

# ICC-ES Evaluation Report

**ESR-3161**
*Issued September 1, 2010*
*This report is subject to re-examination in June, 2011.*
[www.icc-es.org](http://www.icc-es.org) | (800) 423-6587 | (562) 699-0543

A Subsidiary of the International Code Council®

**DIVISION: 07 00 00—THERMAL AND MOISTURE  
PROTECTION**
**Section: 07 21 00—Thermal Insulation**
**REPORT HOLDER:**

**HENRY COMPANY**  
 909 NORTH SEPULVEDA, SUITE 650  
 EI SEGUNDO, CALIFORNIA 90245  
 (800) 486-1278  
[www.henry.com](http://www.henry.com)

**EVALUATION SUBJECT:**
**PERMAX® 0.5 SPRAY-APPLIED POLYURETHANE FOAM  
INSULATION**
**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- 2009 *International Building Code*® (IBC)
- 2009 *International Residential Code*® (IRC)
- 2009 *International Energy Conservation Code*® (IECC)
- Other Codes (see Section 8.0)

**Properties evaluated:**

- Surface-burning characteristics
- Physical properties
- Thermal resistance (*R*-values)
- Attic and crawl space installations

**2.0 USES**

PERMAX® 0.5 spray-applied polyurethane foam insulation is used as a nonstructural thermal insulating material in Type V-B construction under the IBC and in dwellings under the IRC. The insulation is for use in wall cavities, floor assemblies or ceiling assemblies, or in attic and crawl spaces when installed in accordance with Section 4.0.

**3.0 DESCRIPTION**
**3.1 Materials:**

PERMAX® 0.5 spray-applied foam insulation is an open-cell, low-density, spray-applied, polyurethane foam plastic. The insulation is a two-component spray foam plastic with a nominal in-place density of 0.5 pcf (8 kg/m<sup>3</sup>). The insulation is produced in the field by combining a polymeric isocyanate (A component) and a polymeric resin (B component). The insulation liquid components are supplied in 55-gallon (208 L) drums and must be stored at

temperatures between 45°F and 90°F (7.2°C and 32.2°C). The liquid components have a shelf life of one year when stored in factory-sealed containers at these temperatures.

**3.2 Surface-burning Characteristics:**

The insulation, at a maximum thickness of 5<sup>5</sup>/<sub>8</sub> inches (143 mm) and a nominal density of 0.5 pcf (8 kg/m<sup>3</sup>) has a flame-spread index of 25 or less and smoke-developed index of 450 or less when tested in accordance with ASTM E 84. Greater thicknesses are recognized as described in Sections 4.3 and 4.4.

**3.3 Thermal Resistance (*R*-values):**

PERMAX® 0.5 spray-applied foam insulation has thermal resistance (*R*-values) at a mean temperature of 75°F (24°C) as shown in Table 1.

**3.4 FoamKote® FC 50-50A:**

FoamKote® FC 50-50A intumescent coating, manufactured by Flame Control Coatings, LLC, is a one-component, water-based liquid coating. FoamKote® FC 50-50A is supplied in 1-gallon (4 L) and 5-gallon (19 L) pails and has a shelf life of nine months when stored in factory-sealed containers at temperatures between 50°F and 90°F (10° C and 32°C).

**4.0 INSTALLATION**
**4.1 General:**

PERMAX® 0.5 spray-applied foam insulation must be installed in accordance with the manufacturer's published installation instructions and this report. The manufacturer's published instructions and this report must be strictly adhered to, and a copy of this report and the manufacturer's published installation instructions must be available at all times on the jobsite during installation.

**4.2 Application:**

The insulation is spray-applied on the jobsite using a volumetric positive displacement pump as identified in the Henry Company, application manual. The insulation is applied in multiple passes having a maximum thickness of 6 inches (152 mm) per pass up to the maximum insulation thicknesses specified in this report. The insulation components must be stored at temperatures between 50°F and 90°F (10° and 32°C). The insulation must not be used in areas that have a maximum in-service temperature greater than 180°F (82°C). The foam plastic must not be used in electrical outlet or junction boxes or in contact with rain, water, or soil. The foam plastic 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.

### 4.3 Thermal Barrier: Application with a Prescriptive Thermal Barrier:

PERMAX<sup>®</sup> 0.5 spray-applied foam insulation must be separated from the interior of the building by an approved thermal barrier of 1/2-inch-thick (12.7 mm) gypsum wallboard or an equivalent 15-minute thermal barrier complying with, and installed in accordance with, IBC Section 2603.4 or IRC Section R316.4, as applicable. Thicknesses of up to 8 inches (203 mm) for wall cavities and 12 inches (305 mm) for floor/ceiling cavities are recognized, based on room corner fire testing in accordance with NFPA 286.

### 4.4 Attics and Crawl Spaces:

**4.4.1 Application with a Prescriptive Ignition Barrier:** When PERMAX<sup>®</sup> 0.5 spray-applied foam insulation is 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 Sections R316.5.3 and R316.5.4, as applicable. The ignition barrier must be consistent with the requirements of the type of construction required by the applicable code, and must be installed in a manner such that the foam plastic insulation is not exposed.

### 4.4.2 Application without a Prescriptive Ignition Barrier:

**4.4.2.1 General:** When PERMAX<sup>®</sup> 0.5 spray-applied foam insulation is installed without a prescriptive ignition barrier in attics and crawl spaces, in accordance with Sections 4.4.2.2 and 4.4.3, 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. Under-floor (crawl-space) ventilation is provided in accordance with IBC Section 1203.3 or IRC Section R408.1, as applicable.
- e. Attic ventilation is provided in accordance with IBC Section 1203.2 or IRC Section R806, as applicable.
- f. Combustion air is provided in accordance with IMC (*International Mechanical Code*<sup>®</sup>) Section 701.

**4.4.2.2 Application with FoamKote<sup>®</sup> FC 50-50A Intumescent Coating:** In attics, PERMAX<sup>®</sup> 0.5 foam insulation may be spray-applied to the underside of the roof sheathing and/or rafters; and, in crawl spaces, to the underside of wood floors and/or floor joists as described in this section. The thickness of the foam plastic applied to the underside of the top of the space must not exceed 12 inches (305 mm). The thickness of the spray foam insulation applied to vertical wall surfaces in attics and crawl spaces must not exceed 8 inches (203 mm). The foam plastic insulation must be covered with a minimum nominally 10-mil (0.25 mm) wet film thickness of the FoamKote<sup>®</sup> FC 50-50A described in Section 3.4, applied over the insulation in accordance with the coating manufacturer's instructions and this report. The coating is applied in two coats by an airless sprayer, brush or roller at a rate of 1 gallon per 100 square feet (0.41 L/m<sup>2</sup>) per coat, to obtain a recommended minimum dry film thickness of 7.5 mils (0.19 mm) [8.0 wet mils (0.2 wet mm)]. The coating has a minimum four-hour curing time per coat. The coating must be applied to surfaces that are dry, clean, and free of dirt, loose debris and any other substances that could interfere with adhesion of the coating, and when ambient and substrate temperatures are within a range of 50°F (10°C) to 90°F (32°C).

**4.4.3 Use on Attic Floors:** PERMAX<sup>®</sup> 0.5 spray-applied foam insulation may be installed at a maximum thickness of 8 inches (203 mm) between joists on attic floors. The PERMAX<sup>®</sup> 0.5 spray-applied foam insulation must be separated from the interior of the building by an approved thermal barrier, and separated from the attic space with FoamKote<sup>®</sup> FC 50-50A coating as described in Section 4.4.2.2. The ignition barrier in accordance with IBC Section 2603.4.1.6 and IRC Section R316.5.3 may be omitted.

## 5.0 CONDITIONS OF USE

The PERMAX<sup>®</sup> 0.5 spray-applied 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 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 insulation must be separated from the interior of the building by an approved 15-minute thermal barrier, in accordance with Section 4.3.
- 5.3 The insulation must not exceed the nominal density and thicknesses noted in Sections 3.2, 4.3 and 4.4 of this report.
- 5.4 The insulation must be protected from exposure to weather during and after application.
- 5.5 The insulation must be applied by contractors authorized by Henry Company.
- 5.6 Use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with IBC Section 2603.8 or IRC Section 318.4, as applicable.
- 5.7 The insulation has been evaluated only for use in Type V-B construction under the IBC and dwellings under the IRC.
- 5.8 Jobsite certification and labeling 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.
- 5.9 The insulation is produced in West Chicago, Illinois, under a quality control program with inspections by Quality Control Consultants, Inc. (AA-727).

## 6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated November 2009, including reports of tests in accordance with Appendix X of AC377.
- 6.2 Reports of room corner tests in accordance with NFPA 286.

## 7.0 IDENTIFICATION

Components of the spray foam insulation are identified with the report holder's name (Henry Company), address and telephone number; the product trade name (PERMAX<sup>®</sup> 0.5); use instructions; the density; the flame-spread and smoke-development indices; the date of manufacture; thermal resistance values; the evaluation report number (ESR-3161); and the name of the inspection agency (Quality Control Consultants, Inc.).

Each pail of the FoamKote<sup>®</sup> FC 50-50A coating is labeled with the manufacturer's name (Flame Control Coatings, LLC), the product name, and use instructions.

**8.0 OTHER CODES**

The products recognized in this report have also been evaluated in accordance with the following codes:

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

The products comply with the above-mentioned codes as described in Sections 2.0 through 7.0 of this report, with the revisions noted below:

- **Application with a Prescriptive Ignition Barrier:** See Section 4.4.1, except attics and crawl spaces must be vented in accordance with the applicable code.

- **Application without a Prescriptive Ignition Barrier:** See Section 4.4.2, except attics and crawl spaces must be vented in accordance with the applicable code.
- **Thermal Barrier:** See Section 4.3, except the thermal barrier must be in accordance with Section R314.4 of the 2006 IRC.
- **Attics and Crawl Spaces:** See Section 4.4, except combustion air is provided in accordance with Sections 701 and 703 of the 2006 IMC.
- **Conditions of Use:** See Section 5.6, except termite protection must be in accordance with Section R320.5 of the 2006 IRC.

**TABLE 1—THERMAL RESISTANCE (R-VALUES)**

THICKNESS (inches)	R-Value (ft <sup>2</sup> ·h/Btu)
1	3.7
2	7.5
3.5	12.9
4	14.7
5	18.5
5.5	20.3
6	22.2
7	25.9
8	29.6
9	33.3
9.5	35.1
10	37.0
11.5	42.5
12	44.4

For **SI**: 1 inch = 25.4 mm, 1°F·ft<sup>2</sup>·h/Btu = 0.176 110°K·m<sup>2</sup>/W.

<sup>1</sup>R-Values are calculated based on tested K values at 1-inch and 4-inch thicknesses.