Code Compliance Research Report
CCRR-0610

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DIVISION: 07 00 00 – THERMAL AND MOISTURE PROTECTION
Section: 07 21 00 – Thermal Insulation
Section: 07 21 19 – Foamed-In-Place Insulation

REPORT HOLDER:
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REPORT SUBJECT:
UPC 400 Spray-applied Polyurethane Foam Plastic Insulation

1.0 SCOPE OF EVALUATION

1.1 This Research Report addresses compliance with the following Codes:

- 2024, 2021, 2018 *International Building Code®* (IBC)
- 2024, 2021, 2018 *International Residential Code®* (IRC)
- 2024, 2021, 2018 *International Energy Conservation Code®* (IECC)
- 2026, 2023 *Florida Building Code* – See Section 9

NOTE: This report references the most recent Code editions cited. Section numbers in earlier editions may differ.

1.2 The insulation has been evaluated for the following properties (see Table 1):

- Physical properties
- Surface-burning characteristics
- Thermal resistance
- Air permeance

1.3 The insulation has been evaluated for the following uses (see Table 1):

- Use as a nonstructural thermal insulating material on or in interior and exterior walls, floors, ceilings and the underside of roofs
- Alternative to Code-prescribed thermal barriers
- Alternative to Code-prescribed ignition barriers
- Use in Types I, II, III, IV, and V construction under the IBC and construction under the IRC

2.0 STATEMENT OF COMPLIANCE

The spray-applied polyurethane insulation products described in this report comply with the Codes listed in Section 1.1, for the properties stated in Section 1.2, and uses stated in Section 1.3, when installed as described in this report, including the Conditions of Use stated in Section 6.0.

2.1 2024 IBC and IRC Evaluation Reports: The Intertek CCRR is an *Evaluation Report* for approval of an alternate material, design, or method of construction in accordance with Section 104.2.3.6.1 of the 2024 IBC and Section R104.2.2.6.1 of the 2024 IRC.

3.0 DESCRIPTION

3.1 UPC 400: The insulation is a two-component, open cell, spray-applied polyurethane foam plastic having a nominal in-place density of 0.44 pcf. The insulation is produced in the field by combining a polymeric isocyanate (A component) with a resin (B component). The insulation liquid components are supplied in 55-gallon drums and must be stored at temperatures between 50°F and 80°F. The resin (B component) must be protected from freezing temperatures. The A components have a shelf life of twelve months and B components have a shelf life of six months when stored in factory-sealed containers at these temperatures.

3.2 DC315 Intumescent Coating: DC315 intumescent coating, manufactured by International Fireproof Technology, Inc., is a water-based coating supplied in

5-gallon pails and 55-gallon drums. The coating material has a shelf life of 24 months when stored in factory-sealed containers at a temperature between 41°F and 95°F. DC315 complies with ICC-ES AC456 and is recognized in ICC-ES ESR-3702.

3.3 No Burn® Plus ThB: No-Burn® Plus ThB is a one-part water-based intumescent coating manufactured by No-Burn, Inc. The coating is supplied in 5-gallon pails and 55-gallon drums, and has a shelf life of 12 months when stored in unopened containers between 40°F and 90°F. No-Burn® Plus ThB complies with ICC-ES AC456 as recognized in IAPMO Uniform Evaluation Service Report ER-0305.

3.4 Flame Control 60-60A Intumescent Coating: The coating, manufactured by Flame Control Coatings, is a water-based coating supplied in 5-gallon pails and 55-gallon drums, and has a shelf life of 12 months when stored in factory sealed containers at temperatures above 50°F. The coating complies with ICC-ES AC456 as recognized in IAPMO Uniform Evaluation Service Report ER-0596.

4.0 PERFORMANCE CHARACTERISTICS

4.1 Surface-burning Characteristics: The insulation, at a maximum thickness of 4 inches and the nominal density stated in Section 3.1 of this report, has a flame-spread index of 25 or less and a smoke-developed index of 450 or less when tested in accordance with ASTM E84. Based on large scale tests in accordance with NFPA 286 and ICC-ES AC377 Appendix X, the insulation can be installed at greater thicknesses as described in Sections 5.3 and 5.4.

When the insulation is separated from the interior occupied space of the building with minimum 1/2-inch-thick gypsum board, the maximum insulation thickness is not limited. Under the IRC, a thermal barrier of minimum 23/32-inch-thick wood structural panel is also permitted, and the maximum insulation thickness is not limited.

4.2 Thermal Resistance: The thermal resistance of the UPC 400 insulation is shown in Table 2.

4.3 Air Permeability: UPC 400, at a minimum thickness of 3-1/2 inches, is considered air-impermeable insulation in accordance with IBC Section 1202.3 and IRC Sections R202 and R806.5, and is considered an air barrier material complying with IECC Section C402.6.2.3.1, based on testing in accordance with ASTM E2178.

5.0 INSTALLATION

5.1 General: The insulation must be installed in accordance with the manufacturer's published installation instructions, the applicable Code, and this Research Report. A copy of the manufacturer's instructions must be available on the jobsite during installation.

5.2 Application: The insulation is spray-applied on the jobsite using a volumetric positive displacement pump as identified in the General Coatings application instructions. The insulation must be applied when the ambient temperature is greater than 32°F. The insulation must not be used in areas that have a maximum in-service temperature of greater than 180°F. The insulation must not be used in electrical outlet or junction boxes or in contact with water, rain, or soil. The insulation must not be sprayed onto a substrate that is wet or covered with frost or ice, loose scales, rust, oil, or grease. The insulation must be protected from the weather during and after application. The insulation is applied in passes a minimum of 3-inches-thick and a maximum of 8-inches-thick.

5.3 Thermal Barrier:

5.3.1 Application with a Prescriptive Thermal Barrier: The insulation must be separated from the interior living space of the building by an approved thermal barrier of 1/2-inch-thick gypsum board or an equivalent 15-minute thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section R303.4, as applicable. Exceptions are provided in Sections 5.3.2 and 5.4.

When the insulation is separated from the interior living space of the building with minimum 1/2-inch-thick gypsum board, the maximum thickness is not limited. Under the IRC, a thermal barrier of 23/32-inch-thick wood structural panel is also permitted, and the maximum insulation thickness is unlimited.

5.3.2 Application without a Prescriptive Thermal Barrier: The insulation may be installed without the

15-minute thermal barrier prescribed in IBC Section 2603.4 and IRC Section R303.4, when installed as described in this section. The insulation must be covered with one of the following coatings:

- UPC 400 insulation must be a maximum of 8-1/2 inches on walls and 14 inches on ceilings, and be covered on all surfaces with DC315 applied at 18 wet mils (1.13 gal/100ft^2).
- UPC 400 insulation must be a maximum of 8-1/2 inches on walls and 14 inches on ceilings, and be covered on all surfaces with No Burn Plus ThB applied at 14 wet mils (0.90 gal/100 ft^2).

The coating must be applied over the insulation in accordance with the coating manufacturer's instructions and this report. Surfaces to be coated must be dry, clean, and free of dirt, loose debris, and other substances that could interfere with adhesion of the coating. The coating is applied with low-pressure airless spray equipment.

5.4 Attics and Crawl Spaces: The insulation may be applied in attics and crawl spaces as described in either 5.4.1 or 5.4.2. When the insulation is installed in an attic or crawlspace in accordance with this section, a thermal barrier is not required between the insulation and the attic or crawl space but is required between the insulation and the interior living space. Attics and crawl spaces must be ventilated in accordance with the applicable Code.

5.4.1 Application with a Prescriptive Ignition Barrier: When the insulation is installed within attics and crawl spaces where entry is made only for service of utilities, the ignition barrier must be installed in accordance with IBC Section 2603.4.1.6, or IRC Section R303.5.3 or R303.5.4, as applicable. The ignition barrier must be consistent with the requirements for the type of construction required by the applicable Code and must be installed in a manner so the foam plastic insulation is not exposed.

5.4.2 Application without a Prescriptive Ignition Barrier: The insulation may be installed in attics and crawl spaces without the ignition barrier prescribed in IBC Section 2603.4.1.6 and IRC Sections R303.5.3 and R303.5.4, subject to the following conditions:

a. Entry to the attic or crawl space is only to service utilities, and no storage is permitted.
b. There are no interconnected attic or crawl space areas.
c. Air in the attic or crawl space is not circulated to other parts of the building.
d. Under-floor (crawl space) ventilation is provided when required by IBC Section 1202.4 or IRC Section R408.1, as applicable.
e. Attic ventilation is provided when required by IBC Section 1202.2.1 or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in accordance with IBC Section 1202.3 or IRC Section R806.5.
f. Combustion air is provided in accordance with IMC (International Mechanical Code) Section 701.

The insulation may be spray-applied to the underside of the roof sheathing and/or rafters in attics; the underside of wood floors in crawl spaces; and to vertical surfaces in both attics and crawl spaces, as described in this section. The thickness of the insulation applied to the underside of horizontal and vertical surfaces must not exceed those described in Table 3. The insulations must be covered on all exposed surfaces with an intumescent coating as described in Table 3. The coating is applied with low-pressure airless spray equipment in accordance with the coating manufacturer's instructions and this report. Surfaces to be coated must be dry, clean, and free of dirt, loose debris, and other substances that could interfere with the adhesion of the coating.

5.4.3 Unvented Attics:
In unvented attics conforming with IBC Section 1202.3 or IRC Section R806.5, the UPC 400 insulation may be left exposed to the attic without a prescriptive ignition barrier or an intumescent coating, to a maximum thickness of 12 inches on ceilings and 8 inches on walls and a minimum thickness of 3 inches, subject to the following conditions:

a. Entry to the attic is only to service utilities, and no storage is permitted.
b. There are no interconnected attic areas.
c. Air in the attic is not circulated to other parts of the building.
d. Combustion air is provided in accordance with IMC (International Mechanical Code) Section 701.
e. A downward opening attic hatch is required. The hatch shall remain closed at all times except for when servicing of utilities is required. The hatch shall be able to be opened freely without disengaging a latching or locking mechanism.
f. The maximum uniform pressure required to open the downward opening attic hatch shall be less than 10

psf. The performance of the downward opening hatch is outside the scope of this evaluation report, but adequate information shall be provided to the Code Official to demonstrate that this requirement has been satisfied. For field verification, the force required to open the downward opening hatch, when measured from the edge of the downward opening hatch opposite the hinges shall not exceed the value calculated using the equation below:

F_{open} (lbf) ≤ *Hatch Width* (ft.) x *Hatch Length* (ft.) x 5 lbf/ft^2

g. An installation certificate with the following information shall be posted at each entrance to the attic:
   - Product name and installation thickness
   - Manufacturer name, address and contact information
   - Installation contractor name, address and contact information
   - Attestation that the product has been installed in accordance with the manufacture's installation instructions and the requirements of the CCRR
   - A notice that the certificate is not to be removed or altered
   - A list of limitations for the space, including the following:
     - Entry to the space is only to service utilities and no storage is permitted.
     - The hatch shall remain closed at all times except for when servicing of utilities is required. No locks or latches that would prevent the hatch from opening freely may be added at the hatch.
     - FIRE SAFETY WARNING: If hot work (welding/ cutting) is required to be performed, all necessary procedures, precautions and limitations must be observed in accordance with OSHA 1926, Subpart J, Standard 1926.352 requirements for hot work performed in the vicinity of combustible materials.

5.4.4 Use on Attic Floors: The insulation may be applied between and over the joists in attic floors to a maximum thickness of 8-1/2 inches and must be covered with DC315 intumescent coating as described in Section 5.4.2. The insulation must be separated from the interior occupied space by an approved thermal barrier.

5.5 Exterior Walls in Type I, II, III, and IV Construction:

5.5.1 When used in exterior walls of Type I, II, III, or IV construction, the assembly must comply with IBC Section 2603.5 and this section. Intertek Design Listing GCM/FI 30-01 describes the assembly tested and certified by Intertek as complying with NFPA 285. The potential heat of the foam plastic is 445 Btu/ft^2 per inch of insulation thickness with a maximum permitted thickness of 6 inches.

5.5.2 Details of exterior wall coverings and fenestration details must be provided to the building official, along with an engineering analysis demonstrating that the addition of the wall covering and fenestration details will not negatively impact conformance of the assembly with the requirements of IBC Section 2603.5.

6.0 CONDITIONS OF USE

6.1 Installation must comply with this Research Report, the manufacturer's published installation instructions, and the applicable Code. In the event of a conflict, this report governs.

6.2 The insulation must be separated from the interior occupied space of the building by a thermal barrier as described in Section 5.3, except as described in Section 5.3.2 and 5.4.

6.3 The insulation must not exceed the thicknesses noted in Sections 4.1, 5.3, and 5.4, as applicable.

6.4 UPC 400 may be installed in unvented attics without a prescriptive ignition barrier or intumescent coating, subject to the conditions noted in Section 5.4.4.

6.5 Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with IRC Section R305.4 or IBC Section 2603.8, as applicable.

6.6 Walls must include a vapor barrier complying with the code.

6.7 Jobsite certification and labeling of the insulation must comply with IRC Section N1101.10, N1101.14 and IECC Sections C303.1 or R303.1 and R401.3, as applicable.

6.8 The insulation is manufactured under a quality control program with inspections by Intertek Testing Services NA, Inc.

7.0 SUPPORTING EVIDENCE

7.1 Reports of tests in accordance with ASTM E84, ASTM E2178, NFPA 259, NFPA 285, NFPA 286, and UL 1715.

7.2 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated April 2020, including reports of tests in accordance with Appendix X and Appendix U.

7.3 Data in accordance with ICC 1100 (2019).

7.4 Research Reports for evaluation of data in accordance with ICC-ES Acceptance Criteria for Fire-protective Coatings Applied to Spray-applied Foam Plastic Insulation Installed without a Code-prescribed Thermal Barrier (AC456), dated October 2015.

7.5 Intertek Listing Report "General Coatings UPC 400 Spray-applied Polyurethane Insulation" on the Intertek Directory of Building Products.

8.0 IDENTIFICATION

The A and B components of the insulation described in this Research Report are identified with the manufacturer's name (General Coatings Manufacturing Corp or Universal Polymers Corporation), address and telephone number; the product name; use instructions; the flame-spread and smoke-developed indices; the lot number; the Intertek Mark as shown below; and the Code Compliance Research Report number (CCRR-0610).

CODE COMPLIANCE
ETL US
Intertek

9.0 FLORIDA BUILDING CODE

The UPC 400 insulation described in Sections 2.0 through 7.0 of this Research Report complies with the 2026 and 2023 *Florida Building Code – Building, Florida Building Code – Residential* and *Florida Building Code – Energy*, including High-Velocity Hurricane Zones, subject to the following conditions:

- Installation is as described in Sections 2.0 through 7.0 of this Research Report
- The products are under a quality assurance program audited by Intertek

Intertek is an approved evaluation entity and quality assurance entity pursuant to Florida Statute 553.842 – *Product Evaluation and Approval*.

10.0 CODE COMPLIANCE RESEARCH REPORT USE

10.1 Approval of building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.

10.2 Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Intertek.

10.3 Reference to the https://bpdirectory.intertek.com is recommended to ascertain the current version and status of this report.

TABLE 1A – PROPERTIES EVALUATED

PROPERTY	2024 IBC SECTION[1]	2024 IRC SECTION[1]	2024 IECC SECTION[1]
Physical properties	2603.1.1	Not required	Not required
Surface-burning characteristics	2603.3	R303.3	Not applicable
Thermal barrier/ignition barrier	2603.4	R303.4	Not applicable
Air permeability	1202.3	R806.5	C402.6
Exterior Walls in Types I-IV Construction	2603.5	Not applicable	Not applicable
Thermal resistance	1301	N1101.10 N1102	C303.1 R303.1

[1] Section numbers may be different for earlier versions of the International Codes.

TABLE 1B – PROPERTIES EVALUATED – FLORIDA BUILDING CODES

PROPERTY	2026 FBC - BUILDING SECTION	2026 FBC - RESIDENTIAL SECTION	2026 FBC - ENERGY SECTION
Physical properties	2603.1.1	R316.1.1	Not required
Surface-burning characteristics	2603.3	R316.3	Not applicable
Thermal barrier/ignition barrier	2603.4	R316.4	Not applicable
Air permeability	1203.3	R806.5	C402.5 R402.4
Exterior Walls in Types I-IV Construction	2603.5	Not applicable	Not applicable
Thermal resistance	1301	See FBC – Energy	C303.1 R303.1

TABLE 2 – THERMAL RESISTANCE – UPC 400

THICKNESS (in.)	R-VALUE ($^{\circ}F.ft^2.h/Btu$)[1, 2, 3]
1	4.0
3.5	13
14	53

[1]R-values are calculated based on tested R-values at 1- and 3.5-inch thicknesses.
[2]R-values between 1 and 3.5 inches may be interpolated; R-values greater than 3.5 inches are calculated using R=3.8 / inch.
[3]R-values greater than 10 are rounded to the nearest whole number.

TABLE 3 – USE OF INSULATION IN ATTICS AND CRAWL SPACES WITHOUT A PRESCRIPTIVE IGNITION BARRIER

INSULATION TYPE	MAXIMUM THICKNESS (inches) (Wall Cavities and Attic Floor)	MAXIMUM THICKNESS (inches) (Underside of Roof Sheathing/ Rafters and Floors)	INTUMESCENT COATING & MINIMUM THICKNESS (Applied to all Exposed Foam Surfaces)	MINIMUM APPLICATION RATE OF INTUMESCENT COATING	TEST SUBMITTED (AC377)
UPC 400	8	12	No-Burn Plus ThB 6 wet mils	0.37 gal / 100 ft^2	Appendix X
UPC 400	8-1/2	14	DC315 6 wet mils	0.38 gal / 100 ft^2	Appendix X