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ESR-3024

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
SECTION: 07 21 00—THERMAL INSULATION

REPORT HOLDER:

HENRY COMPANY

**2270 CASTLE HARBOR PLACE
ONTARIO, CALIFORNIA 91761**

EVALUATION SUBJECT:

PERMAX® RT-2045 SERIES SPRAY-APPLIED FOAM PLASTIC INSULATION



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ICC-ES Evaluation Report**ESR-3024**

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**DIVISION: 07 00 00—THERMAL AND MOISTURE
PROTECTION****Section: 07 21 00—Thermal Insulation****REPORT HOLDER:****HENRY COMPANY**
2270 CASTLE HARBOR PLACE
ONTARIO, CALIFORNIA 91761
(909) 947-7224
www.henry.com**EVALUATION SUBJECT:****PERMAX® RT-2045 SERIES SPRAY-APPLIED FOAM
PLASTIC 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)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

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

- Other Codes (see Section 8.0)

Properties evaluated:

- Surface-burning characteristics
- Thermal resistance (*R*-values)
- Water vapor transmission
- Air permeability

2.0 USES

Permax® RT-2045 series spray-applied foam plastic insulation is used as thermal insulating material in buildings of Type V-B (IBC) construction, and in dwellings built under the IRC. The insulation is for use in wall cavities, floor/ceiling assemblies, or attics and crawl spaces as described in Section 4.0.

3.0 DESCRIPTION**3.1 General:**

Permax® RT-2045 insulation is a two-component, closed cell, semirigid insulation with a nominal in-place density of 1.8 to 2.0 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 B

has a shelf life of six months when stored in factory-sealed containers at temperatures between 50°F (10°C) and 75°F (24°C). Component A has a shelf life of six months when stored in factory-sealed containers at temperatures between 65°F (18.5°C) and 85°F (29.5°C). The liquid components are supplied in 55-gallon (208 L) drums.

3.2 Surface-burning Characteristics:

The insulation 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 at a maximum thickness of 4 inches (102 mm).

Thicknesses of up to 8 inches (203 mm) for wall cavities and 12 inches (305 mm) for ceiling cavities are recognized, based on testing in accordance with UBC Standard 26-3, when covered with a minimum 1/2-inch-thick (12.7 mm) gypsum installed in accordance with the applicable code.

3.3 Thermal Resistance (*R*-values):

The insulation 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 less than 1 perm [5.7×10^{-11} kg / (m²sPa)], in accordance with ASTM E96, and qualifies as Class II vapor retarder when applied at a minimum thickness of 1 inch (25.4 mm).

3.5 Air Permeability:

The insulation, at a minimum thickness of 1 inch (25.4 mm), is considered air-impermeable in accordance with Section R805.4 of the IRC, based on testing in accordance with ASTM E283.

4.0 INSTALLATION**4.1 General:**

Permax® RT-2045 series insulation must be installed in accordance with the manufacturer's published installation instructions 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 insulation is spray-applied at the jobsite using a volumetric positive displacement pump to combine the Part A and Part B components at a one-to-one volume ratio, as specified in the manufacturer's published installation instructions. The insulation is applied in passes having a minimum thickness of 1/2 inch (12.7 mm) and a maximum thickness of 2 inches (51 mm) per pass, up to the total thickness specified in Section 3.2. The insulation passes must be allowed to fully expand and cure for a minimum of

15 minutes prior to application of an additional pass. The insulation must not be used in areas that have a maximum service temperature greater than that specified in the manufacturer's installation instructions. The insulation must not be used in electrical outlets or junction boxes or in contact with rain, water (e.g., rain, condensation, ice, snow), or soil. The substrate must be free of moisture, frost or ice, loose scales, rust, oil, and grease or other surface contaminants. The spray-applied foam insulation must be protected from weather during and after installation.

4.3 Thermal Barriers:

Permax[®] RT-2045 series 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 Sections R316.4, as applicable.

4.4 Ignition Barriers:

When installation is in attics and crawl spaces, where entry is made only for service of utilities, the insulation must be protected against ignition in accordance with IBC Section 2603.4.1.6 or IRC Section R316.5.3 or R316.5.4, as applicable.

5.0 CONDITIONS OF USE

The Permax[®] RT-2045 series spray-applied polyurethane foam plastic 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 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 has been evaluated only for interior use in Type V-B construction under the IBC, and dwellings in accordance with the IRC.
- 5.3 The thickness and density of the insulation must not exceed what is set forth in Section 3.2.
- 5.4 Permax[®] RT-2045 series insulation must be applied by contractors authorized by Henry Company or by the Spray Polyurethane Foam Alliance (SPFA) for installation of spray polyurethane foam installation.
- 5.5 The spray-applied foam insulation must be separated from the building interior as described in Section 4.3 of this report.
- 5.6 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 303.1.1.2, as applicable.
- 5.7 Use of insulation 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.

- 5.8 The Part A and Part B components are produced in Ontario, California, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated June 2011.
- 6.2 Reports of room corner tests in accordance with UBC 26-3.
- 6.3 Reports of water vapor transmission tests in accordance with ASTM E96.
- 6.4 Reports of air leakage testing in accordance with ASTM E283.

7.0 IDENTIFICATION

The Part A and Part B components for Permax[®] RT-2045 series insulation are packaged in 55-gallon (208 L) drums bearing labels with the report holder's name (Henry Company) and address; the date of manufacture and the lot number; the product name (Permax[®] RT-2045 series); the installation instructions; the density; the flame-spread and smoke-developed indices; and the evaluation report number (ESR-3024).

8.0 OTHER CODES

In addition to the codes referenced in Section 1.0, the products described in this report were evaluated for compliance with the requirements of 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 Thermal Barrier:** See Section 4.3, except the approved thermal barrier must be installed in accordance with Section R314.4 of the 2006 IRC, as applicable.
- **Application with a Prescriptive Ignition Barrier:** See Section 4.4, except attics must be vented in accordance with Section 1203.2 of the 2006 IBC and crawl space ventilation must be in accordance with Section 1203.3 of the 2006 IBC, as applicable. Additionally, an ignition barrier must be installed in accordance with Sections R314.5.3 or R314.5.4 of the 2006 IRC, as applicable.
- **Protection against Termites:** See Section 5.7, except use of the insulation in areas where the probability of termite infestation is "very heavy" must be in accordance with Section R320.5 of the 2006 IRC.
- **Jobsite Certification and Labeling:** See Section 5.6, except jobsite certification and labeling must comply with Sections 102.1.1 and 102.1.11, as applicable, of the 2006 IECC.

TABLE 1—THERMAL RESISTANCE (R-VALUES) OF PERMAX RT-2045

THICKNESS (INCHES)	R-VALUE (°F.ft ² .h/Btu)
1	6.5
2	13
3	19
3.5	22
4	26
5	32
6	38
7	45
8	51
10	64
11	70
12	77

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

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