

ICC-ES Evaluation Report

ESR-2478

Reissued August 1, 2009

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DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07210—Building Insulation
REPORT HOLDER:
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EVALUATION SUBJECT:
**GACO GREEN 052 SPRAY-APPLIED POLYURETHANE
INSULATION, AND GACO POLYFOAM 193 SPRAY-
APPLIED POLYURETHANE INSULATION**
1.0 EVALUATION SCOPE
Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- 2006 *International Energy Conservation Code*® (IECC)
- Other Codes (see Section 8.0)

Properties evaluated:

- Physical properties
- Surface-burning characteristics
- Attic and crawl spaces

2.0 USES

Gaco Green 052 and Gaco Polyfoam 193 spray-applied foam plastic insulations are used as thermal insulation material in cavities of wall, floor and ceiling assemblies and in attic and crawl space applications in buildings of Type V-B construction under the IBC and in dwellings constructed in accordance with the IRC, as described in Section 4.4.

3.0 DESCRIPTION
3.1 General:

Gaco Green 052 insulation is a two-component, open-cell, semirigid foam plastic insulation. Gaco Polyfoam 193 insulation is a two-component, closed-cell, semirigid foam plastic insulation. Gaco Green 052 and Gaco Polyfoam 193 insulations are produced in the field by combining a polymeric isocyanate (Part A) and a polymeric resin (Part B), resulting in products with a density of, respectively, 0.50 pcf (8 kg/m³) and 2.8 pcf (44.9 kg/m³). Gaco Green 052 insulation has a shelf life of six months when stored at

temperatures between 50°F (10°C) and 80°F (26.7°C). Gaco Polyfoam 193 insulation has a shelf life of three months when stored at temperatures between 50°F (10°C) and 70°F (21.1°C).

3.2 Surface-burning Characteristics:

Gaco Green 052, at a maximum thickness of 6 inches (152 mm) and a nominal density of 0.5 pcf (8 kg/m³), has a flame-spread index not exceeding 25 and a smoke-developed index not exceeding 450 when tested in accordance with ASTM E 84.

Gaco Polyfoam 193, at maximum thickness of 4 inches (102 mm) and a nominal density of 2.8 pcf (44.9 kg/m³), has a flame-spread index not exceeding 75 and a smoke-developed index not exceeding 450 when tested in accordance with ASTM E 84.

3.3 Thermal Resistance (R-values):

At a mean temperature of 75°F (24°C), the insulation has thermal resistance (R-values) as shown in Tables 1 and 2.

3.4 Vapor Retarder:

Gaco Polyfoam 193, at a minimum thickness of 1.8 inches (46 mm), has a permeance of 1 perm [57 x 10⁻¹¹ kg/Pa.S.m²] or less, in accordance with ASTM E 96, and may be used where a vapor retarder is required by the applicable code.

4.0 INSTALLATION
4.1 General:

The insulation must be installed in accordance with the manufacturer's published installation instructions, the applicable code and this report. A copy of the manufacturer's published installation instructions must be available at all times on the jobsite during installation.

4.2 Application:

The Gaco Green 052 and Gaco Polyfoam 193 insulations are spray-applied on the jobsite using a proportioning pump to combine Part A and Part B components at a one-to-one ratio, as specified in the manufacturer's published installation instructions. The insulation must not be applied in areas that will be exposed to a maximum ambient temperature greater than 200°F (93°C). The substrates to which the insulation is applied must be clean, dry and free of frost, ice, loose debris or contaminants that will interfere with adhesion of the spray foam insulation. The spray foam insulation must not be applied in electrical outlet or junction boxes or in direct contact with water or soil. In areas where the probability of termite infestation is "very heavy" as determined in accordance with IBC Figure 2603.8 or IRC

Figure R301.2 (6), the foam plastic must be installed in accordance with IBC Section 2603.8 or IRC Section R320.5. Ventilation of the attic or crawl spaces insulated with the spray-applied foam plastic must be provided in accordance with the applicable code. The spray-applied foam insulation must be protected from the weather during and after application.

4.3 Thermal Barrier:

The Gaco Green 052 and Gaco Polyfoam 193 insulations must be separated from the interior of the building by an approved thermal barrier of 0.5-inch-thick (12.7 mm) gypsum board or an equivalent 15-minute thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section R314.4, as applicable, except where installation is in attics or crawl spaces as described in Section 4.4.

4.4 Attics and Crawl Spaces:

When the spray-applied insulations are installed within attics or crawl spaces where entry is made only for service of utilities, an ignition barrier must be installed in accordance with IBC Section 2603.4.1.6 or IRC Section R314.5.3 or R314.5.4, 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 that the foam plastic insulation is not exposed.

5.0 CONDITIONS OF USE

The Gaco Green 052 and Gaco Polyfoam 193 spray-applied insulations described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The insulation must be installed in accordance with the manufacturer's published installation instructions, this evaluation report and the applicable code. If there are any conflicts between the manufacturer's published installation instructions and this report, this report governs.
- 5.2 The spray-applied insulations must be separated from the interior of the building by an approved 15-minute thermal barrier, as described in Section 4.3, except where installation is in an attic or crawl space as described in Section 4.4.
- 5.3 The spray-applied insulations must not exceed the thicknesses noted in Section 3.2.
- 5.4 The spray-applied insulation must be applied by contractors certified by Gaco Western, LLC.
- 5.5 The spray-applied foam insulation must have clearance above grade of 6 inches (152 mm) or greater, except as permitted in the exceptions to IBC Section 2603.8 or IRC Section R320.5.
- 5.6 Jobsite certification and labeling of the insulation must comply with IRC Sections N1101.4 and N1101.4.1 and IECC Sections 102.1.1 and 102.1.11, as applicable.
- 5.7 Gaco Green 052 and Gaco Polyfoam 193 insulations are produced in Waukesha, Wisconsin, under a quality control program, with inspections by Intertek Testing Services NA Inc. (AA-647).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated June 2009.

7.0 IDENTIFICATION

The Part A and Part B components for Gaco Green 052 and Gaco Polyfoam 193 insulation are packaged in 55-gallon drums that carry the manufacturer's name (Gaco Western, LLC) and address; the date of manufacture or the lot number; the product trade name (Gaco Green 052 or Gaco Polyfoam 193); the product type (Part A or Part B); the installation instructions; the density; the flame-spread and smoke-developed indices; the name of the inspection agency (Intertek Testing Services NA Ltd.); and the evaluation report number (ESR-2478).

8.0 OTHER CODES

8.1 Evaluation Scope:

In addition to the codes referenced in Section 1.0, the products in this report were evaluated for compliance with the 1997 *Uniform Building Code*TM (UBC).

The foam plastic insulation described in this report complies with, or is a suitable alternative to what is specified in, the UBC, subject to the provisions of Section 8.2 through 8.7.

8.2 Uses:

Gaco Green 052 and Gaco Polyfoam 193 spray-applied foam plastic insulations are used as thermal insulation material in cavities of wall, floor and ceiling assemblies and in attic and crawl space applications in buildings of Type V-N construction under the UBC, as described in Section 4.4.

8.3 Description:

See Section 3.0.

8.4 Installation:

Requirements are as indicated in Section 4.0 except substitute the wording below for the wording in Section 4.3:

Thermal Barrier:

The Gaco Green 052 and Gaco Polyfoam 193 insulations must be separated from the interior of the building by an approved thermal barrier of 0.5-inch-thick (12.7 mm) gypsum board or an equivalent 15-minute thermal barrier complying, and installed in accordance, with UBC Section 2602.4, except where installation is in attics or crawl spaces as described in Section 4.4.

8.5 Conditions of Use:

Requirements are as shown in Section 5.0 except for the following:

Gaco Green 052 and Gaco Polyfoam 193 insulation is limited to use in Type V-N construction.

8.6 Evidence Submitted:

See Section 6.0.

8.7 Identification:

See Section 7.

TABLE 1—GACO GREEN 052 THERMAL RESISTANCE (R-VALUES)

THICKNESS (inches)	R-VALUE (°F.ft ² .h/Btu)
ASTM C 518 TESTED VALUES	
1	4.2
4	15.6
CALCULATED R-VALUES	
6	23.5

For **SI**: 1 inch = 25.4 mm; 1°F.ft².h/Btu = 0.176 110°K.m²/W.

¹Calculated R-values are based on tested K values at a 1-inch thickness.

TABLE 2—GACO POLYFOAM 193 THERMAL RESISTANCE (R-VALUES): ASTM C 518 TESTED VALUES

THICKNESS (inches)	R-VALUE (°f.FT ² .h/Btu)
1	6.2
4	27.2