Code Compliance Research Report
CCRR-1106

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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:
GacoOnePass Low GWP F1880 and F1880W Spray-applied Polyurethane Insulation

1.0 SCOPE OF EVALUATION

1.1 This Research Report addresses compliance with the following Codes:

- 2024, 2021, 2018, 2015 *International Building Code®* (IBC)
- 2024, 2021, 2018, 2015 *International Residential Code®* (IRC)
- 2024, 2021, 2018, 2015 *International Energy Conservation Code®* (IECC)

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

1.2 GacoOnePass Low GWP F1880 and F1880W have been evaluated for the following properties (see Table 1):

- Physical properties
- Surface-burning characteristics
- Thermal resistance
- Air permeability
- Air Barrier
- Moisture Vapor permeance

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

- Nonstructural thermal insulating material on or in interior and exterior walls, underside of floors, ceilings, and underside of roof decks
- Alternative to thermal and ignition barriers
- Use as air-impermeable insulation
- Use as an air barrier
- Use as a moisture vapor retarder
- Use in Types I, II, III, IV, and V construction under the IBC and construction under the IRC
- Use as exterior duct insulation
- Alternative to water-resistive barriers

2.0 STATEMENT OF COMPLIANCE

GacoOnePass Low GWP F1880 and F1880W comply with the Codes listed in Section 1.1, for the properties stated in Section 1.2 and applicable uses stated in Section 1.3, when installed as described in this report, including the Conditions of Use stated in Section 6.

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 GacoOnePass Low GWP F1880 and F1880W: GacoOnePass Low GWP F1880 and GacoOnePass Low GWP F1880W insulations are closed cell, medium-density, polyurethane foam plastics. The insulations are two-component, spray-applied foam plastics with a nominal in-place density of 2.2 pound per cubic foot. The insulations are 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 250-gallon totes, and must be stored at

temperatures between 40°F and 80°F. The resin (B component) must be protected from freezing temperatures. The insulation has a shelf life of 6 months on the polymeric isocyanate (A component) and 5 months on the resin (B component) when stored in factory-sealed containers at these temperatures.

3.2 DC 315 Intumescent Coating: DC 315 intumescent coating, manufactured by International Fireproof Technology Inc. (IFTI), 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 to 95°F. DC315 complies with ICC-ES AC456 as recognized in ICC-ES ESR-3702.

3.3 Fireshell F10E Coating: Fireshell F10E coating, manufactured by ICP Construction, is a water-based coating supplied in 5-gallon pails and 55-gallon drums. The coating has a shelf life of 1 year when stored unopened at temperatures between 45°F and 95°F. Fireshell F10E complies with ICC-ES AC456 as recognized in ICC-ES ESR-3997.

3.4 No-Burn® Plus ThB Intumescent Coating: No-Burn® Plus ThB intumescent coating is a water-based coating supplied in 5-gallon pails and 55-gallon drums. The coating has a shelf life of 12 months when stored unopened at temperatures between 40°F and 90°F. No-Burn® Plus ThB complies with ICC-ES AC456 as recognized in IAPMO UES ER-0305.

4.0 PERFORMANCE CHARACTERISTICS

4.1 Surface Burning Characteristics: The insulations, at a maximum thickness of 4 inches and a nominal density of 2.2 pound per cubic foot, have 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 NPFA 286, the insulations can be installed at greater thickness as described in Sections 5.3 and 5.4. When insulations are separated from the interior living space of the building with 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, the maximum thickness is not limited.

4.2 Thermal Resistance: The insulations have thermal resistance (R-value) at a mean temperature of 75°F as shown in Table 2.

4.3 Air Permeability: The insulations, at a minimum thickness of 1 inch, are considered air-impermeable insulation in accordance with IBC Section 1202.3 or IRC Sections R202 and R806.5, based on testing in accordance with ASTM E2178.

4.4 Air Barrier: The insulations, at a minimum thickness of 1 inch, are considered an air-barrier material in accordance with IECC Section C402.6.2.3.1, based on testing in accordance with ASTM E2178.

The insulations, at a minimum thickness of 1 inch, is also considered an air barrier assembly in accordance with IECC Section C402.6.2.3.2 when tested in accordance with ASTM E2357. Window and door penetrations must be flashed in accordance with manufacturer's installation instructions and the air barrier assembly must conform to IECC Section C402.5.1.1.

4.5 Vapor Permeance: The insulations have a moisture vapor permeance of 1 perm at a minimum thickness of 1.70 inches and may be used where a Class II vapor retarder is required by the applicable Code.

5.0 INSTALLATION

5.1 General: GacoOnePass Low GWP F1880 and F1880W 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: GacoOnePass Low GWP F1880 and F1880W insulations are spray-applied on the jobsite using a volumetric positive displacement pump as identified in the Gaco application instructions. F1880 must be applied when the substrate temperature is 50°F to 120°F. F1880W must be applied when the substrate temperature is 20°F to 75°F. The insulations must not be used in areas that have a maximum in-service temperature greater than 200°F. The foam plastics must not be used in electrical outlet or junction boxes or in contact with water. The foam plastics

must not be sprayed onto a substrate that is wet, or covered with frost or ice, loose scales, rust, oil, or grease. The insulations must be protected from the weather during and after application. F1880 may be applied to the maximum thickness of 5-1/2 inches in a single pass. F1880W may be applied to the maximum thickness of 3-1/2 inches in a single pass.

5.3 Thermal Barrier:

5.3.1 Application with a Prescriptive Thermal Barrier: GacoOnePass Low GWP F1880 and F1880W insulations must be separated from the interior occupied 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. Exceptions are provided in Sections 5.3.2 and 5.4.

When the insulations are separated from the interior occupied space of the building with a Code-prescribed thermal barrier, the maximum thickness is not limited.

5.3.2 Application without a Prescriptive Thermal Barrier: GacoOnePass Low GWP F1880 and F1880W insulations 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 insulations must be covered on all exposed surfaces with intumescent coating as described in Option 1, 2, or 3 below:

Option 1:

Maximum Thickness	Minimum Application Rate
Vertical wall surfaces – 9 inches	0.87 gallon / 100 ft^2 of IFTI DC315 Intumescent Coating (14 mils WFT; 9 mils DFT)
Underside of roof decks, ceilings, or the underside of floors –12 inches	

Option 2:

Maximum Thickness	Minimum Application Rate
Vertical wall surfaces – 9 inches	1.12 gallon / 100 ft^2 of Fireshell F10E Intumescent Coating (18 mils WFT; 12 mils DFT)
Underside of roof decks, ceilings, or the underside of floors –11 inches	

Option 3:

Maximum Thickness	Minimum Application Rate
Vertical wall surfaces – 9 inches	0.9 gallon / 100 ft^2 of No-Burn® Plus ThB Intumescent Coating (14 mils WFT; 9 mils DFT)
Underside of roof decks, ceilings, or the underside of floors –12.5 inches	

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 the adhesion of the coating. The coating is applied with low-pressure airless spray equipment.

5.4 Attics and Crawl Spaces: The insulations may be applied in attics and crawl spaces as described in either Section 5.4.1 or 5.4.2. When foam insulation is installed in an attic or crawl space in accordance with this section, a thermal barrier, as described in Section 5.3.1, is not required between the foam plastic insulation and the attic or crawl space but is required between the insulation and the interior living space.

5.4.1 Application with Prescriptive Ignition Barrier: When GacoOnePass Low GWP F1880 and F1880W insulations are 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. GacoOnePass Low GWP F1880 and F1880W insulations, as described in this section, may be installed in unvented attics in accordance with IBC Section 1202.3 or IRC Section R806.5 at a minimum thickness of 1 inch. The maximum thickness of insulation is as noted in Section 5.4.2.1.

5.4.2 Application without a Prescriptive Ignition Barrier:

5.4.2.1 General: GacoOnePass Low GWP F1880 and F1880W insulations 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 or IRC Section R806, except when 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.

GacoOnePass Low GWP F1880 and F1880W are air-impermeable insulations and may be installed in unvented attics, as described in this section, in accordance with IBC Section 1202.3 or IRC Section R806.5 when applied at a minimum thickness of 1 inch.

The insulations 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 foam plastics applied to the underside of the top of the space must not exceed 12 inches, and to vertical surfaces must not exceed 9 inches. The insulations may be installed without the prescriptive ignition barrier required by IBC Section 2603.4.1.6 or IRC Section R303.5.3 and R303.5.4, and without a protective coating based on testing in accordance with AC377, Appendix X.

5.4.2.2 Use on Attic Floors: GacoOnePass Low GWP F1880 and F1880W insulations may be installed exposed (no coating) at a maximum thickness of 9 inches between and over the joists in attic floors in accordance with this section and conditions a. through f. of Section 5.4.2.1 based on testing in accordance with AC377, Appendix X. The insulations must be separated from the interior occupied space by an approved thermal barrier. The insulations may be installed without the prescriptive thermal or ignition barrier required by IBC Section 2603.4 and IRC Section R303.5.3, and without a protective coating.

5.5 Exterior Walls in Types I, II, III, and IV Construction: GacoOnePass Low GWP F1880 and F1880W may be installed in exterior walls of buildings of Types I, II, III, and IV construction complying with IBC Section 2603.5 and as described in the section. Intertek Design Listings GWL/FI 30-04 and GWL/FI 30-05 describe the assemblies certified by Intertek as complying with NFPA 285. The tested wall assemblies were extended to include various wall constructions described in Tables 3 and 4 through third-party engineering analysis. The potential heat of the foam plastic in any portion of the wall must not exceed 2043 Btu/ft^2 per inch of insulation thickness. The maximum thickness of insulation is 3-5/8 inches in interior wall cavities and 4 inches on the exterior.

5.6 Duct Insulation: GacoOnePass Low GWP F1880 and F1880W may be applied to the exterior of residential ducts in attics and crawl spaces in compliance with IRC Section M1601.3. The insulations must be protected in accordance with the ignition barrier requirements of either Section 5.4.1 or 5.4.2.

5.7 Water-resistive Barrier: The insulations may be used as an alternative to the water-resistive barrier specified in IBC Section 1403.2 and IRC Section R703.2 when installed at a minimum of 1-inch thickness on the exterior side of exterior wall sheathing.

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 insulations must be separated from the interior living space of the building by a thermal barrier as described in Section 5.3.1, except as described in Sections 5.3.2 and 5.4.

6.3 The insulations must not exceed the thicknesses noted in Sections 4.1, 5.3, 5.4, and 5.5 as applicable.

6.4 Use of the insulations in Types I, II, III, and IV construction must be as described in Section 5.5.

6.5 Use of the insulations in areas where the probability of termite infestation is "very heavy" must be in accordance with IRC Section R318.4 or IBC Section 2603.8, as applicable.

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

6.7 The GacoOnePass Low GWP F1880 and F1880W are 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 C518, ASTM E84, ASTM E2178, ASTM E96, ASTM C411, NFPA 285, NFPA 286, NFPA 259, and UL 1715.

7.2 Priest & Associates Consulting, LLC Evaluation Report dated November 6, 2017.

7.3 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC 377), dated July 2020, including reports of test in accordance with Appendix X.

7.4 Data in accordance with ICC 1100 (2019).

7.5 Data in accordance with 16 CFR Part 460.

7.6 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.

7.7 Intertek Listing Report "GacoOnePass Low GWP F1880/F1880W Spray-applied Polyurethane Foam Insulation", on the Intertek Directory of Building Products.

8.0 IDENTIFICATION

The A and B components of the insulation are identified with the manufacturer's name, address and telephone number, the product name (GacoOnePass Low GWP F1880 or GacoOnePass Low GWP F1880W), use instructions, the flame spread and smoke-development indices, the lot number, the Intertek Mark, and the Code Compliance Research Report number (CCRR-1106).

CODE COMPLIANCE
Intertek
CCRR-1106

9.0 OTHER CODES

This section is not applicable.

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 1 – PROPERTIES EVALUATED

PROPERTY	IBC SECTION[1]	IRC SECTION[1]	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 R402.5
Air barrier	Not applicable	Not applicable	C402.6.2.3
Water-resistive barrier	1403.2	R703.2	Not applicable
Vapor retarder	202, 1404.3	R702.7	Not applicable
Thermal resistance	1301	N1101.10	C303.1 R303.1
Duct Insulation	Not applicable	N1103.3.1 M1601.3	R403.3.3
Exterior walls of Types I – IV construction	2603.5	Not applicable	Not applicable

[1] Section numbers pertain to the most recent edition of the Codes cited in Section 1.1 of this Report.

TABLE 2 – THERMAL RESISTANCE (R Values)[1,2,3]

THICKNESSES (inches)	R-VALUE (°F.ft².h/Btu)
1	7.1
2	15
3	22
3.5	26
4	30
5.5	41
6	44
7.25	54
8	59
9.25	68
10	74
11.25	83
12	89

[1] R-values are calculated based on tested K-values at 1 inch and 4-inch thicknesses.

[2] R-values greater than 10 are rounded to the nearest whole number.

[3] To determine R values for thickness not listed:

a. Between 1 inch and 4 inch can be determined through linear interpolation; or,

b. Greater than 4 inches can be calculated based on R 7.4/inch

TABLE 3 – NFPA 285 COMPLYING WALLS WITH GACO F1880 or F1880W ON EXTERIOR

WALL COMPONENTS	MATERIALS
Base wall system Use either 1, 2 or 3	1. Concrete Wall 2. Concrete Masonry wall 3. One-layer of 5/8 in. thick Type X gypsum wallboard installed on the interior side of minimum 3-5/8 in. deep, minimum No. 20 gage steel studs spaced a maximum of 24 in. on center (OC) with lateral bracing every 4 ft. vertically. Openings must be protected with minimum No. 20 gage steel framing. As an option, use nominal 2 x 4 fire-retardant treated woods studs spaced at a maximum 16 in. OC.
Floorline Firestopping	Mineral wool (4.0 lb/ft^3 density) friction fit in each stud cavity and at each floorline.
Cavity Insulation Use either 1, 2 or 3	1. None 2. Full cavity depth or less of GacoOnePass Low GWP F1880 or F1880W applied using sheathing as substrate and covering the width of the cavity and inside of the stud flange. 3. Any noncombustible insulation (batts can be either faced or unfaced).
Exterior sheathing Use either 1 or 2	1. 1/2 in. thick exterior gypsum sheathing 2. 5/8 in. thick Type X exterior gypsum sheathing
Exterior insulation Use either 1 or 2	1. None 2. GacoOnePass Low GWP F1880 or F1880W with a total maximum thickness of 4 in.
Exterior Veneer Use either 1, 2, 3, 4 or 5	1. Brick: Standard type brick veneer anchors installed a maximum of 24 in. OC vertically in each stud. Maximum 2 in. air gap between exterior insulation and standard nominal 4 in. thick clay brick. 2. Stucco: Minimum 3/4 in. thick, exterior cement plaster and lath. A secondary water resistive barrier can be installed between the exterior insulation and the lath. The secondary water resistive barrier shall not be full-coverage asphalt or butyl-based self-adhered membranes. 3. Minimum 2 in. thick natural stone (granite, limestone, marble and sandstone). Any standard non-open-jointed installation technique can be used. 4. Minimum 1-1/2 in. thick artificial cast stone. Any standard non-open-jointed installation technique can be used. 5. Minimum 1-1/4 in. thick Terra Cotta non-open jointed. Any standard non-open-jointed installation technique can be used.
Flashing of window, door and other exterior wall openings	As an option, flash around window, door, and other exterior openings with limited amounts of maximum 12-inch-wide flashing tape (acrylic, asphalt or butyl-based) or liquid applied membrane materials with or without fiber mesh reinforcement.

TABLE 4 – NFPA 285 COMPLYING WALLS WITH GACO F1880 or F1880W IN WALL CAVITY ONLY

WALL COMPONENTS	MATERIALS
Base wall system Use either 1, 2 or 3	1. Concrete wall 2. Concrete masonry wall 3. One-layer of 5/8 in. thick Type X gypsum board installed on the interior side of minimum 3-5/8 in. deep, minimum No. 20 gage steel studs spaced at a maximum of 24 in. with lateral bracing every 4 ft. vertically. Openings must be protected with minimum No. 20 gage steel framing. As an option, use nominal 2 x 4 fire-retardant treated woods studs spaced at a maximum 16 in. OC.
Floorline Firestopping	Mineral wool (4.0 lb/ft^3 density) friction fit in each stud cavity and at each floorline.
Cavity Insulation	1. Full cavity depth or less of GacoOnePass Low GWP F1880 or F1880W applied using sheathing as substrate and covering the width of the cavity and inside of the stud flange.
Exterior sheathing Use either 1 or 2	1. 1/2 in. thick exterior gypsum sheathing 2. 5/8 in. thick Type X exterior gypsum sheathing
Exterior wall covering Use either 1 or 2	1. Any noncombustible exterior wall covering material 2. Any combustible exterior wall covering system that has successfully been tested in accordance with NFPA 285.
Flashing of window, door and other exterior wall openings	As an option, flash around window, door, and other exterior openings with limited amounts of maximum 12-inch-wide flashing tape (acrylic, asphalt or butyl-based) or liquid applied membrane materials with or without fiber mesh reinforcement.