



CERTIFICATION



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Technical Evaluation Report

TER 1810-01

Use of Icynene-Lapolla® Foam-LOK FL-450 & Foam-LOK FL 750 Spray Polyurethane Foam (SPF) in Unvented Attics & Crawlspace

Icynene-Lapolla®

Product:

Foam-LOK FL-450 and Foam-LOK FL-750

Issue Date:

March 1, 2019

Revision Date:

April 6, 2020

Subject to Renewal:

April 1, 2021





COMPANY
INFORMATION:

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DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

SECTION: 07 21 19 - Foamed-in-Place Insulation

SECTION: 07 27 36 - Sprayed Foam Air Barrier

1 PRODUCTS EVALUATED¹

1.1 Foam-LOK FL-450 and Foam-LOK FL-750

2 APPLICABLE CODES AND STANDARDS^{2,3}

2.1 Codes

- 2.1.1 *IBC—12, 15, 18: International Building Code®*
- 2.1.2 *IRC—12, 15, 18: International Residential Code®*
- 2.1.3 *IECC—12, 15, 18: International Energy Conservation Code*

2.2 Standards and Referenced Documents

- 2.2.1 *ASTM A283: Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates*
- 2.2.2 *ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*
- 2.2.3 *ASTM D1622: Standard Test Method for Apparent Density of Rigid Cellular Plastics*
- 2.2.4 *ASTM D1623: Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics*
- 2.2.5 *ASTM D2126: Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging*
- 2.2.6 *ASTM D2842: Standard Test Method for Water Absorption of Rigid Cellular Plastics*

¹ Building codes require data from valid [research reports](#) be obtained from [approved sources](#). Agencies who are accredited through ISO/IEC 17065 have met the [code requirements](#) for approval by the [building official](#). DrJ is an ISO/IEC 17065 ANAB-Accredited Product Certification Body – Accreditation #1131.

Through ANAB accreditation and the [IAF MLA](#), DrJ certification can be used to obtain product approval in any [jurisdiction](#) or country that has [IAF MLA Members & Signatories](#) to meet the [Purpose of the MLA](#) – “certified once, accepted everywhere.”

Building official approval of a licensed [registered design professional](#) (RDP) is performed by verifying the RDP and/or their business entity complies with all professional engineering laws of the relevant [jurisdiction](#). Therefore, the work of licensed RDPs is accepted by [building officials](#), except when plan (i.e. peer) review finds an error with respect to a specific section of the code. Where this TER is not approved, the [building official](#) responds in writing stating the reasons for [disapproval](#).

For more information on any of these topics or our mission, product evaluation policies, product approval process, and engineering law, visit drjcertification.org or call us at 608-310-6748.

² Unless otherwise noted, all references in this TER are from the 2018 version of the codes and the standards referenced therein (e.g., *ASCE 7*, *NDS*, *ASTM*). This material, design, or method of construction also complies with the 2000-2015 versions of the referenced codes and the standards referenced therein.

³ All terms defined in the applicable building codes are italicized.



- 2.2.7 *ASTM D6226: Standard Test Method for Open Cell Content of Rigid Cellular Plastics*
- 2.2.8 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*
- 2.2.9 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*
- 2.2.10 *ASTM E96: Standard Test Method for Water Vapor Transmission of Materials*
- 2.2.11 *NFPA 286: Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*
- 2.2.12 *UL 723: Test for Surface Burning Characteristics of Building Materials*

3 PERFORMANCE EVALUATION

3.1 IBC and IRC Compliance

- 3.1.1 This TER assesses Foam-LOK FL-450 and Foam-LOK FL-750 for the following:
 - 3.1.1.1 Physical properties of the product in accordance with the standards listed in Section 2.
 - 3.1.1.2 Surface burning characteristics complying with the provisions of IBC Section 2603.3 and IRC Section R316.3.
 - 3.1.1.3 Thermal performance (R-values) complying with the provisions of IRC Section N1102 and IECC Section C402.
 - 3.1.1.4 Use in unvented attic spaces and crawlspaces without a thermal barrier in accordance with IBC Section 2603.9.4 and IRC Sections R316.4 and R316.6.
 - 3.1.1.5 Use without a thermal barrier in accordance with IBC Section 2603.3 and IRC Section R316.3 when No-Burn® Plus ThB intumescent coating is applied.
 - 3.1.1.6 Air permeability in accordance with IRC Section N1102.4, and IECC Sections C402.5 and R402.4.

- 3.2 Any code compliance issues not specifically addressed in this section are outside the scope of this TER.
- 3.3 Any engineering evaluation conducted for this TER was performed on the dates provided in this TER and within DrJ's professional scope of work.

4 PRODUCT DESCRIPTION AND MATERIALS

4.1 The product evaluated in this TER is shown in Figure 1.

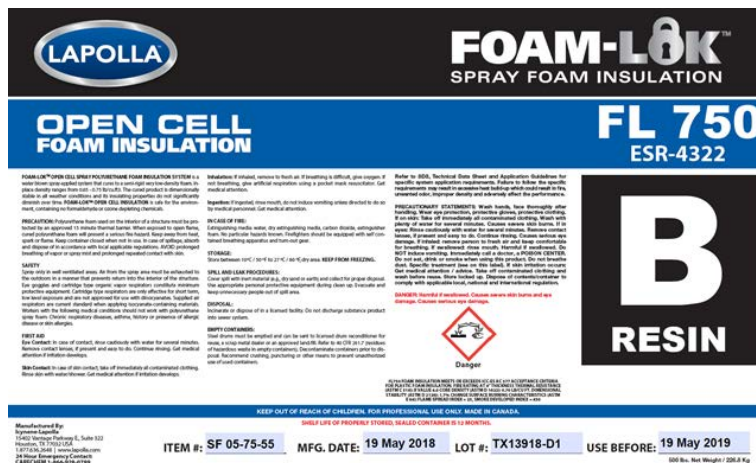


FIGURE 1. FOAM-LOK FL-450 AND FOAM-LOK FL-750 SPF IN UNVENTILATED ATTICS

⁴ 2012 IBC 2603.10





- 4.2 Foam-LOK FL-450 and Foam-LOK FL-750 are two-component, open-cell SPF insulation products.
 - 4.2.1 Foam-LOK FL-450 has a density of 0.5 pounds per cubic foot (pcf) (8 kg/m³).
 - 4.2.2 Foam-LOK FL-750 has a density of 0.7 pounds per cubic foot (pcf) (11 kg/m³).
- 4.3 The two components of Icynene-Lapolla® low density SPF are:
 - 4.3.1.1 Component A: MDI/pMDI isocyanate
 - 4.3.1.2 Component B: proprietary resin
 - 4.3.2 These two components are combined at the point of spray application.

5 APPLICATIONS

5.1 *General*

- 5.1.1 Foam-LOK FL-450 and Foam-LOK FL-750 insulation are used in the following applications:
 - 5.1.1.1 Thermal insulation in buildings constructed in accordance with the *IBC* or *IRC*.
 - 5.1.1.2 Sealant for penetrations as part of an air barrier system.
- 5.1.2 Where fire resistance rated construction is required, contact the manufacturer for more information.

5.2 *Thermal Resistance*

- 5.2.1 Icynene-Lapolla® low density SPF has the thermal resistance as defined in Table 1.





TABLE 1. FOAM-LOK FL-450 AND FOAM-LOK FL-750 THERMAL RESISTANCE PROPERTIES

Product	Thickness (in)	Thermal Resistance (R-values) (h-ft. ² ·°F/Btu) ^{1,2}	Thermal Resistance (U-factors) (Btu/(h-ft. ² ·°F))
Foam-LOK FL-450	1	3.7	0.270
	2	7.4	0.135
	3	11	0.093
	3.5	13	0.079
	4	14	0.069
	5	18	0.056
	5.5	20	0.051
	6	22	0.046
	7	25	0.039
	7.5	27	0.037
	8	29	0.035
	9	32	0.031
	9.5	34	0.029
	10	36	0.028
	11.5	41	0.024
	13.5	49	0.021
14	50	0.020	
Foam-LOK FL-750	1	4	0.250
	2	8	0.125
	3	12	0.083
	3.5	14	0.071
	4	16	0.063
	5	20	0.050
	5.5	22	0.045
	6	24	0.042
	7	28	0.036
	7.5	30	0.033
	8	32	0.031
	9	36	0.028
	9.5	38	0.026
	10	40	0.025
	11.5	46	0.022
	13.5	54	0.019
14	56	0.018	

SI: 1 in = 25.4 mm
 1. Tested at a mean temperature of 75° F.
 2. R-values are calculated from testing at 1" and 3.5" thickness. Calculated R-values over 10 are rounded to the nearest integer.





5.3 Surface Burning Characteristics

5.3.1 Foam-LOK FL-450 and Foam-LOK FL-750 have the surface burning characteristics as shown in Table 2.

TABLE 2. FLAME SPREAD & SMOKE DEVELOPED INDEXES OF ICYNENE-LAPOLLA® LOW DENSITY SPF

Product	Flame Spread	Smoke Developed
Foam-LOK FL-450 ¹	< 25	< 450
Foam-LOK FL-750 ²	< 25	< 450

1. Tested in accordance with ASTM E84/UL723 at a thickness of 6".
2. Tested in accordance with ASTM E84/UL723 at a thickness of 4".

5.4 Permeability

5.4.1 Foam-LOK FL-450 and Foam-LOK FL-750 have the air permeability characteristics shown in Table 3 and, therefore, are an air-impermeable insulation in accordance with IRC Sections R202 and R806.5.

TABLE 3. FOAM-LOK FL-450 AND FOAM-LOK FL-750 AIR BARRIER MATERIAL PROPERTIES

Product	Property
Foam-LOK FL-450 ^{1,3}	< 0.02 (L/s.m ²) ⁴
Foam-LOK FL-750 ^{2,3}	< 0.02 (L/s.m ²) ⁴

1. Sprayed to a minimum thickness of 1.75"
2. Sprayed to a minimum thickness of 3"
3. Tested in accordance with ASTM E2178.
4. Liter per second per square meter when tested at a pressure differential of 75 Pa.

5.5 Unvented Attic and Unvented Enclosed Rafter Assemblies

5.5.1 General:

5.5.1.1 Foam-LOK FL-450 and Foam-LOK FL-750 are approved for use in unvented attic and unvented, enclosed rafter assemblies in accordance with IBC Section 1202.3⁵ provided the following conditions are met:

- 5.5.1.1.1 The attic space is completely within the building thermal envelope.
- 5.5.1.1.2 No interior Class I vapor retarders are installed on the ceiling side (attic floor) of the unvented attic assembly or on the ceiling side of the unvented, enclosed roof framing assembly.
- 5.5.1.1.3 Where wood shingles or shakes are used, a minimum ¼ inch (6.4 mm) vented airspace separates the shingles or shakes and the roofing underlayment above the structural sheathing.
- 5.5.1.1.4 In Climate Zones 5, 6, 7 and 8, a Class III vapor retarder coating or covering in direct contact with the underside of the insulation shall be installed.
- 5.5.1.1.5 The insulation shall be installed in direct contact with the underside of the structural sheathing.
- 5.5.1.1.6 Where other air-permeable insulation is used in conjunction with Foam-LOK FL-450 and Foam-LOK FL-750, the Foam-LOK FL-450 and Foam-LOK FL-750 shall be installed in the thickness required by IBC Table 1202.3⁶ for condensation control.

⁵ 2015 IBC Section 1203.3

⁶ 2015 IBC Section 1203.3





- 5.5.1.2 Foam-LOK FL-450 and Foam-LOK FL-750 shall be separated from the building interior by a thermal barrier consisting of a minimum ½" gypsum wallboard or equivalent in accordance with IBC Section 2603.4 or IRC Section R316.4 except in unventilated attics and crawlspaces as described in Sections 5.5.1.3 and 5.5.1.4.
- 5.5.2 *Application in an Unvented Attic without a Prescriptive Thermal Barrier or Ignition Barrier:*
 - 5.5.2.1 When Foam-LOK FL-450 and Foam-LOK FL-750 are applied in unvented attics conforming to IRC Section R806.5 and as shown in Figure 2, the:
 - 5.5.2.1.1 SPF shall be applied to the underside of roof sheathing to a minimum thickness of 3.5" (89 mm).
 - 5.5.2.1.2 Roof rafter or truss top chord member edges may be left exposed.
 - 5.5.2.1.3 SPF shall be applied to vertical wall surfaces to a minimum thickness of 3.5" (89 mm).
 - 5.5.2.1.4 Wall stud edges may be left exposed.
 - 5.5.2.1.5 Maximum thickness of the SPF is 20" (508 mm) on the underside of roof sheathing or on the vertical wall surfaces.
 - 5.5.2.1.6 SPF insulation may be left exposed to the attic without a thermal barrier, prescriptive ignition barrier, or an intumescent coating.
 - 5.5.2.1.7 Attic shall have access complying with IRC Section R807, horizontally placed in the floor, and shall feature one of the following:
 - 5.5.2.1.7.1 A downward-opening hatch,
 - 5.5.2.1.7.2 A pull down stair or,
 - 5.5.2.1.7.3 Access opening in accordance with IRC Section R807 using Rockfon® Pacific™ 201 Square Edge Ceiling Tile to cover the opening. The Rockfon® Pacific™ 201 ceiling tile shall have a maximum density of 8 pcf, a maximum binder content of 3% and shall be listed as a Class A product in accordance with ASTM E1264.
 - 5.5.2.2 Items penetrating the roof deck or walls, such as skylight wells and venting systems shall be covered with a minimum of 3½" (89 mm) of Foam-LOK FL-450 or Foam-LOK FL-750 insulation with the following exceptions and conditions:
 - 5.5.2.2.1 The perimeter of penetrating items (annular space) does not require fire caulking. However, for penetrating items not needing full coverage, the perimeter (annular space) of the items must be covered with SPF at a minimum 3.5" thickness.
 - 5.5.2.2.2 Penetrations through the attic floor or soffit not conveying air, such as can lights, electrical wiring, potable water, HVAC condensation lines, etc. do not need to be covered with foam or air sealed to the perimeter of the penetration (annular space).
 - 5.5.2.2.3 Skylights penetrating through the attic floor, soffit, gable or roof deck where the tubular daylighting pathway is constructed of gypsum, steel or other non-combustible material (with melting temperature greater than steel) do not need full coverage of foam.
 - 5.5.2.2.4 For all attic volumes
 - 5.5.2.2.4.1 Rigid or flexible HVAC ducts penetrating only the attic floor including all plastic materials, rigid or semi-rigid/flexible aluminum, any ducts wrapped in fiberglass and steel or copper components may be left uncovered by foam.





- 5.5.2.2.5 For attics up to 46,080 cu. ft.
 - 5.5.2.2.5.1 Any schedule 40 (minimum) ABS or PVC vent pipe does not need to be covered in SPF.
 - 5.5.2.2.5.2 Rigid or flexible vent ducts/pipes that only penetrate the attic floor and/or soffit, including rigid or semi-rigid/flexible aluminum, any ducts wrapped in fiberglass, any ducts with higher melting/softening points than aluminum, and steel or copper do not need to be protected with SPF. Additionally, where exhaust fans with capacity of 60 cfm or less are installed, plastic materials thinner than schedule 40 do not need to be protected with SPF.
 - 5.5.2.2.5.3 Rigid or flexible vent ducts/pipes that only penetrate the roof deck and/or gable, including rigid or semi-rigid/flexible aluminum, any ducts wrapped in fiberglass, any ducts with higher melting/softening points than aluminum, and steel or copper do not need to be protected with SPF. Additionally, where exhaust fans with capacity of 60 cfm or less are installed AND the total area of penetrations from this section do not exceed 36 square inches, plastic materials thinner than schedule 40 do not need to be protected with SPF.
- 5.5.2.2.6 For attics larger than 46,080 cu. ft.
 - 5.5.2.2.6.1 Rigid or flexible vent ducts/pipes that only penetrate the attic floor and/or soffit, including any materials with higher melting/softening points than aluminum, and steel or copper do not need to be protected with SPF. Additionally, where exhaust vent fans with a capacity of 60 cfm or less are installed, any plastic materials, rigid or semi-rigid/flexible aluminum, any ducts wrapped in fiberglass, and vinyl or other plastic with lower melting/softening pints than aluminum do not need to be protected with SPF.
 - 5.5.2.2.6.2 Rigid or flexible vent ducts/pipes that only penetrate the roof deck and/or gable, including any materials with higher melting/softening points than aluminum, and steel or copper do not need to be protected with SPF. Additionally, where exhaust vent fans with a capacity of 60 cfm or less are installed AND the total area of penetrations from this section do not exceed 36 square inches, any plastic materials, rigid or semi-rigid/flexible aluminum, any ducts wrapped in fiberglass, and vinyl or other plastic with lower melting/softening points than aluminum do not need to be protected with SPF.
 - 5.5.2.2.7 Other items penetrating the roof deck or gable not specifically named above (other than steel or copper) need to be covered in SPF at a minimum 3.5" thickness.
- 5.5.3 *Application in an Unvented Crawlspace without a Prescriptive Thermal Barrier or Ignition Barrier:*
 - 5.5.3.1 When Foam-LOK FL-450 and Foam-LOK FL-750 are applied in unvented crawlspaces conforming to IRC Section R408.3, the:
 - 5.5.3.1.1 SPF shall be applied to the underside of upper surface to a minimum thickness of 3.5" (89 mm).
 - 5.5.3.1.2 SPF shall be applied to vertical wall surfaces to a minimum thickness of 3.5" (89 mm).
 - 5.5.3.1.3 Wall stud edges may be left exposed.
 - 5.5.3.1.4 Maximum thickness of the SPF is 14" (356 mm) on the underside of the upper surface or 3.5" (89 mm) on the vertical wall surfaces.
 - 5.5.3.1.5 SPF insulation may be left exposed to the crawlspace without a thermal barrier, prescriptive ignition barrier, or an intumescent coating.
 - 5.5.3.1.6 Crawlspace access shall be provided in accordance with IRC Section R408.4.
 - 5.5.3.1.7 Enclosures for items penetrating the upper surface or walls, such as plumbing and venting systems, shall be covered with a minimum of 3.5" (89 mm) of Foam-LOK FL-450 and Foam-LOK FL-750 insulation.
 - 5.5.3.2 Where the application exceeds the limitations set forth herein, design shall be permitted in accordance with accepted engineering procedures, experience, and technical judgment.





5.6 *Application for Use as an Interior Finish without the Use of a Thermal Barrier or Ignition Barrier When Used with the Addition of No-Burn® Plus ThB Intumescent Coating*

- 5.6.1 Icynene-Lapolla® SPF with a covering of No-Burn® Plus, applied in accordance with Table 4, was tested to NFPA 286 and met the acceptance criteria of IBC Section 803.1.1.1⁷.
- 5.6.2 When No-Burn® Plus is applied to Icynene-Lapolla® SPF in accordance with Table 4, the assembly may be installed without a thermal barrier or ignition barrier in accordance with IBC Section 2603.9.

TABLE 4. APPLICATION OF NO-BURN® TO ICYNELE-LAPOLLA® SPF

Products	No-Burn® Product Name	Maximum Thickness on Walls and Vertical Surfaces (in)	Maximum Thickness on Ceilings, Underside of Roof Sheathing/Rafters & Floors (in)	Application of No-Burn® Coating
Foam-LOK FL-450	Plus ThB	6	7	18 mils wet (12 mils dry) 89 sq. ft. per gallon

SI: 1 in = 25.4 mm

6 INSTALLATION

- 6.1 Installation shall comply with the manufacturer’s installation instructions and this TER. In the event of a conflict between the manufacturer’s installation instructions and this TER, the more restrictive shall govern.
 - 6.1.1 Foam-LOK FL-450 and Foam-LOK FL-750 shall be applied to the framing using two-component spray equipment and shall be applied using a 1:1 ratio of Component A and Component B.
 - 6.1.2 The substrate shall be dry and free of frost, ice, rust, oil, grease, dirt or any other substances that may prevent adhesion of the SPF to the substrate.
 - 6.1.3 Foam-LOK FL-450 and Foam-LOK FL-750 are intended for interior use only and are not to be used where they could come in contact with water. Provide protection from weather during and after installation.
 - 6.1.4 Where used as an air barrier in unventilated attics, the insulation shall be installed to the minimum thickness required and shall be installed in accordance with the provisions of IRC Section R806.
 - 6.1.5 Foam-LOK FL-450 and Foam-LOK FL-750 may be installed to the required thickness with one pass of the spray equipment. If installation using multiple passes is desired, no cure time is required between passes.
 - 6.1.6 Do not use Foam-LOK FL-450 and Foam-LOK FL-750 inside of electrical or junction boxes.
 - 6.1.7 Foam-LOK FL-450 and Foam-LOK FL-750 shall be installed only when the temperature is at or above 14°F (-10°C).
 - 6.1.8 Insulation shall not be installed in areas where the service temperature is greater than 180°F (82°C).
- 6.2 Foam-LOK FL-450 and Foam-LOK FL-750 Installation
 - 6.2.1 For general SPF installation guidelines, see the American Chemistry Council’s Guidance on Best Practices for the Installation of Spray Polyurethane Foam.
 - 6.2.2 Foam-LOK FL-450 and Foam-LOK FL-750 shall be installed in accordance with Icynene-Lapolla®’s installation instructions and this TER.

⁷ 2015 IBC Section 803.1.2.1



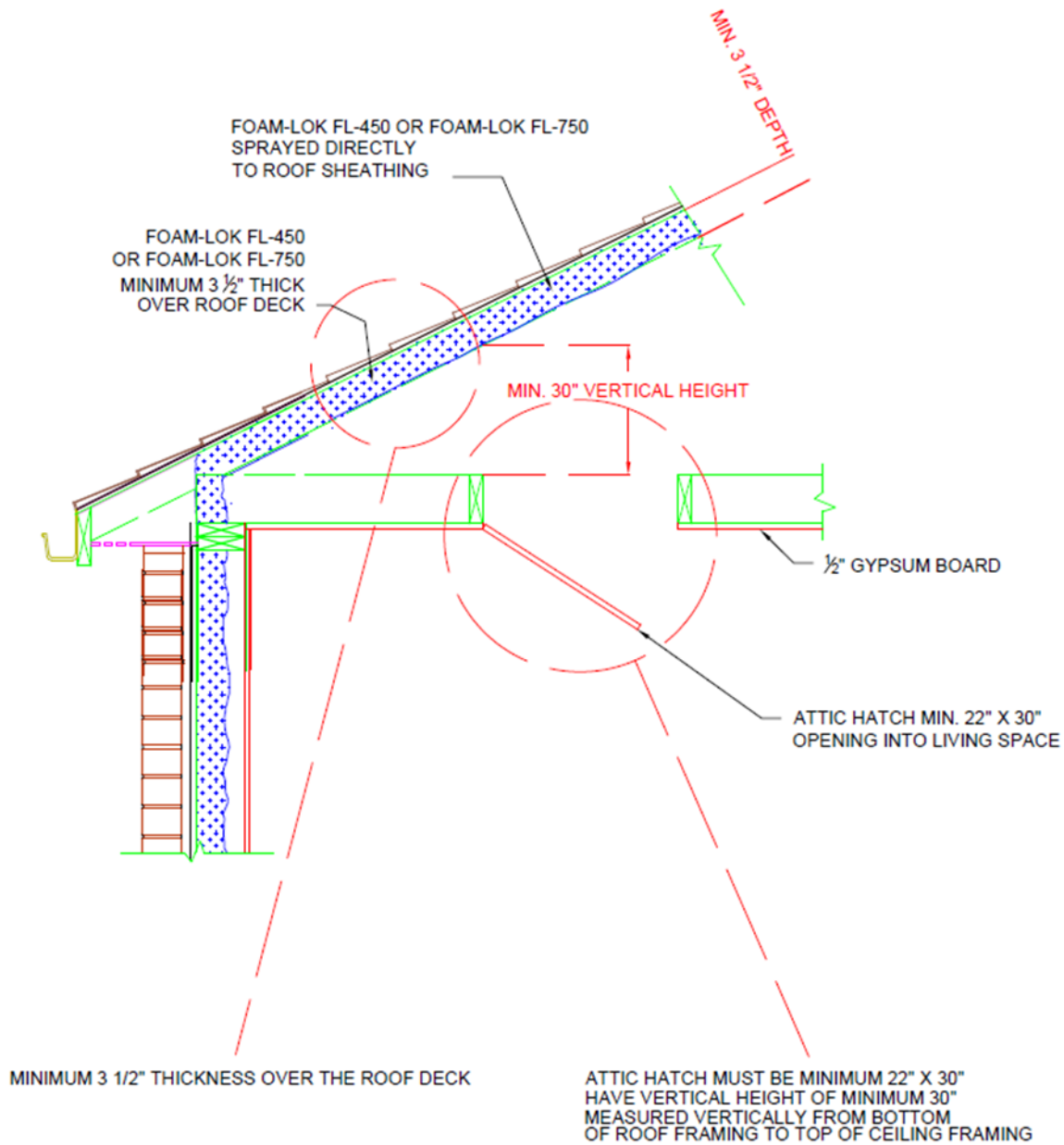


FIGURE 2. FOAM-LOK FL-450 AND FOAM-LOK FL-750 USED IN AN UNVENTED ATTIC SPACE

7 TEST ENGINEERING SUBSTANTIATING DATA

- 7.1 Structural testing of trusses, joists, and rafters for comparison before and after *NFPA 286* modified fire testing. The fire testing was performed by QAI Labs in 2014, and the structural testing was performed by SBCRI under contract with Qualtim, Inc
- 7.2 Testing and data in accordance with *NFPA 286*, modified for unventilated attics and performed by Intertek
- 7.3 Testing and data in accordance with *NFPA 286*, modified for unventilated attics and performed by QAI Labs
- 7.4 Testing and data in accordance with *NFPA 286*, modified for unvented attic with penetrations and performed by Priest and Associates



- 7.5 Testing and data in accordance with *NFPA 286*, modified to assess the surface burning performance of Icynene Foam-LOK FL-450 with a No-Burn® intumescent coating application and performed by QAI Labs
- 7.6 Fire testing of the described attic assembly to a modified version of *NFPA 286* to evaluate its performance as an unvented attic with penetrations performed by Priest and Associates.
- 7.7 Fire testing of Icynene Foam-LOK FL-450 with No-Burn® intumescent coating to *NFPA 286* performed by QAI Labs
- 7.8 Engineering analysis comparing Foam-LOK FL-450 and Foam-LOK FL-750 fire performance by Priest and Associates
- 7.9 Engineering analysis of Rockfon® Pacific™ 201 ceiling panels by Priest & Associates
- 7.10 Engineering analysis justifying omission of requirement to cover entire length of items penetrating roof deck with 3½ inches of Foam-LOK FL-450 and Foam-LOK FL-750 by Priest & Associates
- 7.11 Testing and data determining the material properties of Foam-LOK FL-450 and Foam-LOK FL-750 by Bodycote
- 7.12 Testing showing surface burning characteristics in accordance with *ASTM E84* by Bodycote
- 7.13 Testing as an air barrier material in accordance with *ASTM E2178* by Exova
- 7.14 Some information contained herein is the result of testing and/or data analysis by other sources which conform to *IBC Section 1703* and relevant professional engineering law. DrJ relies on accurate data from these sources to perform engineering analysis. DrJ has reviewed and found the data provided by other professional sources to be credible.
- 7.15 Where appropriate, DrJ's analysis is based on design values that have been codified into law through codes and standards (e.g., *IBC*, *IRC*, *NDS*®, and *SDPWS*). This includes review of code provisions and any related test data that aids in comparative analysis or provides support for equivalency to an intended end-use application. Where the accuracy of design values provided herein is reliant upon the published properties of commodity materials (e.g., lumber, steel, and concrete), DrJ relies upon the grade mark, stamp, and/or design values provided by raw material suppliers to be accurate and conforming to the mechanical properties defined in the relevant material standard.

8 FINDINGS

- 8.1 When used and installed in accordance with this TER and the manufacturer's installation instructions, the product(s) listed in Section 1.1 are approved for the following:
 - 8.1.1 The testing protocol for this project included:
 - 8.1.1.1 Structural testing of joists and trusses before application of Foam-LOK FL-450 SPF. Testing performed by SBCRI under contract with Qualtim, Inc.
 - 8.1.1.2 Shipping, and installation of trusses and joists into an attic assembly with subsequent application of Foam-LOK FL-450 for the purpose of fire testing the assembly and comparing the structural stiffness of the joists and trusses before and after the fire test. Control specimens were also included in the shipping and assembly to benchmark performance.
 - 8.1.1.3 Fire testing of the described attic assembly to a modified version of *NFPA 286*. Testing performed by QAI Labs.
 - 8.1.1.4 Disassembly of the attic by QAI Labs and shipping of trusses and joists back to SBCRI.



- 8.1.1.5 Repeat structural testing by SBCRI to determine the stiffness loss and strength effects of:
 - 8.1.1.5.1 Shipping and handling, installation and disassembly of the control and the fire tested structural elements.
 - 8.1.1.5.2 Application of spray foam to these elements.
 - 8.1.1.5.3 Attic fire testing, including realistic fire temperatures and duration.
 - 8.1.1.5.4 Comparison of the performance of the control specimens to the attic fire tested specimens.
- 8.2 There was no measured difference in performance between rafter framing and truss framing in the context of performance post-*NFPA 286* fire testing. The comparisons included:
 - 8.2.1 Truss and rafter framing that had been transported and installed in a building.
 - 8.2.2 Truss and rafter framing onto which Foam-LOK FL-450 foam had been applied in accordance with standard Icynene-Lapolla® application procedures for attics.
 - 8.2.3 Truss and rafter framing subjected to modified *NFPA 286* testing of an unvented attic.
 - 8.2.4 Truss and rafter framing compared to control specimens.
- 8.3 Additional test data and evaluations comparing the fire performance of Foam-LOK FL-450 and Foam-LOK FL-750 in unvented attics and crawlspace using modified *NFPA 286* testing was also provided to prove the similarity of the performance of Foam-LOK FL-450 and Foam-LOK FL-750 and that these products can be used interchangeably.
- 8.4 The application of Foam-LOK FL-450 and Foam-LOK FL-750 does not compromise the structural performance of standard rafter or truss framing in code compliant unvented attic and crawlspace applications as defined in *IRC Section R806.5*.
- 8.5 *IBC Section 104.11* (*IRC Section R104.11* and *IFC Section 104.9* are similar) states:

104.11 Alternative materials, design and methods of construction and equipment. The provisions of this code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *building official* finds that the proposed design is satisfactory and complies with the intent of the provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code...Where the alternative material, design or method of construction is not *approved*, the *building official* shall respond in writing, stating the reasons the alternative was not *approved*.
- 8.6 This product has been evaluated in the context of the codes listed in Section 2 and is compliant with all known state and local building codes. Where there are known variations in state or local codes applicable to this evaluation, they are listed here.
 - 8.6.1 No known variations

9 CONDITIONS OF USE

- 9.1 Foam-LOK FL-450 and Foam-LOK FL-750 insulation described in this TER comply with, or are suitable alternatives to, what is specified in the codes listed in Section 2, subject to the following conditions:
 - 9.1.1 The manufacturer's installation instructions and this TER shall be available on the jobsite for inspection.
 - 9.1.2 The SPF insulation shall be installed in accordance with the manufacturer's published installation instructions, this TER and the applicable code. If there is a conflict between the installation instructions and this TER, the more restrictive governs.
 - 9.1.3 The SPF insulation shall be separated from the interior of the building by an approved 15-minute thermal barrier, except as noted in this TER.
 - 9.1.4 When installed in unvented attics without a code-prescribed ignition barrier or thermal barrier, the installation shall meet the conditions outlined in Section 5.5.



- 9.1.5 The SPF insulation shall meet the minimum thicknesses and densities noted in this TER.
- 9.1.6 The SPF insulation shall be protected from the weather during and after application.
- 9.1.7 The SPF insulation shall be applied by licensed dealers and installers certified by Icynene-Lapolla®.
- 9.1.8 Use of the SPF insulation in areas where the probability of termite infestation is “very heavy” shall be in accordance with IBC Section 2603.8 and IRC Section R318.4 as applicable.
- 9.1.9 Jobsite certification and labeling of the SPF insulation shall comply with IRC Section N1101.10.1 and N1101.10.1.1 and IECC Section C303.1.1 and C303.1.1.1.
- 9.1.10 A vapor retarder shall be installed in accordance with the applicable code.
- 9.1.11 The components used to produce Foam-LOK FL-450 and Foam-LOK FL-750 are manufactured in Mississauga, Ontario, Canada, under a quality control program with inspections in accordance with IBC Section 2603.2 and IRC Section R316.2.
- 9.2 Where required by the building official, also known as the authority having jurisdiction (AHJ) in which the project is to be constructed, this TER and the installation instructions shall be submitted at the time of permit application.
- 9.3 Any generally accepted engineering calculations needed to show compliance with this TER shall be submitted to the AHJ for review and approval.
- 9.4 Design loads shall be determined in accordance with the building code adopted by the jurisdiction in which the project is to be constructed and/or by the Building Designer (e.g., owner or registered design professional).
- 9.5 At a minimum, this product shall be installed per Section 6 of this TER.
- 9.6 This product is manufactured under a third-party quality control program in accordance with IBC Section 104.4 and 110.4 and IRC Section R104.4 and R109.2.
- 9.7 The actual design, suitability, and use of this TER, for any particular building, is the responsibility of the owner or the owner's authorized agent. Therefore, the TER shall be reviewed for code compliance by the building official for acceptance.
- 9.8 The use of this TER is dependent on the manufacturer's in-plant QC, the ISO/IEC 17020 third-party quality assurance program and procedures, proper installation per the manufacturer's instructions, the building official's inspection, and any other code requirements that may apply to demonstrate and verify compliance with the applicable building code.

10 IDENTIFICATION

- 10.1 The product(s) listed in Section 1.1 are identified by a label on the board or packaging material bearing the manufacturer's name, product name, TER number, and other information to confirm code compliance.
- 10.2 Additional technical information can be found at icynene.com.

11 REVIEW SCHEDULE

- 11.1 This TER is subject to periodic review and revision. For the most recent version of this TER, visit drjcertification.org.
- 11.2 For information on the current status of this TER, contact DrJ Certification.





FBC SUPPLEMENT TO TER NO. 1810-01

REPORT HOLDER:

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DIVISION: 07 00 00 - THERMAL AND MOISTURE PROTECTION

SECTION: 07 21 19 - Foamed-in-Place Insulation

SECTION: 07 27 36 - Sprayed Foam Air Barrier

1 EVALUATION SUBJECT:

- 1.1 Icynene Classic Ultra, Classic Ultra Select & Classic Plus Spray Polyurethane Foam

2 REPORT PURPOSE AND SCOPE

2.1 Purpose

- 2.1.1 The purpose of this Technical Evaluation Report (TER) supplement is to indicate that Icynene-Lapolla® Foam-LOK FL-450 and Foam-LOK FL-750 recognized in TER No. 1810-01, have also been evaluated for compliance with the codes noted below.

2.2 Applicable Code Editions

- 2.2.1 *FBC Building*— 14, 17: Florida Building Code - Building
- 2.2.2 *FBC Residential*— 14, 17: Florida Building Code – Residential
- 2.2.3 This supplement is subject to renewal concurrently with TER No. 1810-01.

3 CONCLUSIONS

- 3.1 Icynene-Lapolla® Foam-LOK FL-450 and Foam-LOK FL-750, described in TER No. 1810-01, comply with the provisions of the Florida Building Code – Building and the Florida Building Code – Residential, provided the design and installation are in accordance with the International Building Code (IBC) provisions noted in the TER.
- 3.2 Use of Icynene-Lapolla® Foam-LOK FL-450 and Foam-LOK FL-750 SPF for compliance with the High-Velocity Hurricane Zone (HVHZ) provisions of the Florida Building Code – Building and the Florida Building Code – Residential has been evaluated.
- 3.3 In accordance with Florida Rule No. 61G20-3, Icynene-Lapolla® Foam-LOK FL-450 and Foam-LOK FL-750 are outside the scope of the Florida Product Approval system.