LEGACY REPORT

ER-5405

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Legacy report on the 1997 *Uniform Building Code*™, the 2000 *International Building Code*® and the 2000 *International Residential Code*®

DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07540—Thermoplastic Membrane Roofing

I.B. ROOF SYSTEMS PVC MEMBRANE ROOF COVERING SYSTEMS

I.B. ROOF SYSTEMS
2877 CHAD DRIVE, SUITE B
EUGENE, OREGON 97408

1.0 SUBJECT

I.B. Roof Systems PVC Membrane Roof-covering Systems.

2.0 DESCRIPTION

2.1 General:

I.B. PVC (polyvinyl chloride) membranes are single-ply roofing membranes. The membranes are installed in accordance with this report over combustible or noncombustible decks that are insulated or uninsulated. See Table 1 for roof classification requirements and Table 2 for wind uplift resistance requirements.

2.2 Materials:

2.2.1 I.B. PVC Membrane: I.B. PVC is a polyester-fabric-reinforced, plasticized polyvinyl chloride membrane, manufactured in nominal 50-, 60- and 80-mil (1.27, 1.52 and 2.03) thicknesses, in 72-inch-wide-by-100-foot-long rolls (1829 mm by 30 480 mm).

2.2.2 Fasteners: Dekfast $2^1/_2$-inch HS Membrane Plates are $2^1/_2$-inch-diameter (63.5 mm), 0.038-inch-thick (0.96 mm) steel discs having an AZ50 Galvalume coating, a 0.261-inch-diameter (6.63 mm) center hole and six pointed barbs projecting $^1/_8$ inch (3.2 mm) downward from the underside between two raised circular stampings. The Dekfast plates are used with Dekfast #15 HS Fasteners, which are No. 15 carbon steel screws, having double-edged self-drilling points, $^7/_{16}$-inch-diameter (11. 1 mm) truss heads, a major thread diameter of 0.257 inch (6.53 mm), a minor thread diameter of 0.167 inch (4.24 mm) and a black proprietary coating.

Olympic XHD Seam Plates are nominal $2^3/_8$-inch-diameter (60.3 mm), nominal 0.040-inch-thick (1.02 mm) steel discs, having an AZ55 Galvalume coating, a 0.230-inch-diameter (5.84 mm) center hole and six pointed barbs projecting $^1/_8$-inch (3.2 mm) downward. The Olympic XHD plates are used with Olympic XHD Fasteners, which are carbon steel screws having a buttress thread design, double-edged self-drilling points, a $^7/_{16}$-inch-diameter (11.1 mm) truss head, a major thread diameter of 0.265 inch (6.73 mm), a minor thread diameter of 0.158 inch (4.01 mm) and a black proprietary coating.

2.2.3 Insulation: Polyisocyanurate foam plastic insulation must comply with ASTM C 1289 and Chapter 26 of the 2000 *International Building Code*® (IBC) or the 1997 *Uniform Building Code*™ (UBC).

Foam plastic insulation must be Apache Products Company Pyrox insulation (ER-3240), or be recognized in a current ICC-ES evaluation report, or be justified to the satisfaction of the building official as complying with the labeling and identification, surface-burning characteristics, and thermal barrier requirements of UBC Section 2602 or IBC Section 2603 and this evaluation report. The foam plastic insulation must also be approved by Factory Mutual and classified by Underwriters Laboratories Inc. for roofing applications.

When foam plastic insulation is installed directly over a steel deck without a thermal barrier, the roof assembly, which includes the foam plastic insulation and the I.B. PVC membrane, must be listed for compliance with a test for insulated roof decks, such as FM 4450 (Approval Standard for Class I Insulated Steel Deck Construction), UL 1256 (Fire Test for Roof Deck Construction), or the ICC-ES Acceptance Criteria for Foam Plastic Insulation Applied Directly to Steel Decks (AC142).

2.3 Installation:

2.3.1 General: All systems recognized in this evaluation report must be installed by applicators trained and approved by I.B. Roof Systems. Substrates must be clean and smooth, and free of sharp edges and loose or foreign materials. Roof surfaces must slope a minimum of $^1/_4$ inch per foor (2.1%) slope) to ensure proper drainage. Application of the roofing assemblies must be in accordance with Tables 1 and 2 of this report.

Mechanical attachment of insulation to substrates must be with fasteners and plates described in Section 2.2.2 and Table 2, at a density or spacing set forth in Table 2. Base sheets, when used, are applied over the insulated substrate and shingled with the flow of water. Laps in the membrane must be 5 inches on sides and 3 inches on ends. Fasteners and discs are placed approximately 1.5 inches (38 mm) from the edge of the membrane sheet. Seams must be hot-air

welded. A minimum of two 3-foot-wide (914 mm) sheets are installed on roof perimeters; 6-foot-wide (1829 mm) sheets are installed in the field of the roof. Fastener density must be doubled at roof corners and perimeters as defined in Note 4 to Table 16-H of the UBC. Fasteners must penetrate the underside of steel or plywood decks a minimum of $^1/_2$ inch (12.7 mm), and shall penetrate wood and concrete decks a minimum of 1 inch (25.4 mm).

All openings through the roof, valleys, drains, and parapets must be flashed in accordance with the manufacturer's instructions. See Figure 1 for typical details.

2.3.2 Thermal Barrier: A thermal barrier complying with Section 2602.4 of the UBC is required for roof assemblies incorporating foam plastic. Acceptable thermal barriers include minimum $^1/_2$-inch-thick (12.7 mm) gypsum board or 1-inch-thick (25.4 mm) concrete. For roof assemblies applied over a minimum nominal $^{15}/_{32}$-inch (11.9 mm) Exposure 1 plywood with edges supported by blocking, tongue-and-groove joints or other approved type of edge support, per UBC Section 2602.5.3 or IBC Section 2603.4.1.5, the plywood serves as the thermal barrier.

For compliance with the thermal barrier requirements of UBC Section 2602.5.3 or IBC Section 2603.4.1.5, when the foam plastic insulation is installed over a steel deck, the foam plastic insulation must be recognized in a current ICC-ES evaluation report for use in this manner. Alternatively, the insulation must be shown to comply with UL 1256 or the FM 4450 calorimeter test. A thermal barrier complying with UBC Section 2602.4 or IBC Section 2603.4 is required where the foam plastic insulation is not recognized for installation directly over steel decks.

2.3.3 Perimeter Attachment: Continuous wood blocking must be installed at the roof perimeter and around roof projections and penetrations. The blocking must be attached to resist a minimum force of 175 pounds per lineal foot (2555 N/m) in any direction. Edge flashing is attached to the wood blocking, with fasteners described in Section 2.2.2, at 4 inches (102 mm) on center.

2.4 Roofing Classification:

The roofing classifications of the various systems described in this report are provided in Table 1.

2.5 Wind Resistance:

Installation of the various roof-covering systems described in this report is limited to areas, wind speeds and building heights shown in Table 2.

2.6 Identification:

Rolls of the roofing membranes are identified by the I.B. Roof Systems name and the applicable manufacturing information, such as lot number. Pallets of roofing membranes have a label bearing the I.B. Roof Systems name and address, the product name, the evaluation report number (ER-5826) and the name of the inspection agency (Intertek Testing Services, Inc.)

Fasteners are identified by the company name and by the size.

Apache Products Company Pyrox insulation is identified in accordance with ER-3240.

Foam plastic insulation must be identified with the manufacturer's name, the name of the inspection agency, the surface burning characteristics, and, where applicable, with wording that indicates compliance with UBC Section 2602.5.3 or IBC Section 2603.4.1.5.

3.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Membrane Roof-covering Systems (AC75), dated June 2003, including reports of tests in accordance with CAN/CGSB 37.54-95; and a quality control manual.

4.0 FINDINGS

That the I.B. PVC roof covering membranes described in this report comply with the 1997 *Uniform Building Code*™, the 2000 *International Building Code*® and the 2000 *International Residential Code*®, subject to the following conditions:

4.1 The roof covering system is installed by applicators approved by I.B. Roof Systems.

4.2 The materials and installation comply with this report and the manufacturer's instructions.

4.3 Where moderate or heavy traffic occurs, such as for maintenance of equipment, the roof covering is adequately protected to prevent rupture or wearing of the surface.

4.4 Roof classification requirements in Table 1 and wind design requirements in Table 2 are followed.

4.5 The membranes are manufactured in Cambridge, Ontario, Canada, under a quality control program with inspections by Intertek Testing Services NA Ltd. (AA-688).

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

TABLE 1—I.B. ROOFING SYSTEMS

SYSTEM NO.	ROOF CLASSIFICATION	SUBSTRATE	MAXIMUM SLOPE[2]	INSULATION			ROOF COVERING APPLICATION	
				Type	Thickness (inches)	Attachment	Base Sheet	Membrane
1	A	Steel[1]	3:12 (25%)	Polyisocyanurate	Any	Mechanically attached to substrate	None	I.B. PVC, mechanically attached

For **SI:** 1 inch = 25.4 mm, 1 gal./100 sq. ft. = 0.41 L/m^2, 1 sq. ft. = 0.093 m^2.
N/A = Not applicable.

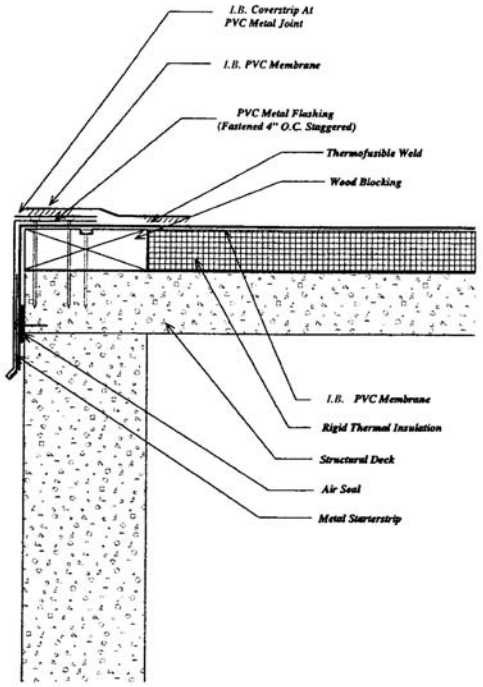
[1]A thermal barrier complying with Section 2602.4.3 of the UBC is required except as noted in Section 2.3.2 of this report.
[2]Minimum roof slope is $^1/_4$:12 (2.1%).

TABLE 2—METHOD OF ATTACHMENT OF ROOFING MEMBRANE AND INSULATION

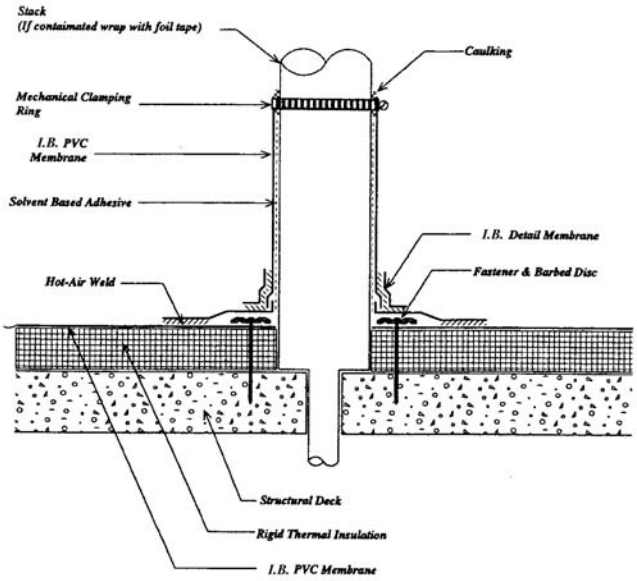
SUBSTRATE	INSULATION ATTACHMENT			MEMBRANE ATTACHMENT[1,2]		DESIGN WIND PRESSURE (psf)	ALLOWABLE LOCATIONS BASED ON WIND UPLIFT CAPACITY[3]	
	Type	Minimum Thickness (inches)	Fastener Type and Density[1,2]	Row Spacing (inches)	Fastener Spacing (inches)		Maximum Basic Wind Speed (mph)	Exposure
ASTM A 611, Grade E, or ASTM A 653, Grade 80, steel, min. No. 22 gage	Polyisocyanurate	1.0	Presecured	67	12	45	80	C
					6	60	90	C
						60	80	D
Steel, min. No. 22 gage	Polyisocyanurate	1.5	Presecured	67	12	30	70	B
					6	45	80	C

For **SI:** 1 inch = 25.4 mm, 1 foot = 304.8 mm.

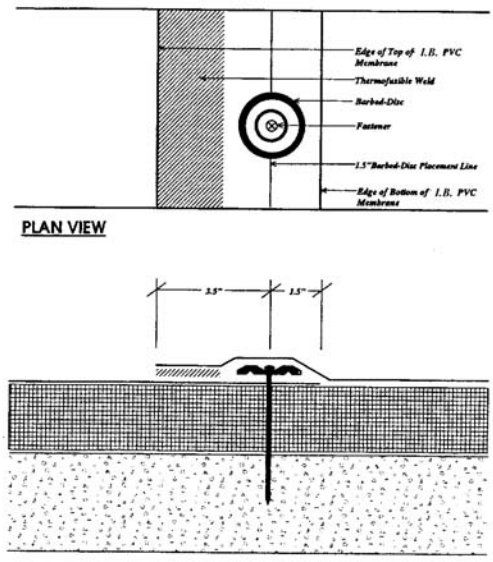
[1]Fastener density is doubled at roof corners and perimeters, which are defined in Note 4 of UBC Table 16-H.
[2]Fasteners are Dekfast 2$^1/_2$-inch HS Membrane Plates and Dekfast #15 HS Fasteners or Olympic XHD Seam Plates and Olympic XHD Fasteners. Fasteners must be of sufficient length to penetrate steel substrates.
[3]Maximum roof covering height above grade is 40 feet.



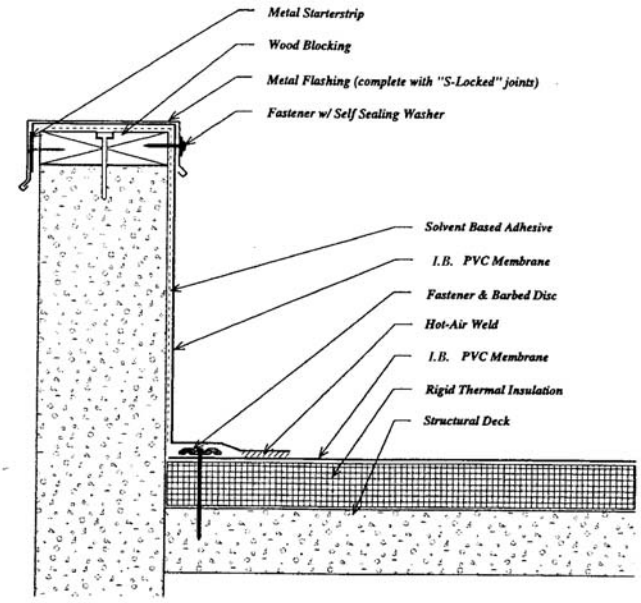
PVC ZERO EDGE PERIMETER



STACK FLASHING FABRICATED



MECHANICALLY FASTENED INSEAM BARBED-DISC PLACEMENT



PARAPET WALL WITH METAL CAP

FIGURE 1