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DIVISION: 07—THERMAL AND MOISTURE PROTECTION
Section: 07410—Metal Roof and Wall Panels

REPORT HOLDER:

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EVALUATION SUBJECT:

ENVELOPE 2000® RR EXTERIOR AND INTERIOR WALL PANELS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2003 *International Building Code*® (IBC)
- 1997 *Uniform Building Code*™ (UBC)

Properties evaluated:

- Structural
- Fire resistance

2.0 USES

The Envelope 2000® RR wall panels are used as exterior wall cladding or interior wall finish in accordance with, respectively, the codes specifically listed in Section 1.0 of this report and the Conditions of Use noted in Section 5.0.

3.0 DESCRIPTION

3.1 General:

Envelope 2000® RR Exterior and Interior Wall Panels are aluminum composite material (ACM) sandwich panels consisting of aluminum facers adhered to a thermoset phenolic-impregnated kraft paper core. The panels are factory-assembled to a maximum size of 60 inches (1524 mm) wide by 144 inches (3658 mm) long, and a thickness of 0.152 inch (3.9 mm). The panels have a Class I flame-spread classification and a smoke-developed rating of less than 450 when tested in accordance with ASTM E 84-94 (UBC Standard 8-1).

3.2 Materials:

3.2.1 Facings: The exterior facing material is 0.024-inch-thick (0.61 mm) aluminum alloy 3105, temper H24 [minimum tensile yield strength of 18 ksi (124 MPa)]. The interior facing is 0.010-inch-thick (0.25 mm) aluminum alloy 5052, temper H34 [minimum tensile yield strength of 26 ksi (179 MPa)]. The panel facings are prefinished.

3.2.2 Core: The core, a thermosetting plastic composite of kraft paper and phenolic resin, has a nominal thickness of 0.105 inch (2.7 mm) and a nominal density of 89 pounds per cubic foot (1,426 kg/m³). The core is classified as a CC1 approved plastic material when tested in accordance with ASTM D 635-74 (UBC Standard 26-7).

3.2.3 Adhesive: The facings are bonded to the plastic composite core with ISOGRIP SP 3030D, manufactured by Ashland Chemical Company, and recognized in evaluation report ESR-1140.

3.2.4 Attachment Accessories: Extrusions, angles, corner brackets, and stiffeners are manufactured from 6063-T5 aluminum alloy, as shown in Figure 1.

3.2.5 Silicone Sealant: Sealant shall be Dow Corning 795, which is a low-modulus, one-component silicone complying with ASTM C 920-94.

3.3 Panel Assembly at Fabricator—Rout and Return Method:

Panels are preassembled at an approved fabricator's facility, using the Rout and Return method. The method involves routing around a panel's entire perimeter using a V-groove router, leaving only the facer sheet uncut at the base of the groove along all edges. Routing must be at least 1 inch (25.4 mm) from each edge of the panel, to create 1-inch (25.4 mm) return legs all around when folded up at a right angle, while using the facer sheet as a hinge. Corners formed by the return legs are sealed with silicone, described in Section 3.2.5 of this report, and braced by corner brackets with ³/₁₆-inch-diameter-by-¹/₂-inch (4.8 mm by 12.7 mm) aluminum rivets, one per bracket leg. The panels are reinforced at the back with 1-inch-by-2-inch (25 mm by 51 mm) aluminum tube stiffeners, with a wall thickness of 0.15 inch (3.81 mm), spanning the shorter panel dimension. One stiffener is placed at the center of the panel; remaining stiffeners are placed 24 inches (610 mm) on center away from the center. Stiffeners are shop-attached to the back of the panel with ¹/₈- to ³/₁₆-inch (3.2 to 4.8 mm) beads of Dow Corning 795 sealant and a ¹/₁₆-inch-thick-by-³/₄-inch-wide (1.6 mm by 19.1 mm) double-sided foam tape. The sealant is applied continuously along both edges of the tube stiffeners, while the double-sided foam tape provides "body" to sealant bond line and stability as the sealant cures.

Perimeter aluminum extrusions, used for panel attachment to structural framing, are fastened to the return legs around the perimeter of the panel with pairs of ³/₁₆-inch-diameter (4.8 mm) pop rivets spaced 1 to 2 inches (25 to 51 mm) apart, and each pair is spaced a maximum of 16 inches (406 mm) on center along the length of the extrusions. See Figure 2.

3.4 Allowable Transverse Load:

When the Envelope 2000® RR panels are assembled and installed as set forth in this report, the maximum allowable transverse load is 36 psf (1724 Pa), negative or positive.

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4.0 INSTALLATION

The preassembled panels are attached to minimum No. 16 gage [0.050 inch (1.27 mm) base-metal thickness] steel framing studs spaced at a maximum of 16 inches on center (406 mm), using No. 10-14 self-drilling galvanized or stainless steel screws. The screws, having sufficient length to penetrate through the supporting steel members, are driven through the perimeter extrusions and into the steel studs at 16 inches (406 mm) on center. Stud cavities are insulated with approved fiberglass insulation materials. Plastic shims, a minimum of $\frac{1}{16}$ inch (1.6 mm) thick, are used to separate the aluminum extrusions from the steel studs. Perimeter aluminum extrusions must interlock at the joints between panels. All joints between panels, or between panels and adjacent building materials, must be sealed using sealants described in Section 3.2.5 of this report, and backer rod combinations. Means of drainage must be provided at building sill locations. Typical panel installation details are shown in Figure 3.

5.0 CONDITIONS OF USE

The Envelope 2000® RR Exterior and Interior Wall Panels comply with those codes specifically listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The panels shall be fabricated and erected in accordance with this report and the manufacturer's instructions, a copy of which shall be kept at the jobsite.
- 5.2 Allowable transverse loads shall be as set forth in this report.
- 5.3 Under the UBC, the panels shall be limited to combustible, nonfire-rated, Type V construction.
- 5.4 The panels, framing and connections shall be designed, and the designs shall be submitted to the building official for approval on each project.
- 5.5 Under the IBC, panels are permitted in noncombustible construction provided installation is limited to the following heights:
 - 5.5.1 A maximum of 40 feet in height above the grade plane, under the limitations specified in Section 1407.11.1 of the IBC.
 - 5.5.2 A maximum of 50 feet in height above the grade plane, under the limitations specified in Section 1407.11.2 of the IBC.
- 5.6 Under the UBC, panels may be used where light-transmitting exterior wall panels are permitted under the limitations specified in Section 2603.5 of the UBC.
- 5.7 Under the UBC, panels may be used where glazing of unprotected openings is permitted under limitations set forth in Section 2603.4 of the UBC.
- 5.8 Under the UBC, panels may be used as plastic veneer under limitations specified in Section 2604 of the UBC.
- 5.9 Panels may be used as an interior finish where:
 - 5.9.1 Class I, II and III materials are permitted under Chapter 8 of the UBC.
 - 5.9.2 Class A, B and C materials are permitted under Chapter 8 of the IBC.
- 5.10 Under the UBC, panels may be used as plastic panels and signs under the limitations specified in Section 404.3.7 of the UBC.
- 5.11 Evidence of weather tightness of the wall cladding system in accordance with Section 1407.6 of the IBC and Section 1402.1 of the UBC shall be to the satisfaction of the building official.
- 5.12 The preassembly of the panels, described in Section 3.3 of this report, shall be at the shop of an approved fabricator.
- 5.13 The panels are laminated in Indianapolis, Indiana, under a quality control program with inspections conducted by Omega Point Laboratories (AA-657).

6.0 EVIDENCE SUBMITTED

- 6.1 Reports of peel strength testing in accordance with ASTM D 1791-93.
- 6.2 Reports of ignition properties tests in accordance with ASTM D 1929-96.
- 6.3 Reports of rate-of-burn tests in accordance with ASTM D 635-91.
- 6.4 Reports of surface-burning characteristics tests in accordance with ASTM E 84-98.
- 6.5 Reports of room corner fire tests in accordance with UBC Standard 26-3.
- 6.6 Reports of transverse load tests in accordance with ASTM E 72-95.
- 6.7 Reports of physical properties tests in accordance with ASTM C 920.
- 6.8 Reports of tests in accordance with ASTM D 822, G 23, D 4214 and D 2244.
- 6.9 A quality control manual.

7.0 IDENTIFICATION

Each panel shall bear a stamp noting the name and address of the manufacturer (Citadel Architectural Products, Inc.), the product name, the evaluation report number (ESR-1015) and the name of the inspection agency (Omega Point Laboratories).

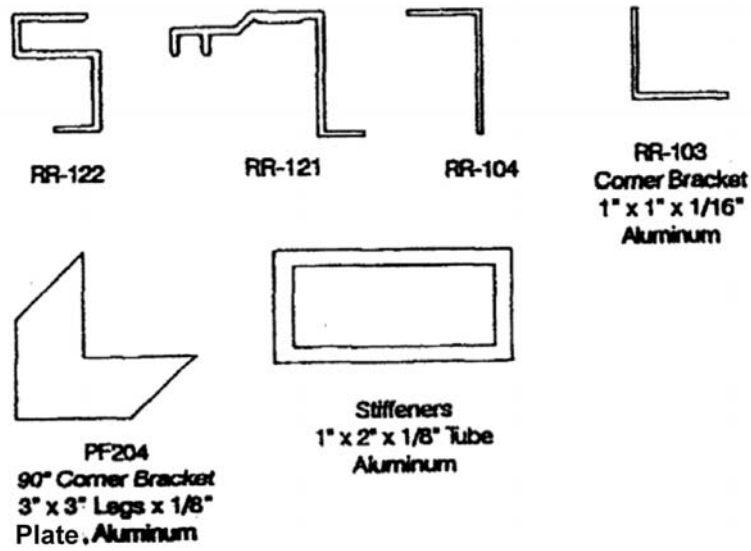


FIGURE 1—ALUMINUM EXTRUSIONS

2 rivets should be placed at the centerline 1'-2" apart, then space additional rivets no more than 16" o.c. along extrusion. Place 2 rivets no more than 1'-3" from extrusion edge.

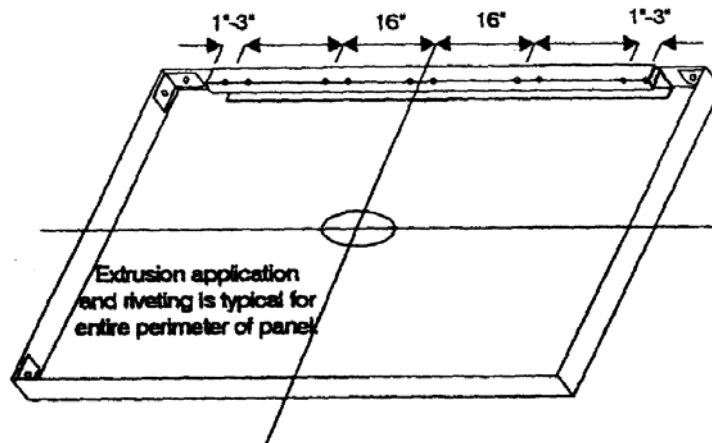
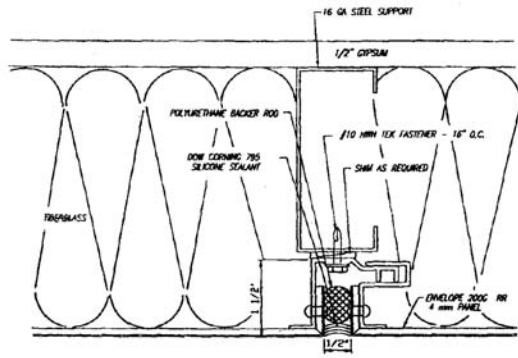
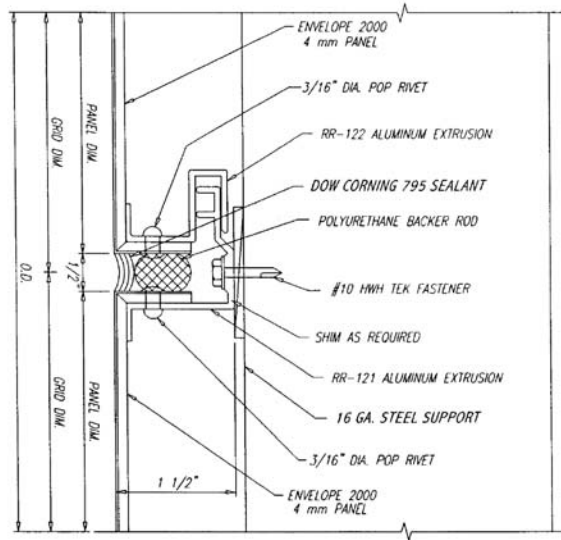


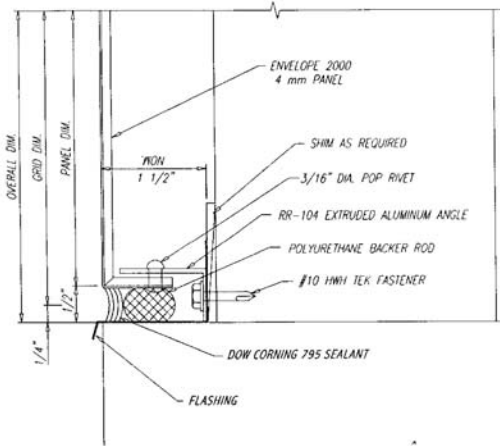
FIGURE 2—RIVET SPACING FOR EXTRUSION ATTACHMENT



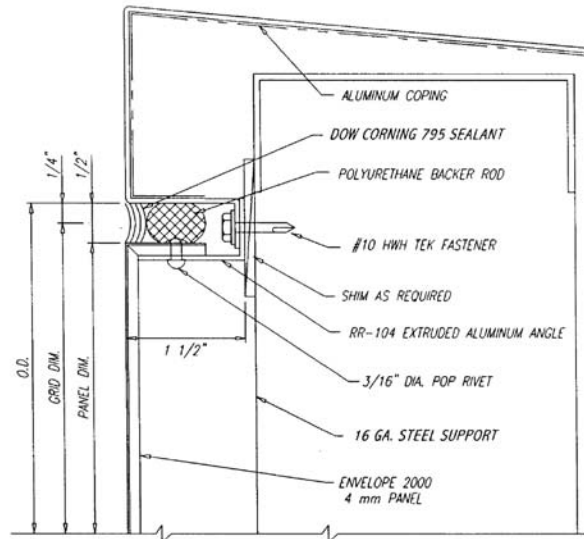
VERTICAL JOINT



HORIZONTAL JOINT

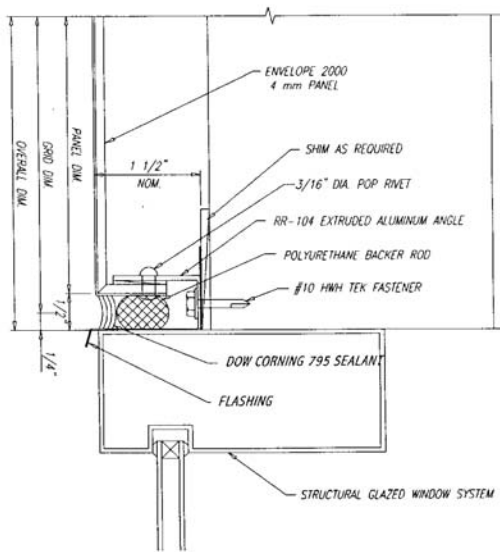


BASE

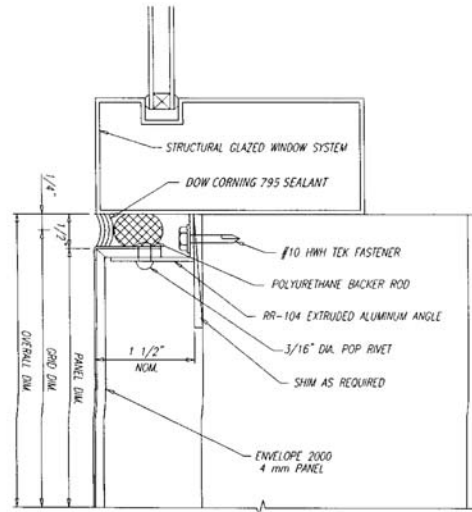


PARAPET

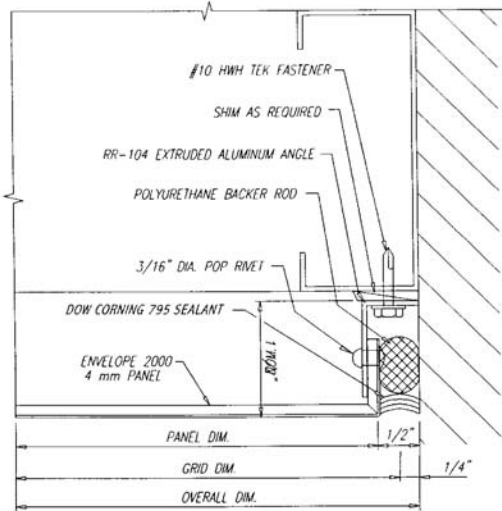
FIGURE 3—ENVELOPE 2000® RR PANEL TYPICAL INSTALLATION DETAILS



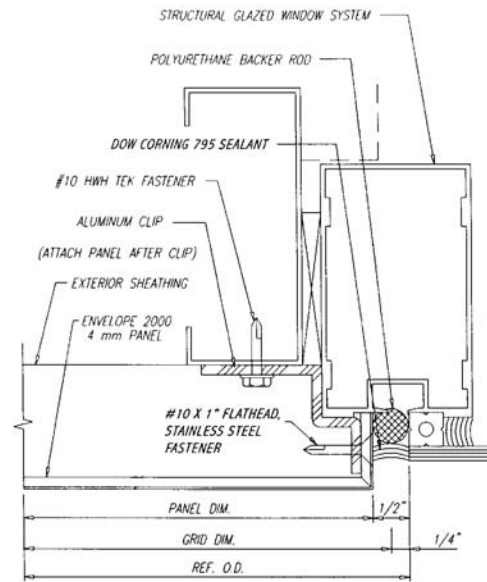
WINDOW HEAD



WINDOW SILL, JAMB



JAMB, OPTION 1



JAMB, OPTION 2

FIGURE 3—ENVELOPE 2000® RR PANEL TYPICAL INSTALLATION DETAILS (Continued)