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# ICC-ES Report

## ESR-3646

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Reissued 02/2016

This report is subject to renewal 02/2017.

**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION**

**SECTION: 07 21 00—THERMAL INSULATION**

**REPORT HOLDER:**

**HENRY COMPANY**

**999 NORTH SEPULVEDA BOULEVARD, SUITE 800  
EL SEGUNDO, CALIFORNIA 90245**

**EVALUATION SUBJECT:**

**PERMAX™ 0.5LV**



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# ICC-ES 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:**
**PERMAX™ 0.5LV**
**1.0 EVALUATION SCOPE**
**Compliance with the following codes:**

- 2012 and 2009 *International Building Code*® (IBC)
- 2012 and 2009 *International Residential Code*® (IRC)
- 2012 and 2009 *International Energy Conservation Code*® (IECC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)<sup>†</sup>

<sup>†</sup>The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

**Properties evaluated:**

- Physical properties
- Surface-burning characteristics
- Thermal resistance (*R*-values)
- Attic and crawl space applications
- Water vapor transmission

**2.0 USES**

PERMAX™ 0.5LV is an open-cell, spray-applied, polyurethane foam insulation 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 attics and crawl spaces when installed in accordance with Section 4.4.

**3.0 DESCRIPTION**
**3.1 PERMAX 0.5LV:**

PERMAX™ 0.5LV spray foam insulation is a two-component, low-density, open-cell, spray-applied polyurethane foam plastic with a nominal in-place density of 0.5 pcf. The insulation is produced in the field by combining an isocyanate component A with a resin component B in a one-to-one volume ratio. Component A

has a shelf life of six months when stored in factory-sealed containers at temperatures between 65°F (18°C) and 85°F (29°C). Component B has a shelf life of six months when stored in factory-sealed containers at temperatures between 50°F (10°C) and 85°F (29°C). The liquid components are supplied in 55-gallon (208 L) drums.

**3.2 Surface-burning Characteristics:**

PERMAX™ 0.5LV at a maximum thickness of 4.0 inches (102 mm) and a nominal density of 0.5 pcf, has a flame-spread index of 25 or less and smoked-developed index of 450 or less when tested in accordance with ASTM E84.

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

PERMAX™ 0.5LV has thermal resistance (*R*-values), at a mean temperature of 75°F (24°C), as shown in Table 1.

**3.4 Vapor Retarder:**

The insulation has a vapor permeance of 19.5 perms when applied at a minimum thickness of 1½ inches (38 mm) based on testing in accordance with ASTM E96 (desiccant method).

**3.5 DC 315 Intumescent Coating:**

DC 315 Intumescent Coating is manufactured by International Fireproof Technology, Inc., and is a water-based latex intumescent coating supplied in 55-gallon (208L) drums. The coating has a shelf life of one year when stored in a factory-sealed container at temperatures between 50°F and 80°F (10°C and 26.7°C).

**4.0 DESIGN AND INSTALLATION**
**4.1 General:**

PERMAX™ 0.5LV 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 instructions. 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 (10°C) and 85°F (29°C). The insulation must not be used in areas that have a maximum in-service temperature

greater than 180°F (82.2°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:

**4.3.1 Application with a Prescriptive Thermal Barrier:** PERMAX™ 0.5LV 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.

**4.3.2 Application without a Prescriptive Thermal Barrier:** The prescriptive 15-minute thermal barrier may be omitted when installation is in accordance with this section. The insulation and coating may be spray-applied to the interior facing of walls, the underside of roof sheathing or roof rafters, and in crawl spaces, and may be left exposed as an interior finish without a prescribed 15-minute thermal barrier or prescribed ignition barrier. The thickness of the foam plastic applied to the underside of the roof sheathing must not exceed 11 1/2 inches. The thickness of the insulation on vertical wall surfaces must not exceed 11 1/2 inches. The foam plastic must be covered on all surfaces with DC 315 intumescent coating at a minimum wet film thickness of 18 mils (0.46 mm) [12 dry mils (0.30 mm)], at a rate of 89.1 ft<sup>2</sup>/gal (3634.85 m<sup>2</sup>/L). The coating must be applied over the PERMAX™ 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 coating. The coating is applied in one coat with brush, roller or low-pressure airless equipment.

#### 4.4 Use in Attics and Crawl Spaces:

**4.4.1 Application with a Prescriptive Ignition Barrier:** When PERMAX™ 0.5LV 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 for 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 Applications without a Prescriptive Ignition Barrier:

**4.4.2.1 General:** When PERMAX™ 0.5LV spray-applied foam insulation is installed without a prescriptive ignition barrier, in attics and crawl spaces as described in Section 4.4.2.2, the following conditions apply:

- Entry to the attic or crawl space is only to service utilities, and no storage is permitted.
- There are no interconnected attic or crawl space areas.
- Air in the attic or crawl space is not circulated to other parts of the building.
- Under-floor (crawl space) ventilation is provided in accordance with IBC Section 1203.3 or IRC Section R408.1, as applicable.
- Attic ventilation is provided when required by IBC Section 1203.2 or IRC Section R806, except when air-impermeable insulation is permitted in unvented attics in

accordance with Section R806.5 of the 2012 IRC (Section R806.4 of the 2009 IRC).

- Combustion air is provided in accordance with *International Mechanical Code*® (IMC) Section 701.

#### 4.4.2.2 Application with DC 315 Intumescent Coating:

In attics, the insulation may be spray-applied to the underside of roof sheathing or roof rafters, and/or to vertical surfaces. In crawl spaces, the insulation may be spray-applied to the underside of floors and/or vertical surfaces. The thickness of the foam plastic, applied to the underside of the top of the space and vertical surfaces, must not exceed 11 1/2 inches (292 mm). The foam plastic must be covered on all exposed surface with DC 315 intumescent coating, described in Section 3.5, at a minimum wet film thickness of 4 mils (0.10 mm) [3 dry mils (0.08 mm)]. The DC 315 intumescent coating must be applied over the PERMAX™ 0.5LV 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 any other substances that could interfere with adhesion of the coating. The coating must be applied when ambient and substrate temperatures are a minimum of 50°F (10°C).

#### 4.5 Use on Attic Floors:

PERMAX™ 0.5LV spray-applied foam insulation may be installed at a maximum thickness of 11 1/2 inches (292 mm) between joists on attic floors. The insulation must be separated from the interior of the building by an approved thermal barrier. The ignition barrier required in IBC Section 2603.4.1.6 and IRC Section R316.5.3 may be omitted.

### 5.0 CONDITIONS OF USE

The PERMAX™ 0.5LV 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, except as noted in Section 4.4 for attics and crawl spaces.
- 5.3 The insulation must be protected from exposure to weather during and after application.
- 5.4 The insulation must be applied by contractors authorized by Henry Company.
- 5.5 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 R318.4.
- 5.6 The insulation has been evaluated only for use in Type V-B construction under the IBC and in dwellings under the IRC.
- 5.7 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.
- 5.8 A vapor retarder must be installed in accordance with the applicable requirements of the applicable code.

5.9 The insulation is produced in Ontario, California, under a quality control program with inspections by ICC-ES.

6.2 Reports of room corner tests in accordance with NFPA 286.

**6.0 EVIDENCE SUBMITTED**

**7.0 IDENTIFICATION**

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated November 2012 (editorially corrected April 2013), including reports of tests in accordance with Appendix X of AC377.

Components of the foam insulation are identified with the report holder's name (Henry Company) and address; the product trade name (PERMAX™ 0.5LV); the batch number; and the evaluation report number (ESR-3646).

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

THICKNESS (inches)	R-Value (°F·ft <sup>2</sup> ·h/Btu) <sup>1</sup>
1	3.5
2	7
3½	12
4	14
5	17
6	21
7	24
8	27
9	31
10	34
11½	39

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 values at 1-inch and 3.5-inch thicknesses.