ICC-ES Evaluation Report

ESR-2132

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This report is subject to re-examination in one year.

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DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07570—Coated Foam Roofing

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EVALUATION SUBJECT:

PERMAX 108 AND 115 ROOF COATING SYSTEMS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2006 *International Building Code*® (IBC)
- 2006 *International Residential Code*® (IRC)
- 1997 *Uniform Building Code*™ (UBC)

Properties evaluated:

- Physical properties
- Fire classification
- Wind resistance
- Impact resistance

2.0 USES

The Permax roofing systems described in this report are Class A and B roof coverings of coated foam plastic, permitted on buildings of any type of construction.

3.0 DESCRIPTION

The Permax roofing systems consist of spray-applied foam plastic covered with an elastomeric coating.

The foam plastic is RT-2035 2.5-3.0 polyurethane foam having a flame-spread rating of 75 or less when tested in accordance with ASTM E 84 (UL 723) at a maximum thickness of 4 inches (102 mm) and a maximum density of 3 pcf (48 kg/m^3).

The coatings are designated as Permax 108 and 115. Foam thickness and density, coating information, and roof covering classification for the various systems are shown in Table 1.

The coated foam plastic roof coverings described in this report comply with the Resistance to Foot Traffic Test in Section 5.5 of FM 4470.

4.0 INSTALLATION

4.1 Deck Preparation:

Roof surfaces must be free of grease, oil, dirt, sediment, moisture, and other foreign materials. All surfaces not to be covered with foam must be masked off or otherwise protected from overspray. All parapets, crickets and valleys must be flashed in accordance with the applicable code. Where precast concrete planks are present, all joints must be taped with minimum 2-inch-wide (51 mm) roofing tape identified as DT-100.

New plywood decks must be primed with an Acryprime-Substrate primer. New concrete decks must be allowed to cure at least 21 days prior to application of foam. The surface is then primed with a penetrating epoxy primer, Urebond V.

New metals decks are primed with a two-component wash primer. Gaps in end or side laps must be sealed with an approved sealant.

4.2 Application of the Foam Plastic:

The RT-2035 foam plastic is spray-applied to the prepared substrate in $^1/_2$-inch- to 1-inch-thick (12.7 mm to 25.4 mm) passes to the appropriate thickness as noted in Table 1. The wind velocity at time of application must not exceed 12 miles per hour (19.3 km/h), and the ambient temperature must be at least 60ºF (33ºC). The foam plastic must not be applied over wet substrates or if rain or inclement weather is imminent. The foam plastic is applied in a one-to-one ratio with equipment capable of metering each component within ±2 percent of the design ratio. The full specified thickness of foam plastic must be applied at one time. If the foam application is terminated before the final thickness is attained, additional foam may be applied within 24 hours, provided the existing foam is primed with Acryprime-Substrate primer and a minimum of $^1/_2$ inch (12.7 mm) of foam is applied in a single pass. The foam plastic must be free of bumps, pin holes and ridges. Any such irregularities must be eliminated.

4.3 Application of Coating:

The coating is applied in two coats at the appropriate rate as specified in Table 1. The coating must not be applied if rain, fog or inclement weather is imminent or if temperatures below freezing are anticipated within 24 hours of the coating application.

An optional top surfacing material may be applied over Systems 4 and 5 of Table 1. The material consists of No. 6 crushed limestone applied at a rate of 64 pounds per 100 square feet (3.1 kg/m^2), embedded into the uncured top coating and covered with Permaguard roof mix applied at a rate of one batch per 100 square feet (9.29 m^2). One batch of Permaguard roofing mix consists of 40 pounds (18.1 kg) of dry mix, $4^1/_2$ gallons (17 L) of water, $^1/_2$ gallon of Permaguard Acrylic Resin and $^3/_4$ ounce (21.3 g) of Colloid 60.

4.4 Existing Roofs:

The roofing system may be installed over existing roofs, provided the roof deck is as required for the system. The existing roof covering may remain in place if permitted by the building official. Roofing systems utilizing the Permax 108 coating, described in this report, may be installed over built-up, composition, or asphalt-shingle roof coverings and the roof classification will be as noted in Table 1.

Prior to foaming, the roof surface must be prepared to assure adequate adhesion. All loose rock, cementitious coatings, peeling paint, dirt and debris must be removed by brooming, power vacuuming or wire brushing.

The surface is primed with an Acryprime-Substrate primer at a rate of 200 square feet (18.6 m^2) per gallon (3.78 L) and allowed to cure a minimum of one hour prior to foam application. Spray applications are subject to the same conditions as noted in Section 4.2. Where the existing roof covering is removed to the substrate, the deck is prepared as set forth in Section 4.1.

4.5 Wind Resistance:

The systems installed in accordance with Sections 4.1 through 4.3 have allowable wind uplift pressures as noted in Table 2.

4.6 Perimeter Flashing:

Edge securement for perimeter flashing shall be in accordance with IBC Section 1504.5 and the manufacturer's instructions.

5.0 CONDITIONS OF USE

The Permax 108 and 115 Roof Coating Systems 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 Installation and application of the coated foam plastic roof coverings must comply with the applicable code, the manufacturer's published installation instructions, and this report. In the event of conflicts between the manufacturer's installation instructions and this report, this report governs.

5.2 All materials must be applied by personnel trained and approved by Resin Technology/Henry Company.

5.3 Where moderate or heavy foot traffic occurs for maintenance of equipment or other reasons, the roof covering must be adequately protected to prevent rupture or wearing of the surface.

5.4 Foam plastic insulation must be separated from the interior of the building by an approved thermal barrier in accordance with IBC Section 2603.4, IRC Section R314.5.2 or UBC Section 2602.5.3.

5.5 The code official may require a vapor retarder or barrier to be installed. Use of the foam plastic insulation as a vapor barrier is outside the scope of this report.

5.6 Flashing must be installed at wall and roof intersections and at gutters and around roof openings.

5.7 The roof deck and supporting structure to which the roof covering is attached must be designed to withstand the applicable wind pressures determined in accordance with ASCE 7.

5.8 The RT-2035 foam plastic insulation is produced at the Resin Technology/Henry Company facility at 2270 Castle Harbor Place, in Ontario California; and the Permax 108 and 115 coatings are produced at 1245 Brooks Street, Ontario, California, under a quality control program with inspections by Underwriters Laboratories Inc. (AA-668).

6.0 EVIDENCE SUBMITTED

6.1 Data in accordance with the ICC-ES Acceptance Criteria for Spray-applied Foam Plastic Insulation (AC377), dated May 2008.

6.2 Reports of physical property tests in accordance with ASTM D 6083.

6.3 Reports of impact resistance tests in accordance with Section 5.5 of FM 4470.

6.4 Reports of tests in accordance with ASTM E 84, ASTM E 108 (UL 723), and UL 1256.

6.5 Quality documentation.

6.6 Manufacturer's published installation instructions.

7.0 IDENTIFICATION

All material drums and containers are labeled with the manufacturer's name (Resin Technology/Henry Company or Henry Company) and address, product designation, shelf life, the evaluation report number (ESR-2132), and the name of the inspection agency (Underwriters Laboratories Inc.). Labels for foam plastic insulation also include the flame spread index. See Table 3 for product designations.

TABLE 1—PERMAX ROOF COVERING SYSTEMS APPLIED OVER RT-2035 SPRAY-APPLIED POLYURETHANE FOAM PLASTIC[1, 9]

SYSTEM NO.	COATING		TOP SURFACING	MINIMUM FOAM PLASTIC THICKNESS (inches)	MAXIMUM FOAM PLASTIC THICKNESS (inches)	MAXIMUM ROOF SLOPE[8] (in./horiz. ft.)	ROOF CLASSIFICATION
	Coating Type	Coating Application Rate (gal./100 ft^2)					
1	P-108	3	Not required	1	4	3	A
2[2,6]	P-108	3	Granules[3]	$1^1/_2$	$1^1/_2$	$^1/_4$	A
3	P-108	$2^1/_2$	Permaguard[10]	1	4	3	A
4	P-108	$2^1/_2$	Permaguard[10]	1	4	4	A
5[2,4]	P-108	$2^1/_2$	Permaguard[10]	1	4	3	A
6	P-108	3	Granules[3]	1	1	Unlimited	A
7	P-115	3	Granules[3]	1	4	3	A
8[2,4]	P-108	3	Granules[3]	$1^1/_2$	$1^1/_2$	1	B
9[7]	P-108	3	Granules[3]	$^1/_2$	4	$^1/_2$	B
10[2]	P-108	3	Granules[3]	$^3/_4$	4	$^1/_2$	B
11[2,5]	P-108	3	Granules[3]	1	1	4	B
12[2]	P-115	3	Granules[3]	$1^1/_2$	4	$^1/_2$	B
13	P-108	3	Granules[3]	1	4	3	A

For **SI:** 1 inch = 25.4 mm, 1 gallon/100 square feet = 0.41 L/m^2, 1 pcf = 16.0 kg/m^3, 1 foot = 304.8 mm, 1 pound/100 square foot = 0.0488 kg/m^2.

[1]Except where noted in footnote 2, 5, 6, or 7, roof decks must be noncombustible (cementitious or metal). Steel decks are minimum No. 26 gage [0.019 inch (0.483 mm)].
[2]Roof deck may be minimum $^{15}/_{32}$-inch-thick plywood bonded with exterior glue, with all board edges supported by blocking, tongue-and-groove joints or other approved type of edge support.
[3]The coating is surfaced with No. 11 roofing granules applied at a rate of 50 pounds per 100 square feet.
[4]Seams in plywood decks must be covered with minimum 12-inch-wide, 90-pound, mineral-surfaced capsheet.
[5]Roof deck may be four-ply BUR assembly surfaced with a flood coat of roofing asphalt and 400 pounds per 100 square feet of roofing gravel embedded in the asphalt, with all loose gravel removed.
[6]Roof deck may be minimum $^{15}/_{32}$-inch-thick plywood bonded with exterior glue, provided the entire deck is covered with $^1/_4$-inch-thick DensDeck with all joints staggered a minimum of 6 inches from the plywood joints.
[7]Roof deck may be $^{15}/_{32}$-inch-thick plywood substrate provided the plywood is covered entirely with 90-pound mineral-surfaced capsheet, mechanically attached.
[8]Minimum roof slope is $^1/_4$ inch vertical to each horizontal foot (2.1%).
[9]All roof systems include RT-2035 polyurethane foam plastic at 2.5 to 3.0 pcf.
[10]Permaguard top coat as described in Section 4.3.

TABLE 2—WIND RESISTANCE–COATED FOAM ROOF COVERINGS[1]

ALLOWABLE WIND UPLIFT (psf)	SUBSTRATE	RT-2035 FOAM PLASTIC INSULATION THICKNESS (inches)
Limited by substrate	Structural concrete	2
105	Steel deck	Deck flutes are filled and covered with 1-inch foam plastic insulation[2]

For **SI:** 1 psf = 0.0479 kPa, 1 inch = 25.4 mm.

[1]Coating must be Permax 108 or 115.
[2]Assembly must be FM approved.

TABLE 3—IDENTIFICATION LABEL CROSS REFERENCE

PRODUCT	RESIN TECHNOLOGY/HENRY COMPANY CODE	HENRY COMPANY CODE
Roof coating	Permax-108/115	No. 582/580
Roof insulation	RT-2035-2.5/3.0	No. 714-2.5/3.0