EVALUATION REPORT

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DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION
Section: 07 21 00 – Thermal Insulation

REPORT HOLDER:
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EVALUATION SUBJECT:

QuadFoam®2.0

1.0 EVALUATION SCOPE:

1.1 Compliance with the following codes:

- 2009 International Building Code® (IBC)
- 2009 International Residential Code® (IRC)
- 2009 International Energy Conservation Code® (IECC)
- 2006 International Building Code® (IBC)
- 2006 International Residential Code® (IRC)
- 2006 International Energy Conservation Code® (IECC)

1.2 Evaluated in accordance with

- ICC-ES AC 377, dated October 2010

1.3 Properties evaluated:

- Surface-burning characteristics
- Physical properties
- Thermal Resistance
- Use in attics and crawlspaces
- Air permeability

2.0 USES

QuadFoam® 2.0 is a closed-cell spray foam is used as a nonstructural thermal insulating material in Type VB construction under the IBC and dwellings under the IRC.
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3.0 DESCRIPTION

3.1 QuadFoam® 2.0 Insulation:

QuadFoam®2.0 is a spray applied, closed cell polyurethane foam plastic insulation having a nominal density of 2.0 pounds per cubic foot (32 kg/m^3).

3.2 Surface Burning Characteristics:

3.2.1 The **QuadFoam® 2.0** insulation, at a maximum thickness of 4 inches (102 mm) and a nominal density of 2.0 pounds per cubic foot (32.0 kg/m^3), has a flame spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E 84.

3.2.2 Thicknesses of up to 11 ½ inches (292 mm) for ceiling cavities and 7 ½ inches (191 mm) for wall cavities are recognized based on testing in accordance with NFPA 286, when covered with a minimum ½ inch thick gypsum board or an equivalent thermal barrier complying with, and installed in accordance with the applicable code.

3.3 Thermal Resistance:

QuadFoam® 2.0 insulation has a thermal resistance, R-value, at a mean temperature of 75° F (24° C) as shown in Table 1.

3.4 Intumescent Coating:

DC 315: intumescent coating is manufactured by International Fireproof Technology Inc., and is a water-based coating supplied in 5-gallon (19L) pails and 55-gallon (208L) drums. The coating material has a maximum shelf life of 24 months when stored in factory sealed containers at temperatures between 50°F (10°C) and 90°F (32°C).

4.0 DESIGN AND INSTALLATION

4.1 General:

QuadFoam® 2.0 spray-applied foam insulation must be installed in accordance with the manufacturer's published installation instructions and this report. A copy of these instructions and this evaluation report must be available on the jobsite at all times during installation.

4.2 Application:

QuadFoam® 2.0 must be applied using spray equipment specified by Quadrant Urethane Technologies.

4.3 Thermal Barrier:

4.3.1 Application with a Prescriptive Thermal Barrier: QuadFoam® 2.0 spray foam insulation with maximum nominal thicknesses of 11.5 inches (292 mm) in ceiling cavities and 7.5 inches (190 mm) in wall cavities must be separated from the interior of the building by a thermal barrier. The IBC and IRC specify an approved thermal barrier of ½-inch thick (12.7 mm) gypsum board wallboard or equivalent 15-minute thermal barrier complying with IBC Section 2603.4 or IRC Section R316.4, as applicable.

4.3.2 Application without a Prescriptive Thermal Barrier: QuadFoam® 2.0 spray foam insulation may be installed without a prescriptive thermal barrier when it has been coated on all surfaces with 18 mils dry film thickness of DC 315 intumescent coating as described in Section 3.4 of this report. The maximum thickness of the spray foam insulation is limited to 7.5 inches (190 mm) on vertical surfaces and 11.5 inches (292 mm) on overhead surfaces. Coating must be applied in accordance with International Fireproof Technology's installation instructions and this report. Surfaces to be coated must be dry, clean, and free of dirt, loose debris and other substances. The coating is applied in one-coat with low-pressure airless air equipment.

4.4 Attics and Crawl Spaces:

When installing QuadFoam® 2.0 in attics and/or crawl spaces and a thermal barrier is omitted in accordance with IBC Section 2603.4.1.6 or IRC Sections R316.5.3 or R316.5.4, installation must comply with either Sections 4.4.1 or 4.4.2 below.

QuadFoam® 2.0 spray-foam insulation qualifies as an air-impermeable insulation and, when installed in accordance with Sections 4.4.1 or 4.4.2.1, may be used to insulate unvented attics in accordance with IRC Section R806.4.

4.4.1 Application with a Prescriptive Ignition Barrier: When QuadFoam® 2.0 insulation is installed within attics and crawl spaces where entry is made only service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 or IRC Sections R316.5.3 and R316.5.4, as applicable. The ignition barrier must be consistent with the construction type of the building.

4.4.2 Application without a Prescriptive Ignition Barrier: Where the spray-applied insulation is installed in accordance with Section 4.4.2.1 or 4.4.2.2, the following conditions apply:

a) Entry to the attic or crawl space is only to service utilities, and no storage is permitted.
b) There are no interconnected attic or crawl space areas.
c) Air in the attic or crawl space is not circulated to other parts of the building.
d) Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806, except when an air-impermeable insulation is permitted in unvented attics in accordance with Section R806.4 of IRC. Under-floor (crawl space) ventilation is provided when required by IBC Section 1203.3 or IRC Section R408.1, as applicable.
e) The foam plastic insulation is limited to the maximum thickness and density tested.
f) Combustion air is provided in accordance with Sections 701 and 703 (2006 IMC) and Section 701 (2012 and 2009 IMC).
g) The installed coverage rate or thickness of coatings, if part of the insulation system, shall be equal to or greater than that which was tested.

4.4.2.1 Attics and Crawl Spaces: QuadFoam® 2.0 spray foam insulation may be spray-applied without an ignition barrier to the underside of the roof deck to thicknesses not exceeding 11.5 inches (292 mm) and/or vertical surfaces to thicknesses not exceeding 7.5 inches (190 mm), as described in this section When QuadFoam® 2.0 is installed as described in this section, no ignition barrier or a coating are required.

As an alternative QuadFoam® 2.0 insulation may be covered with DC 315 intumescent coating as described in Section 3.4 and installed with the manufacturer's installation instructions. The foam plastic must be covered on all exposed surfaces with an application of DC 315 as described in Section 3.4 of 18 mils dry film thickness. Surfaces to be coated must be dry, clean, and free of dirt, loose debris and other substances. The coating is applied in one-coat with low-pressure airless air equipment.

4.4.2.2 Use on Attic Floors:
QuadFoam® 2.0 insulation may be installed exposed (no coating), without an ignition barrier up to a maximum thickness of 11 ½ inches (292 mm) between and over the joist in attic floors. The insulation must be separated from the interior of the building by an approved thermal barrier. The ignition barrier required by IBC Section 2603.4 and IRC Section R316.5.3 may be omitted in this case.

5.0 CONDITIONS OF USE

The QuadFoam® 2.0 spray foam insulation described in this report complies with, or is a suitable alternative to what is specified in those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 The product must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. The instructions within this report govern if there are any conflicts between the manufacturer's published installation instructions and this report.

5.2 QuadFoam® 2.0 insulation must be protected by a 15 minute thermal barrier in accordance with Section 4.3.1 of this report except when installation complies with Sections 4.3.2 (Application without a Prescriptive Thermal Barrier) and/or 4.4 (Attics and Crawl Spaces) of this report

5.3 The A and B components of the insulation are produced under a quality control program with inspections by IAPMO Uniform ES.

5.4 QuadFoam® 2.0 insulation must be installed by contractors certified by Quadrant Urethane Technologies.

5.5 When QuadFoam® 2.0 insulation is used in areas wherein the likelihood of termite infestation is "very heavy," it must be installed in accordance with 2009 IBC Section 2603.8 or IRC Section R318.4, as applicable.

5.6 Jobsite labeling and certification of the insulation must comply with IRC Sections N1101.4 and N1101.4.1 and IECC Sections 303.1.1 and 303.1.2 as applicable.

5.7 Where applicable, QuadFoam® 2.0 must be installed with a vapor retarder in accordance with the applicable code.

5.8 Use of QuadFoam® 2.0 insulation under this report is limited to Construction Type VB.

6.0 EVIDENCE SUBMITTED

6.1 Data and test reports submitted are from laboratories in compliance with ISO/IEC 17025 and in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation, (AC377), dated October 2010, including reports of tests in accordance with Appendix X of AC 377.

7.0 IDENTIFICATION

Containers of QuadFoam® 2.0 components are identified with a label bearing the Quadrant Corp. name address; the product trade name (QuadFoam® 2.0, Grade S, W, AS or AW); the lot number; the flame spread and smoke developed indices; mixing instructions; density; the shelf life; the expiration date; and the IAPMO Uniform ES Evaluation Report number (ER-0272).

IAPMO UES #0272

Amir Zamanian, PE
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GP Russ Chaney
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Table 1—Thermal Resistance (R-Values)[1]

Thickness (inch)	R-Value (°F•ft^2•hr/Btu)
1.0	6.5
2.0	13
3.0	19
4.0	25
7.5	47
11.5	71

SI: 1 inch = 25.4 mm; 1 °F•ft^2•hr/Btu = 0.176 °K•m^2•hr/W

[1]R-values are calculated based on tested k-factors at 1- and 3.5-inch thicknesses.