannot exceed the air gap tested. Item 2 may use any air gap.	1) Any Combustible Cladding that has passed NFPA 285 (examples below) a. NFPA 285 Tested/Approved MCM/ACM Metal Aluminum Composite building panels. b. NFPA 285 Tested/Approved stone/aluminum honeycomb composite c. NFPA 285 Tested/Approved HPL High-Pressure Laminate 2) Any noncombustible cladding such as (but not limited to) a. Brick – Standard type brick veneer anchors, installed a maximum of 24 inches on center, vertically on each stud with maximum 1-inch air gap between exterior insulation and brick. Brick to be standard nominal 4-inch-thick clay brick installed in a running bond pattern using Type S mortar. b. Stucco – Minimum ¾-inch thick, exterior plaster and lath. A secondary water resistive barrier (WRB) can be installed between the exterior insulation and lath. The secondary WRB shall not be full coverage asphalt or butyl based self-adhered membranes. c. Minimum 2-inch-thick natural stone (granite, limestone, marble or sandstone). Any standard non-open joint installation technique shall be used. d. Architectural cast stone – 2 ½ -inch minimum thickness e. Terra Cotta Cladding – 1 ¼ - inch minimum thickness f. ¼-inch-thick glass reinforced concrete panels (installed per manufacturer's instructions) g. Concrete – 2 inches thick minimum h. CMU Blocks – 4 inches thick minimum i. Sheet metals such as aluminum, copper, zinc, or steel – any thickness.
Window/Door Perimeters	Framed as required for base wall. Use 25-gauge sheet steel for flashing area outside of base wall.

For **SI:** 1 inch = 25.4 mm

TABLE 3- FINISH RATING OF FIRESTABLE FS 2.0[1]

Finish Rating (minutes)	Nominal Average Thickness of Firestable FS 2.0 (inches)
15	2.375
20	3.25
25	4.375
30	5.5
35	7.0
40	8.375

For **SI:** 1 inch = 25.4 mm

[1] Interpolation shall not be taken for the values in this table.

FLORIDA SUPPLEMENT

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1.0 SCOPE OF EVALUATION

- 2023 and 2020 Florida Building Code, Building (FBC, Building)
- 2023 and 2020 Florida Building Code, Residential (FBC, Residential)
- 2023 and 2020 Florida Building Code, Energy (FBC, Energy)

2.0 FINDINGS

Firestable FS 2.0 closed cell spray foam plastic insulation reported in IAPMO UES Evaluation Report ER-857 is a satisfactory building product alternative to those prescribed in the FBC, Building; FBC, Residential; and the FBC, Energy. Installation of the foam plastic insulation shall be in accordance with the 2021 or 2018 International Building Code, 2021 or 2018 International Residential Code, and the 2021 or 2018 International Energy Code as noted in ER-857, as applicable. Firestable FS 2.0 closed cell spray foam plastic insulation complies with the High-velocity Hurricane Zone provisions of the FBC, Building, and FBC, Residential.

3.0 LIMITATIONS

Use of Firestable FS 2.0 closed cell spray foam plastic insulation recognized in this report supplement is subject to the following limitations:

3.1 In order to provide for inspection for termite infestation, clearance between exterior wall coverings and final earth grade on the exterior of a building shall not be less than 6 inches (152 mm) in accordance with Section 1403.7 of the FBC, Building or Section R704 of the FRC, Residential.

3.2 This supplement expires concurrently with ER-857.

4.0 STATE PRODUCT APPROVAL

For products falling under Florida Rule 61G20-3.001, verification shall be provided that a quality assurance agency audits the manufacturer's quality assurance program and audits the production quality of products, in accordance with Section (5)(d) of Florida Rule 61G20-3.008. The quality assurance agency shall be approved by the Commission (or the building official when the report holder does not possess an approval by the Commission).