Listing and Technical Evaluation Report™

A Duly Authenticated Report from an Approved Agency

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Use of FOAM-LOK 450™ and FOAM-LOK 750™ Spray Polyurethane Foam in Unvented Attics and Crawlspaces

Trade Secret Report Holder:

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CSI Designations:

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 Innovative Products Evaluated[1]

1.1 FOAM-LOK 450 and FOAM-LOK 750 Spray Polyurethane Foam (SPF) Insulation

2 Product Description and Materials

2.1 The labels for the innovative products evaluated in this report are shown in **Figure 1**.

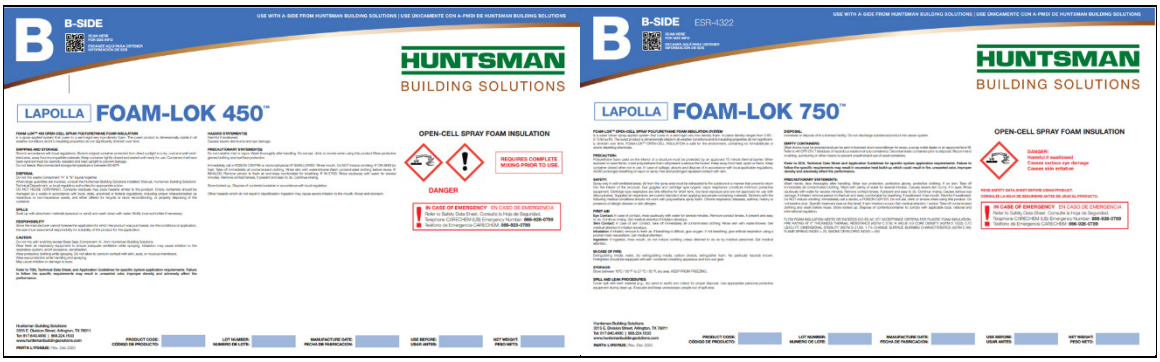

Figure 1. FOAM-LOK 450 and FOAM-LOK 750 SPF Product Labels

2.2 FOAM-LOK 450 and FOAM-LOK 750 are two-component, open-cell Spray Polyurethane Foam insulation products.

2.2.1 FOAM-LOK 450 has a density of 0.5 pounds per cubic foot (pcf) (8 kg/m^3).

2.2.2 FOAM-LOK 750 has a density of 0.7 pounds per cubic foot (pcf) (11 kg/m^3).

2.3 The two components of FOAM-LOK 450 and FOAM-LOK 750 low density SPF are:

2.3.1 Component A: MDI/pMDI isocyanate

2.3.2 Component B: proprietary resin

2.4 These two components are combined at the point of spray application.

2.5 As needed, review material properties for design in **Section 6** and the regulatory evaluation in **Section 8**.

3 Definitions[2]

3.1 New Materials[3] are defined as building materials, equipment, appliances, systems, or methods of construction, not provided for by prescriptive and/or legislatively adopted regulations, known as alternative materials.[4] The design strength and permissible stresses shall be established by tests[5] and/or engineering analysis.[6]

3.2 Duly authenticated reports[7] and research reports[8] are test reports and related engineering evaluations that are written by an approved agency[9] and/or an approved source.[10]

3.2.1 These reports utilize intellectual property and/or trade secrets to create public domain material properties for commercial end-use.

3.2.1.1 This report protects confidential Intellectual Property and trade secretes under the regulation, 18.US.Code.90, also known as Defend Trade Secrets Act of 2016 (DTSA).[11]

3.3 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited. DrJ Engineering, LLC (DrJ) is accredited and listed in the ANAB directory.

3.4 An approved source is *"approved"* when a professional engineer (i.e., Registered Design Professional, hereinafter RDP) is properly licensed to transact engineering commerce. The regulatory authority governing approved sources is the state legislature via its professional engineering regulations.[12]

3.5 Testing and/or inspections conducted for this duly authenticated report were performed by an ISO/IEC 17025 accredited testing laboratory, an ISO/IEC 17020 accredited inspection body, and/or a licensed RDP.

3.5.1 The Center for Building Innovation (CBI) is ANAB[13] ISO/IEC 17025 and ISO/IEC 17020 accredited.

3.6 The regulatory authority shall enforce[14] the specific provisions of each legislatively adopted regulation. If there is a non-conformance, the specific regulatory section and language of the non-conformance shall be provided in writing[15] stating the nonconformance and the path to its cure.

3.7 The regulatory authority shall accept duly authenticated reports from an approved agency and/or an approved source with respect to the quality and manner of use of new materials or assemblies as provided for in regulations regarding the use of alternative materials, designs, or methods of construction.[16]

3.8 ANAB is an International Accreditation Forum (IAF) Multilateral Recognition Arrangement (MLA) signatory. Therefore, recognition of certificates and validation statements issued by conformity assessment bodies accredited by all other signatories of the IAF MLA with the appropriate scope shall be approved.[17] Thus, all ANAB ISO/IEC 17065 duly authenticated reports are approval equivalent,[18] and can be used in any country that is an MLA signatory found at this link: https://iaf.nu/en/recognised-abs/

3.9 Approval equity is a fundamental commercial and legal principle.[19]

4 Applicable Local, State, and Federal Approvals; Standards; Regulations[20]

4.1 *Local, State, and Federal*

4.1.1 Approved in all local jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured local jurisdictions: Austin, Baltimore, Broward County, Chicago, Clark County, Dade County, Dallas, Detroit, Denver, DuPage County, Fort Worth, Houston, Kansas City, King County, Knoxville, Las Vegas, Los Angeles City, Los Angeles County, Miami, Nashville, New York City, Omaha, Philadelphia, Phoenix, Portland, San Antonio, San Diego, San Jose, San Francisco, Seattle, Sioux Falls, South Holland, St. Louis County, Texas Department of Insurance, and Wichita.[21]

4.1.2 Approved in all state jurisdictions pursuant to ISO/IEC 17065 duly authenticated report use, which includes, but is not limited to, the following featured states: California, Florida, New Jersey, Oregon, New York, Texas, Washington, and Wisconsin.[22]

4.1.3 Approved by the Code of Federal Regulations Manufactured Home Construction: Pursuant to Title 24, Subtitle B, Chapter XX, Part 3282.14[23] and Part 3280[24] pursuant to the use of ISO/IEC 17065 duly authenticated reports.

4.1.4 Approved means complying with the requirements of local, state, or federal legislation.

4.2 *Regulations*

4.2.1 *IBC – 18, 21, 24: International Building Code®*

4.2.2 *IRC – 18, 21, 24: International Residential Code®*

4.2.3 *IECC – 18, 21, 24: International Energy Conservation Code®*

4.2.4 *FBC-B—20, 23: Florida Building Code[25] – Building*

4.2.5 *FBC-R—20, 23: Florida Building Code[25] – Residential*

4.3 *Standards*

4.3.1 *ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus*

4.3.2 *ASTM D1622: Standard Test Method for Apparent Density of Rigid Cellular Plastics*

4.3.3 *ASTM D1623: Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics*

4.3.4 *ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials*

4.3.5 *ASTM E2178: Standard Test Method for Air Permeance of Building Materials*

4.3.6 *NFPA 286: Standard Methods of Fire Test for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth*

5 Listed[26]

5.1 Equipment, materials, products, or services included in a List published by a nationally recognized testing laboratory (e.g., CBI), an approved agency (e.g., CBI and DrJ), and/or and approved source (e.g., DrJ), or other organization(s) concerned with product evaluation (e.g., DrJ), that maintains periodic inspection (e.g., CBI) of production of listed equipment or materials, and whose listing states either that the equipment or material meets nationally recognized standards or has been tested and found suitable for use in a specified manner.

6 Tabulated Properties Generated from Nationally Recognized Standards

6.1 *Structural Applications*

6.1.1 FOAM-LOK 450 and FOAM-LOK 750 insulation are used in the following applications:

6.1.1.1 Thermal insulation in buildings constructed in accordance with the IBC or IRC.

6.1.1.2 Sealant for penetrations as part of an air barrier system.

6.1.2 Where fire resistance rated construction is required, contact the manufacturer for more information.

6.2 *Thermal Resistance*

6.2.1 The thermal resistance values for FOAM-LOK 450 and FOAM-LOK 750 are listed in **Table 1**.

Table 1. FOAM-LOK 450 and FOAM-LOK 750 Thermal Resistance Properties

Product Designation	Thickness (in)	Thermal Resistance (R-Values) (h·ft.²·°F/Btu)[1,2]	Thermal Resistance (U-Factors) (Btu/h·ft.²·°F)
FOAM-LOK 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

Table 1. FOAM-LOK 450 and FOAM-LOK 750 Thermal Resistance Properties

Product Designation	Thickness (in)	Thermal Resistance (R-Values) (h·ft.²·°F/Btu)[1,2]	Thermal Resistance (U-Factors) (Btu/h·ft.²·°F)
FOAM-LOK 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.

6.3 *Surface Burning Characteristics*

6.3.1 FOAM-LOK 450 and FOAM-LOK 750 were evaluated for surface burning characteristics, flame spread, and smoke developed characteristics in accordance with ASTM E84 as specified in IBC Section 2603.3, IBC Section 2603.5.4, and IRC Section R303.3.[27]

6.3.2 The flame spread and smoke developed indexes are listed in **Table 2**.

Table 2. Flame Spread and Smoke Developed Indexes

Product	Flame Spread	Smoke Developed	Classification
FOAM-LOK 450[1]	< 25	< 450	Class A
FOAM-LOK 750[2]	< 25	< 450	Class A

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".

6.4 *Air Barrier*

6.4.1 FOAM-LOK 450 and FOAM-LOK 750 were evaluated for use as air barrier materials in accordance with ASTM E2178 and met the requirements of IRC Section N1101.10.5, IECC Section R303.1.5, and IECC Section C402.6.2.3.1[28] when installed in accordance with the manufacturer installation instructions and this report.

6.4.1.1 The air permeability of FOAM-LOK 450 and FOAM-LOK 750 is provided in **Table 3**.

Table 3. FOAM-LOK 450 and FOAM-LOK 750 Air Barrier Material Performance

Product	Property[4]
FOAM-LOK 450[1,3]	< 0.02 (L/s·m^2)
FOAM-LOK 750[2,3]	< 0.02 (L/s·m^2)

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.

6.5 *Unvented Attic and Unvented Enclosed Rafter Assemblies*

6.5.1 *General:*

6.5.1.1 FOAM-LOK 450 and FOAM-LOK 750 are approved for use in unvented attic and unvented enclosed rafter assemblies in accordance with IBC Section 1202.3, provided the following conditions be met:

6.5.1.1.1 The attic space is completely within the building thermal envelope.

6.5.1.1.2 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.

6.5.1.1.3 Where wood shingles or shakes are used, a minimum 1/4" (6.4 mm) vented airspace separates the shingles or shakes and the roofing underlayment above the structural sheathing.

6.5.1.1.4 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.

6.5.1.1.5 The insulation shall be installed in direct contact with the underside of the structural sheathing.

6.5.1.1.6 Where other air-permeable insulation is used in conjunction with FOAM-LOK 450 and FOAM-LOK 750, the FOAM-LOK 450 and FOAM-LOK 750 shall be installed in the thickness required by IBC Table 1202.3 for condensation control.

6.5.1.2 FOAM-LOK 450 and FOAM-LOK 750 shall be separated from the building interior by a thermal barrier consisting of a minimum 1/2" gypsum wallboard or equivalent in accordance with IBC Section 2603.4 or IRC Section R303.4,[29] except in unventilated attics and crawlspaces as described in **Section 6.5.2** and **Section 6.5.3**.

6.5.2 *Application in an Unvented Attic Without a Prescriptive Thermal Barrier or Ignition Barrier:*

6.5.2.1 When FOAM-LOK 450 and FOAM-LOK 750 are applied in unvented attics conforming to IRC Section R806.5 and as shown in **Figure 2**:

6.5.2.1.1 SPF shall be applied to the underside of roof sheathing to a minimum thickness of 3 1/2" (89 mm).

6.5.2.1.2 Roof rafter or truss top chord member edges may be left exposed.

6.5.2.1.3 SPF shall be applied to vertical wall surfaces to a minimum thickness of 3 1/2" (89 mm).

6.5.2.1.4 Wall stud edges may be left exposed.

6.5.2.1.5 Maximum thickness of the SPF is 20" (508 mm) on the underside of roof sheathing or on the vertical wall surfaces.

6.5.2.1.6 SPF insulation may be left exposed to the attic without a thermal barrier, prescriptive ignition barrier, or an intumescent coating.

6.5.2.1.7 Attic shall have access complying with IRC Section R807, horizontally placed in the floor, and shall feature one of the following:

6.5.2.1.7.1 A downward-opening hatch;

6.5.2.1.7.2 A pull down stair; or

6.5.2.1.7.3 Access opening in accordance with IRC Section R807 using Rockfon® Pacific™ 201 Square Edge Ceiling Tile to cover the opening

6.5.2.1.7.3.1 An attic access opening of 22 1/2" x 30", or the baseline standard IRC size, was used to evaluate performance. The Rockfon Pacific 201 Square Edge Ceiling Tile is set on 1" x 2" trim, installed around the opening. The typical installation is installing trim around the opening, where one-half of the trim width extends into the opening to support the panel. This allows fastening of the trim to the rough framing, where it is expected that there will be a 1" lip around the opening for Rockfon Pacific 201 Square Edge Ceiling Tile bearing.

6.5.2.1.7.3.2 The Rockfon Pacific 201 Square Edge Ceiling Tile shall have a maximum density of 8-pcf, a maximum binder content of three percent (3%), and shall be listed as a Class A product in accordance with ASTM E1264.

6.5.2.2 Items penetrating the roof deck or walls, such as skylight wells and venting systems, shall be covered with a minimum of 3 1/2" (89 mm) of FOAM-LOK 450 and FOAM-LOK 750 insulation with the following exceptions and conditions:

6.5.2.2.1 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 1/2" thickness.

6.5.2.2.2 Penetrations through the attic floor or soffit not conveying air, such as canned 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).

6.5.2.2.3 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.

6.5.2.2.4 *For All Attic Volumes:*

6.5.2.2.4.1 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.

6.5.2.2.5 *For Attics Up to 46,080 Cubic Feet:*

6.5.2.2.5.1 Any schedule 40 (minimum) Acrylonitrile Butadiene Styrene (ABS) or Polyvinyl Chloride (PVC) vent pipe does not need to be covered in SPF.

6.5.2.2.5.2 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 Cubic Feet per Minute (cfm) or less are installed, plastic materials thinner than schedule 40 do not need to be protected with SPF.

6.5.2.2.5.3 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.

6.5.2.2.6 *For Attics Larger Than 46,080 Cubic Feet:*

6.5.2.2.6.1 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 points than aluminum, do not need to be protected with SPF.

6.5.2.2.6.2 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.

6.5.2.2.7 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 $3^1/_2$" thickness.

6.5.3 *Application in an Unvented Crawlspace With a Prescriptive Thermal Barrier or Ignition Barrier:*

6.5.3.1 When FOAM-LOK 450 and FOAM-LOK 750 are applied in unvented crawlspaces conforming to IRC Section R408.3:

6.5.3.1.1 SPF insulation shall be applied to the underside of the upper surface to a minimum thickness of $3^1/_2$" (89 mm).

6.5.3.1.2 SPF insulation shall be applied to vertical wall surfaces to a minimum thickness of $3^1/_2$" (89 mm).

6.5.3.1.3 Wall stud edges may be left exposed.

6.5.3.1.4 Maximum thickness of the SPF is 14" (356 mm) on the underside of the upper surface or 3 1/2" (89 mm) on the vertical wall surfaces.

6.5.3.1.5 SPF insulation may be left exposed to the crawlspace without a thermal barrier, prescriptive ignition barrier, or an intumescent coating.

6.5.3.1.6 Crawlspace access shall be provided in accordance with IRC Section R408.4.

6.5.3.1.7 Enclosures for items penetrating the upper surface or walls, such as plumbing and venting systems, shall be covered with a minimum of 3 1/2" (89 mm) of SPF insulation.

6.6 *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:*

6.6.1 FOAM-LOK 450 and FOAM-LOK 750 SPF insulation with a covering of No-Burn Plus ThB Intumescent Coating, applied in accordance with **Table 4**, was tested to NFPA 286 and met the acceptance criteria of IBC Section 803.1.1.1.

6.6.2 When No-Burn Plus ThB Intumescent Coating is applied to FOAM-LOK 450 and FOAM-LOK 750 SPF insulation 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 FOAM-LOK 450 and FOAM-LOK 750

Product	No-Burn Product Name	Maximum Thickness on Walls and Vertical Surfaces (in)	Maximum Thickness on Ceilings, Underside of Roof Sheathing/Rafters and Floors (in)	Application of No-Burn Coating
FOAM-LOK 450	Plus ThB	6	16	16 mils wet (11 mils dry) 100 sq. ft. per gallon
FOAM-LOK 750	Plus ThB	6	16	16 mils wet (11 mils dry) 100 sq. ft. per gallon
SI: 1 in = 25.4 mm				

6.7 Alternative techniques shall be permitted in accordance with accepted engineering practice and experience. These provisions for the use of alternative materials, designs, and methods of construction are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed herein. This includes, but is not limited to, the following areas of engineering: mechanics of materials, structures, building science, and fire science.

7 Certified Performance[30]

7.1 All construction methods shall conform to accepted engineering practices to ensure durable, livable, and safe construction and shall demonstrate acceptable workmanship reflecting journeyman quality of work of the various trades.[31]

7.2 The strength and rigidity of the component parts and/or the integrated structure shall be determined by engineering analysis or by suitable load tests to simulate the actual loads and conditions of application that occur.[32]

8 Regulatory Evaluation and Accepted Engineering Practice

8.1 FOAM-LOK 450 and FOAM-LOK 750 comply with the following legislatively adopted regulations and/or accepted engineering practice for the following reasons:

8.1.1 This report assesses FOAM-LOK 450 and FOAM-LOK 750 for the following:

8.1.1.1 Physical properties of the product in accordance with the standards listed in **Section 4**.

8.1.1.2 Surface burning characteristics complying with the provisions of IBC Section 2603.3 and IRC Section R303.3.[33]

8.1.1.3 Thermal performance (R-values) complying with the provisions of IRC Section N1102 and IECC Section C402.

8.1.1.4 Use in unvented attic spaces and crawlspaces without a thermal barrier in accordance with IBC Section 2603.9, IRC Section R303.4,[34] and IRC Section R303.6.[35]

8.1.1.5 Use without a thermal barrier in accordance with IBC Section 2603.4 and IRC Section R303.4[36] when No Burn Plus ThB Intumescent Coating is applied.

8.1.1.6 Air permeability in accordance with IRC Section N1102.4, IECC Section C402.5, and IECC Section R402.4.

8.2 Any building code, regulation and/or accepted engineering evaluations (i.e., research reports, duly authenticated reports, etc.) that are conducted for this Listing were performed by DrJ, which is an ISO/IEC 17065 accredited certification body and a professional engineering company operated by RDP or approved sources. DrJ is qualified[37] to practice product and regulatory compliance services within its scope of accreditation and engineering expertise,[38] respectively.

8.3 Engineering evaluations are conducted with DrJ's ANAB accredited ICS code scope of expertise, which is also its areas of professional engineering competence.

9 Installation

9.1 Installation shall comply with the approved construction documents, the manufacturer installation instructions, this report, and the applicable building code.

9.2 In the event of a conflict between the manufacturer installation instructions and this report, contact the manufacturer for counsel on the proper installation method.

9.3 FOAM-LOK 450 and FOAM-LOK 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.

9.4 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.

9.5 FOAM-LOK 450 and FOAM-LOK 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.

9.6 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.

9.7 FOAM-LOK 450 and FOAM-LOK 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.

9.8 Do not use FOAM-LOK 450 and FOAM-LOK 750 inside of electrical or junction boxes.

9.9 FOAM-LOK 450 and FOAM-LOK 750 shall be installed only when the temperature is at or above 14° F (10° C).

9.10 Insulation shall not be installed in areas where the service temperature is greater than 180° F (82° C).

9.11 *Installation Procedure*

9.11.1 For general SPF installation guidelines, see the American Chemistry Council's Guidance on Best Practices for the Installation of Spray Polyurethane Foam.

9.11.2 FOAM-LOK 450 and FOAM-LOK 750 shall be installed in accordance with the manufacturer installation instructions and this report.

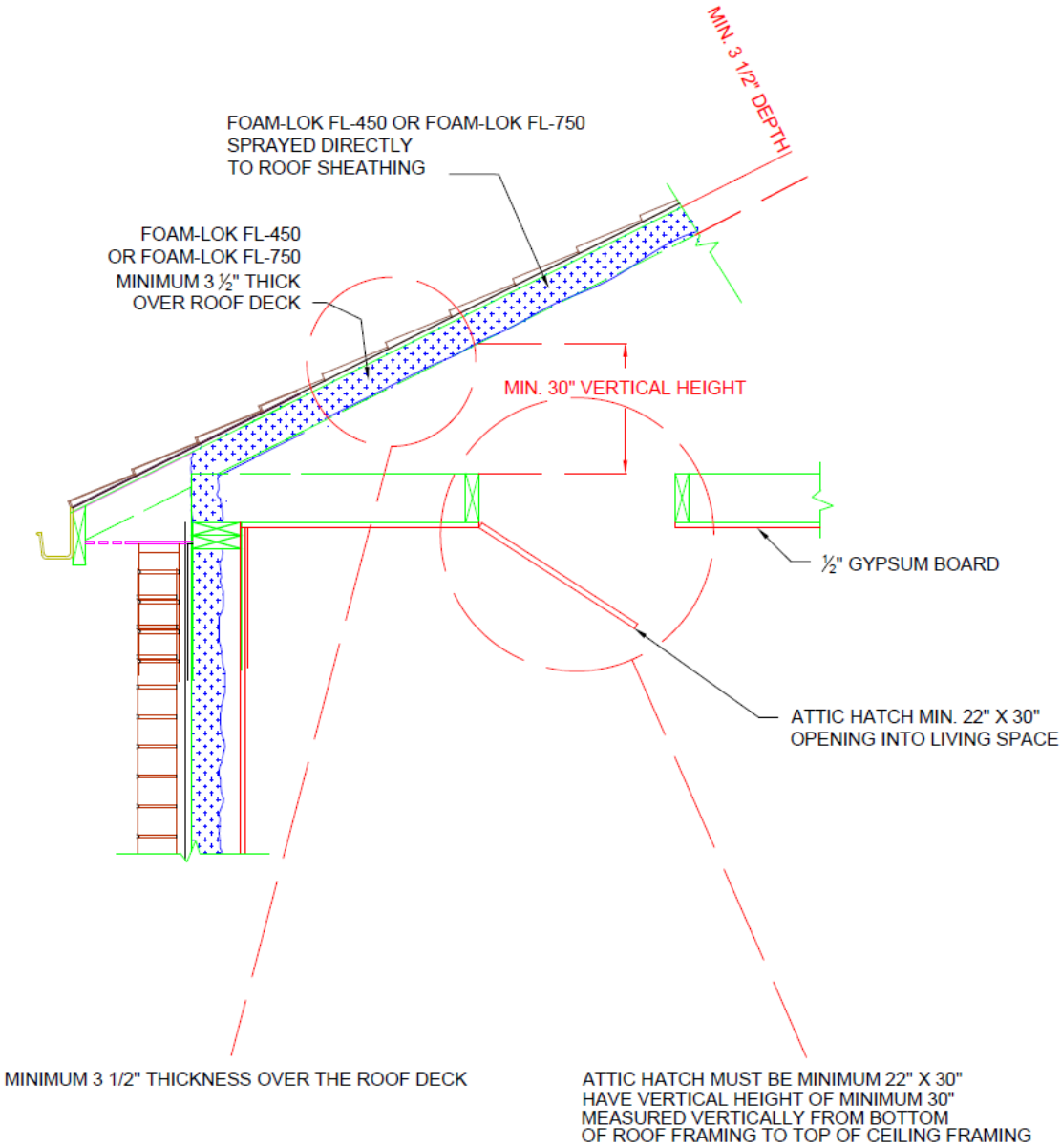

Figure 2. FOAM-LOK 450 and FOAM-LOK 750 Used in an Unvented Attic Space

10 Substantiating Data

10.1 Testing has been performed under the supervision of a professional engineer and/or under the requirements of ISO/IEC 17025 as follows:

10.1.1 Modified fire testing in accordance with NFPA 286 for unventilated attics and surface burning performance

10.1.2 Surface burning characteristics testing in accordance with ASTM E84

10.1.3 Air barrier material testing in accordance with ASTM E2178

10.1.4 Testing for material properties in accordance with ASTM D1622, ASTM D1623, and ASTM C518

10.2 Engineering analysis comparing FOAM-LOK 450 and FOAM-LOK 750 fire performance by Priest and Associates.

10.3 Engineering analysis of Rockfon Pacific 201 Square Edge ceiling panels by Priest & Associates.

10.4 Engineering analysis justifying omittance of requirement to cover entire length of items penetrating roof deck with $3^1/_2$" of FOAM-LOK 450 and FOAM-LOK 750 by Priest & Associates.

10.5 Information contained herein may include the result of testing and/or data analysis by sources that are approved agencies, approved sources, and/or an RDP. Accuracy of external test data and resulting analysis is relied upon.

10.6 Where applicable, testing and/or engineering analysis are based upon provisions that have been codified into law through state or local adoption of regulations and standards. The developers of these regulations and standards are responsible for the reliability of published content. DrJ's engineering practice may use a regulation-adopted provision as the control. A regulation-endorsed control versus a simulation of the conditions of application to occur establishes a new material as being equivalent to the regulatory provision in terms of quality, strength, effectiveness, fire resistance, durability, and safety.

10.7 The accuracy of the provisions provided herein may be reliant upon the published properties of raw materials, which are defined by the grade mark, grade stamp, mill certificate, or duly authenticated reports from approved agencies and/or approved sources provided by the supplier. These are presumed to be minimum properties and relied upon to be accurate. The reliability of DrJ's engineering practice, as contained in this duly authenticated report, may be dependent upon published design properties by others.

10.8 *Testing and Engineering Analysis*

10.8.1 The strength, rigidity, and/or general performance of component parts and/or the integrated structure are determined by suitable tests that simulate the actual conditions of application that occur and/or by accepted engineering practice and experience.[39]

10.9 Where additional condition of use and/or regulatory compliance information is required, please search for FOAM-LOK 450 and FOAM-LOK 750 on the DrJ Certification website.

11 Findings

11.1 As outlined in **Section 6**, FOAM-LOK 450 and FOAM-LOK 750 have performance characteristics that were tested and/or meet applicable regulations. In addition, they are suitable for use pursuant to its specified purpose.

11.2 When used and installed in accordance with this duly authenticated report and the manufacturer installation instructions, FOAM-LOK 450 and FOAM-LOK 750 shall be approved for the following applications:

11.2.1 Use in unvented attic spaces and crawlspaces without a thermal barrier in accordance with IBC Section 2603.9, IRC Section R303.4,[40] and IRC Section R303.6.[41]

11.2.2 Use without a thermal barrier in accordance with IBC Section 2603.4 and IRC Section R303.4[42] when No Burn Plus ThB Intumescent Coating is applied.

11.3 Any application specific issues not addressed herein can be engineered by an RDP. Assistance with engineering is available from Huntsman Building Solutions.

11.4 IBC Section 104.2.3[43] (IRC Section R104.2.2[44] and IFC Section 104.2.3[45] are similar) in pertinent part state:

> **104.2.3 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 is not specifically prohibited by this code and has been approved.

11.5 **Approved:**[46] Building regulations require that the building official shall accept duly authenticated reports.[47]

11.5.1 An approved agency is *"approved"* when it is ANAB ISO/IEC 17065 accredited.

11.5.2 An approved source is *"approved"* when an RDP is properly licensed to transact engineering commerce.

11.5.3 Federal law, Title 18 US Code Section 242, requires that, where the alternative product, material, service, design, assembly, and/or method of construction is not approved, the building official shall respond in writing, stating the reasons why the alternative was not approved. Denial without written reason deprives a protected right to free and fair competition in the marketplace.

11.6 DrJ is a licensed engineering company, employs licensed RDPs and is an ANAB Accredited Product Certification Body – Accreditation #1131.

11.7 Through the IAF Multilateral Arrangement (MLA), this duly authenticated report can be used to obtain product approval in any jurisdiction or country because all ANAB ISO/IEC 17065 duly authenticated reports are equivalent.[48]

12 Conditions of Use

12.1 As defined in **Section 6**, where material and/or engineering mechanics properties are created for load resisting design purposes, the resistance to the applied load shall not exceed the ability of the defined properties to resist those loads using the principles of accepted engineering practice.

12.2 FOAM-LOK 450 and FOAM-LOK 750 insulation comply with, or are suitable alternatives to, what is specified in the codes listed in **Section 4**, subject to the following conditions:

12.2.1 The manufacturer installation instructions and this report shall be available on the jobsite for inspection.

12.2.2 The SPF insulation shall be installed in accordance with the manufacturer published installation instructions, this report, and the applicable code. If there is a conflict between the installation instructions and this report, the more restrictive governs.

12.2.3 The SPF insulation shall be separated from the interior of the building by an approved 15-minute thermal barrier, except as noted in this report.

12.2.4 When installed in unvented attics without a code-prescribed ignition barrier or thermal barrier, the installation shall meet the conditions outlined in **Section 6.5**.

12.2.5 The SPF insulation shall meet the minimum thicknesses and densities noted in this report.

12.2.6 The SPF insulation shall be protected from the weather during and after application.

12.2.7 The SPF insulation shall be applied by licensed dealers and installers certified by Huntsman Building Solutions.

12.2.8 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 R303.7,[49] as applicable.

12.2.9 Jobsite certification and labeling of the SPF insulation shall comply with IRC Section N1101.10.1, IRC Section N1101.10.1.1, IECC Section C303.1.1, and IECC Section C303.1.1.1.

12.2.10 A vapor retarder shall be installed in accordance with the applicable code.

12.2.11 The components used to produce FOAM-LOK 450 and FOAM-LOK 750 are manufactured in Arlington, Texas and Mississauga, Ontario, Canada, under a quality control program with inspections in accordance with IBC Section 2603.2 and IRC Section R303.2.[50]

12.3 When required by adopted legislation and enforced by the building official, also known as the Authority Having Jurisdiction (AHJ) in which the project is to be constructed:

12.3.1 Any calculations incorporated into the construction documents shall conform to accepted engineering practice and, when prepared by an approved source, shall be approved when signed and sealed.

12.3.2 This report and the installation instructions shall be submitted at the time of permit application.

12.3.3 These innovative products have an internal quality control program and a third-party quality assurance program.

12.3.4 At a minimum, these innovative products shall be installed per **Section 9**.

12.3.5 The review of this report by the AHJ shall comply with IBC Section 104.2.3.2 and IBC Section 105.3.1.

12.3.6 These innovative products [has/have] an internal quality control program and a third party quality assurance program in accordance with IBC Section 104.7.2, IBC Section 110.4, IBC Section 1703, IRC Section R104.7.2, and IRC Section R109.2.

12.3.7 The application of these innovative products in the context of this report is dependent upon the accuracy of the construction documents, implementation of installation instructions, inspection as required by IBC Section 110.3, IRC Section R109.2, and any other regulatory requirements that may apply.

12.4 The approval of this report by the AHJ shall comply with IBC Section 1707.1, where legislation states in part, *"the building official shall make, or cause to be made, the necessary tests and investigations; or the building official shall accept duly authenticated reports from approved agencies in respect to the quality and manner of use of new materials or assemblies as provided for in Section 104.2.3"*, all of IBC Section 104, and IBC Section 105.3.

12.5 Design loads shall be determined in accordance with the regulations adopted by the jurisdiction in which the project is to be constructed and/or by the building designer (i.e., owner or RDP).

12.6 The actual design, suitability, and use of this report for any particular building, is the responsibility of the owner or the authorized agent of the owner.

13 Identification

13.1 FOAM-LOK 450 and FOAM-LOK 750 Spray Polyurethane Foam Insulation, as listed in **Section 1.1**, are identified by a label on the board or packaging material bearing the manufacturer name, product name, this report number, and other information to confirm code compliance.

13.2 Additional technical information can be found at huntsmanbuildingsolutions.com.

14 Review Schedule

14.1 This report is subject to periodic review and revision. For the latest version, visit www.drjcertification.org.

14.2 For information on the status of this report, please contact DrJ Certification.

Issue Date: March 11, 2022
Subject to Renewal: April 1, 2027

FBC Supplement to Report Number 1810-01

REPORT HOLDER: Huntsman Building Solutions

1 Evaluation Subject

1.1 FOAM-LOK 450 and FOAM-LOK 750 Spray Polyurethane Foam Insulation

2 Purpose and Scope

2.1 Purpose

2.1.1 The purpose of this Report Supplement is to show FOAM-LOK 450 and FOAM-LOK 750, recognized in Report Number 1810-01, have also been evaluated for compliance with the codes listed below as adopted by the Florida Building Commission.

2.2 *Applicable Code Editions*

2.2.1 *FBC-B—20, 23: Florida Building Code – Building*

2.2.2 *FBC-R—20, 23: Florida Building Code – Residential*

3 Conclusions

3.1 FOAM-LOK 450 and FOAM-LOK 750, described in Report Number 1810-01, comply with FBC-B and FBC-R and are subject to the conditions of use described in this supplement.

3.2 Where there are variations between the IBC and IRC and the FBC-B and FBC-R applicable to this report, they are listed here:

3.2.1 FBC-B Section 104 is reserved.

3.2.2 FBC-B Section 110.4 is reserved and replaces IBC Section 110.4.

3.2.3 FBC-B Section 104.6 is reserved and replaces IBC Section 104.4.

3.2.4 FBC-B Section 104.11 replaces IBC Section 104.2.3 and Section 104.2.3.2.

3.2.5 FBC-B Section 105.3 replaces IBC Section 105.3.

3.2.6 FBC-B Section 105.3.1 replaces IBC Section 105.3.1.

3.2.7 FBC-B Section 110.3 replaces IBC Section 110.3.

3.2.8 FBC-B Section 803.1.2.1 replaces IBC Section 803.1.1.1.

3.2.9 FBC-B Section 1203.3 replaces IBC Section 1202.3.

3.2.10 FBC-B Section 1707.1 replaces IBC Section 1707.1.

3.2.11 FBC-B Section 2306.1 replaces IBC Section 2306.1.

3.2.12 FBC-B Section 2306.3 replaces IBC Section 2306.3.

3.2.13 FBC-B Section 2603.3 replaces IBC Section 2603.3.

3.2.14 FBC-B Section 2603.4 replaces IBC Section 2603.4.

3.2.15 FBC-B Section 2603.5.4 replaces IBC Section 2603.5.4.

3.2.16 FBC-B Section 2603.8 replaces IBC Section 2603.8.

3.2.17 FBC-B Section 2603.9 replaces IBC Section 2603.9.

3.2.18 FBC-R Section N1101.1 replaces IRC Section N1101.10.1, IRC Section N1101.10.1.1, IRC Section N1101.10.5, IRC Section N1102 and IRC Section N1102.4.

3.2.19 FBC-R Section R104 and Section R109 are reserved.

3.2.20 FBC-R Section R316.2 replaces IRC Section R303.2.

3.2.21 FBC-R Section R316.3 replaces IRC Section R303.3.

3.2.22 FBC-R Section R316.4 replaces IRC Section R303.4.

3.2.23 FBC-R Section R316.6 replaces IRC Section R303.6.

3.2.24 FBC-R Section R316.7 replaces IRC Section R303.7.

3.2.25 FBC-R Section R408.3 replaces IRC Section R408.3.

3.2.26 FBC-R Section R408.4 replaces IRC Section R408.4.

3.2.27 FBC-R Section R806 replaces IRC Section R806.

3.2.28 FBC-R Section R806.5 replaces IRC Section R806.5.

4 Conditions of Use

4.1 FOAM-LOK 450 and FOAM-LOK 750, described in Report Number 1810-01, must comply with all of the following conditions:

4.1.1 All applicable sections in Report Number 1810-01.

4.1.2 The design, installation, and inspections are in accordance with additional requirements of FBC-B Chapter 16 and Chapter 17, as applicable.

Notes

1 For more information, visit drjcertification.org or call us at 608-310-6748.

2 Capitalized terms and responsibilities are defined pursuant to the applicable building code, applicable reference standards, the latest edition of TPI 1, the NDS, AISI S202, US professional engineering law, Canadian building code, Canada professional engineering law, Qualtim External Appendix A: Definitions/Commentary, Qualtim External Appendix B: Project/Deliverables, Qualtim External Appendix C: Intellectual Property and Trade Secrets, definitions created within Design Drawings and/or definitions within Reference Sheets. Beyond this, terms not defined shall have ordinarily accepted meanings as the context implies. Words used in the present tense include the future; words stated in the masculine gender include the feminine and neuter; the singular number includes the plural and the plural, the singular.

3 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1702

4 Alternative Materials, Design and Methods of Construction and Equipment: The provisions of any regulation code are not intended to prevent the installation of any material or to prohibit any design or method of construction not specifically prescribed by a regulation. Please review https://www.justice.gov/atr/mission and https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3

5 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.2:~:text=the%20design%20strengths%20and%20permissible%20stresses%20shall%20be%20established%20by%20tests

6 The design strengths and permissible stresses of any structural material shall conform to the specifications and methods of design of accepted engineering practice. https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1706.1:~:text=Conformance%20to%20Standards-,The%20design%20strengths%20and%20permissible%20stresses,-of%20any%20structural

7 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1:~:text=the%20building%20official%20shall%20make%2C%20or%20cause%20to%20be%20made%2C%20the%20necessary%20tests%20and%20investigations%3B%20or%20the%20building%20official%20shall%20accept%20duly%20authenticated%20reports%20from%20approved%20agencies%20in%20respect%20to%20the%20quality%20and%20manner%20of%20use%20of%20new%20materials%20or%20assemblies%20as%20provided%20for%20in%20Section%20104.2.3.

8 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4.2

9 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_agency

10 https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#approved_source

11 https://www.law.cornell.edu/uscode/text/18/1832 (b) Any organization that commits any offense described in subsection (a) shall be fined not more than the greater of $5,000,000 or 3 times the value of the stolen trade secret to the organization, including expenses for research and design and other costs of reproducing the trade secret that the organization has thereby avoided. The federal government and each state have a public records act. To follow DTSA and comply state public records and trade secret legislation requires approval through ANAB ISO/IEC 17065 accredited certification bodies or approved sources. For more information, please review this website: Intellectual Property and Trade Secrets.

12 https://www.nspe.org/resources/issues-and-advocacy/professional-policies-and-position-statements/regulation-professional AND https://apassociation.org/list-of-engineering-boards-in-each-state-archive/

13 https://www.cbitest.com/accreditation/

14 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.1:~:text=directed%20to%20enforce%20the%20provisions%20of%20this%20code

15 https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#104.2.3 AND https://up.codes/viewer/mississippi/ibc-2024/chapter/1/scope-and-administration#105.3.1

16 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1

17 https://iaf.nu/en/about-iaf-mla/#:~:text=Once%20an%20accreditation%20body%20is%20a%20signatory%20of%20the%20IAF%20MLA%2C%20it%20is%20required%20to%20recognise%20certificates%20and%20validation%20and%20verification%20statements%20issued%20by%20conformity%20assessment%20bodies%20accredited%20by%20all%20other%20signatories%20of%20the%20IAF%20MLA%2C%20with%20the%20appropriate%20scope

18 True for all ANAB accredited product evaluation agencies and all International Trade Agreements.

19 https://www.justice.gov/crt/deprivation-rights-under-color-law AND https://www.justice.gov/atr/mission

20 Unless otherwise noted, the links referenced herein use un-amended versions of the 2024 International Code Council (ICC) 2024 International Code Council (ICC) model codes as foundation references. Mississippi versions of the IBC 2024 and the IRC 2024 are un-amended. This material, product, design, service and/or method of construction also complies with the 2000-2012 versions of the referenced codes and the standards referenced therein. As pertinent to this technical and code compliance evaluation, CBI and/or DrJ staff have reviewed any state or local regulatory amendments to assure this report is in compliance.

21 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by the local jurisdiction. https://up.codes/codes/general

22 See Adoptions by Publisher for the latest adoption of a non-amended or amended model code by state. https://up.codes/codes/general

23 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3282/subpart-A/section-3282.14

24 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

25 All references to the FBC-B and FBC-R are the same as the 2024 IBC and 2024 IRC unless otherwise noted in the Florida Supplement at the end of this report.

26 https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#p-3280.2(Listed%20or%20certified); https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#listed AND https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#labeled

27 2021 IRC Section R316.3

28 2021 IECC Section C402.5.1.3 and 2018 IECC Section C402.5.1.2.1

29 2021 IRC Section R316.4 and 2018 IRC Section R316.4

30 https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1703.4

[31] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=All%20construction%20methods%20shall%20be%20in%20conformance%20with%20accepted%20engineering%20practices%20to%20insure%20durable%2C%20livable%2C%20and%20safe%20housing%20and%20shall%20demonstrate%20acceptable%20workmanship%20reflecting%20journeyman%20quality%20of%20work%20of%20the%20various%20trades

[32] https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280#:~:text=The%20strength%20and%20rigidity%20of%20the%20component%20parts%20and/or%20the%20integrated%20structure%20shall%20be%20determined%20by%20engineering%20analysis%20or%20by%20suitable%20load%20tests%20to%20simulate%20the%20actual%20loads%20and%20conditions%20of%20application%20that%20occur

[33] 2021 IRC Section R316.3

[34] 2021 IRC Section R316.4 and 2018 IRC Section R316.4

[35] 2021 IRC Section R316.6 and 2018 IRC Section R316.6

[36] 2021 IRC Section R316.4 and 2018 IRC Section R316.4

[37] Qualification is performed by a legislatively defined Accreditation Body. ANSI National Accreditation Board (ANAB) is the largest independent accreditation body in North America and provides services in more than 75 countries. DrJ is an ANAB accredited product certification body.

[38] https://anabpd.ansi.org/Accreditation/product-certification/AllDirectoryDetails?prgID=1&orgID=2125&statusID=4#:~:text=Bill%20Payment%20Date-,Accredited%20Scopes,-13%20ENVIRONMENT.%20HEALTH

[39] See Code of Federal Regulations (CFR) Title 24 Subtitle B Chapter XX Part 3280 for definition: https://www.ecfr.gov/current/title-24/subtitle-B/chapter-XX/part-3280

[40] 2021 IRC Section R316.4 and 2018 IRC Section R316.4

[41] 2021 IRC Section R316.6 and 2018 IRC Section R316.6

[42] 2021 IRC Section R316.4 and 2018 IRC Section R316.4

[43] 2021 IBC Section 104.11

[44] 2021 IRC Section R104.11

[45] 2018: https://up.codes/viewer/wyoming/ifc-2018/chapter/1/scope-and-administration#104.9 AND 2021: https://up.codes/viewer/wyoming/ibc-2021/chapter/1/scope-and-administration#104.11

[46] Approved is an adjective that modifies the noun after it. For example, Approved Agency means that the Agency is accepted officially as being suitable in a particular situation. This example conforms to IBC/IRC/IFC Section 201.4 (https://up.codes/viewer/mississippi/ibc-2024/chapter/2/definitions#201.4) where the building code authorizes sentences to have an ordinarily accepted meaning such as the context implies.

[47] https://up.codes/viewer/mississippi/ibc-2024/chapter/17/special-inspections-and-tests#1707.1

[48] Multilateral approval is true for all ANAB accredited product evaluation agencies and all International Trade Agreements.

[49] 2021 IRC Section R316.7

[50] 2021 IRC Section R316.2