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ESR-2653

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION
Section: 07 42 43—Composite Wall Panels

REPORT HOLDER:

MITSUBISHI PLASTICS COMPOSITES AMERICA, INC.
401 VOLVO PARKWAY
CHESAPEAKE, VIRGINIA 23320
(757) 382-5750
www.alpolic.com

ADDITIONAL LISTEE:

MITSUBISHI PLASTICS INC.
INDUSTRIAL MATERIALS DIVISION,
COMPOSITE MATERIALS DEPARTMENT
MITSUBISHI PLASTICS BUILDING, 6F
1-2-2 NIHONBASHI-HONGOKU-CHO
CHUO-KU, TOKYO 103-0021
JAPAN

EVALUATION SUBJECT:

ALPOLIC®/fr WALL PANELS

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2009 *International Building Code®* (IBC)
- Other Codes (see Section 8.0)

Property evaluated:

- Fire performance
- Durability

2.0 USES

The Alpolic®/fr wall panels are aluminum composite panels complying with IBC Section 1407 for metal composite materials (MCM) and are used as nonload-bearing exterior wall panels in accordance with Section 1407 of the IBC. Additionally, the Alpolic®/fr wall panels are used as an interior wall finish in accordance with Section 803 of the IBC. For installation on exterior walls of Type I, II, III, or IV construction, the Alpolic®/fr wall panels must be installed as a component of exterior wall assemblies constructed in accordance with Section 4.3 of this report. For installation on exterior fire-resistance-rated walls, the wall assemblies must be constructed in accordance with Section 4.5.

3.0 DESCRIPTION

3.1 Panels:

The Alpolic®/fr wall panels are aluminum composite wall panels manufactured in two nominal thicknesses, 4 millimeters and 6 millimeters (0.16 or 0.23 inch). The panels consist of two nominally 0.020-inch-thick (0.5 mm) aluminum skins bonded to both surfaces of a polyethylene-based core [nominal density of 93 pcf (1490 kg/m^3] that contains inorganic fillers. The panel skins have a factory-applied painted finish.

The nominal thickness of the core material is 0.118 inch (3 mm) for the 4-millimeter-think (0.16 mm) wall panels and 0.197 (5.0 mm) for the 6-millimeter-think (0.23 inch) wall panels.

The Alpolic®/fr wall panels are available in widths from 30 inches (762 mm) to 62 inches (1575 mm). Lengths are available from 4 feet (1219 mm) to 24 feet (7315 mm). The 4-millimeter- and 6-millimeter-think Alpolic®/fr MCM wall panels weigh 1.54 psf and 2.23 psf (7.5 and 10.9 kg/m^2), respectively.

The Alpolic®/fr wall panels have a flame-spread index of not more than 25 and a smoke-developed index of not more than 450 when tested in accordance with ASTM E 84.

3.2 Panel Stiffeners and Attachment Accessories:

Installation of the Alpolic®/fr wall panels requires the following materials that are supplied by the MCM systems fabricator in a rout-and-return, dry-set type installation method (see Figure 1):

- Continuous I-shaped extruded aluminum stiffeners (see Section 1 of Figure 1), alloy 6063-T6.
- Extruded aluminum mounting bars along perimeter of the panels (see callouts 2 and 3 of Figure 1), alloy 6063-T6.
- Extruded aluminum retainers, alloy 6063-T6.
- Spline angles.

4.0 INSTALLATION

4.1 General:

If there are any conflicts between this report and the manufacturer's installation instructions, this report governs. The manufacturer's published installation instructions and this report must be strictly adhered to, and a copy of the manufacturer's instructions must be available at all times on the jobsite during installation.

4.2 Installation (Rout-and-return, Dry-set Type Method):

The systems fabricator must route around the entire perimeter of the flat panels along the panel edges using a V-groove router, leaving the face sheet uncut at the base of the routed groove. The panel edges are then folded at a right angle to create a return leg at each panel edge, using the uncut facer sheet to act as a hinge so that the flat panels are formed into "pans." A $^3/_4$ moon-shaped groove is also cut into each return leg of the panels to facilitate panel interlock with the mounting bars described below. Spline angles must be shop-attached at the panel corners by the panel fabricator using pop-rivets. Additionally, the systems' fabricator must install I-shaped extruded aluminum stiffeners on the back of the panels, parallel to the panel span at a maximum spacing of 24 inches (610 mm) on center. The stiffeners must be adhered to the panels using an approved structural silicone sealant/adhesive complying with ASTM C 1184. The panel length measured in the direction parallel to the stiffeners shall not exceed 5 feet (1.52 m). See Figure 1.

Extruded aluminum mounting bars must be attached to the building walls at the jobsite. The panels are then attached to the mounting bars using extruded aluminum retainers so that the panels are pressure interlocked into the bulb end of the mounting bars.

4.3 Exterior Walls of Buildings of Type I, II, III or IV Construction:

Where exterior walls are required to be noncombustible construction, the walls with the Alpolic®/fr wall panels must be constructed as follows:

1. Minimum 43-mil [0.0428 inch minimum base-metal thickness (1.09 mm)], $3^5/_8$-inch-deep (92.1 mm), cold-formed steel C-shaped studs spaced a maximum of 16 inches (406 mm) on center.
2. The interior side of the wall must be covered with one layer of minimum $^5/_8$-inch-thick (15.9 mm), Type X gypsum wallboard, applied vertically with horizontal joints blocked. The wallboard must be fastened to the studs and blocking in accordance with the IBC. The interior wallboard joints must be taped and treated with paper tape and joint compound. The screw heads must be treated with joint compound.
3. The exterior side of the wall must be covered with one layer of minimum $^5/_8$-inch-thick (15.9 mm), Type X gypsum sheathing complying with ASTM C 79, with horizontal joints blocked. The sheathing must be attached to studs and blocking in accordance with the IBC.
4. The wall cavity between the steel studs must be filled with $3^5/_8$-inch-thick (92 mm), R-11, foil-faced, glass-fiber insulation.
5. All openings in the wall construction must be framed with minimum 43-mil [0.0428 inch minimum base-metal thickness (1.09 mm)] galvanized steel framing.

The Alpolic®/fr panels must be installed on the exterior side of the wall in accordance with Sections 4.1 and 4.2. The floor level cavity at the intersection of the floor slab and the exterior wall framing system must be completely filled with an approved material or system meeting the criteria specified in IBC Section 714.4.

4.4 Interior Wall Covering:

The Alpolic®/fr panels may be used as an interior wall finish in compliance with IBC Chapter 8. The panels must be installed on the interior side of the wall in accordance with Sections 4.1 and 4.2 above. The panels have a Class A interior finish classification.

4.5 Fire-resistance Rated Wall Assemblies:

The Alpolic®/fr wall panels used in fire-resistance-rated walls must be in accordance with the following:

4.5.1 Two-hour Fire-resistance Rated, Nonload-bearing Wall Assembly:

1. Minimum 43-mil [0.0428 inch minimum base-metal thickness (1.09 mm)], $3^5/_8$-inch-deep (92.1 mm), cold-formed steel C-shaped studs spaced a maximum of 16 inches (406 mm) on center.
2. The interior side of the wall must be covered with two layers of $^5/_8$-inch-thick (16 mm), Type X gypsum wallboard applied vertically. Horizontal joints of the first layer of wallboard must be blocked unless horizontal joints of the adjacent wallboard layers are staggered a minimum of 12 inches (305 mm). The first layer must be attached to the steel studs and blocking with $1^5/_8$-inch-long (41 mm), No. 6, Type S drywall screws spaced at 8 inches (203 mm) on center along the wallboard perimeter and joints and 12 inches (305 mm) on center in the field of the wallboard. The second layer must be attached to the steel studs and blocking with $2^1/_4$-inch-long (57 mm), No. 6, Type S drywall screws spaced at 8 inches (203 mm) on center at the perimeter, and 12 inches (305 mm) on center in the field of the wallboard. The joints of the face layer must be taped and treated with joint compound complying with ASTM C 474 and ASTM C 475. The screw heads must be treated with the same joint compound.
3. The exterior side of the wall must be covered with two layers of $^5/_8$-inch-thick (16 mm), Type X gypsum sheathing applied vertically. Horizontal joints of the first layer of wallboard must be blocked unless horizontal joints of the adjacent sheathing layers are staggered a minimum of 12 inches (305 mm). The first layer must be attached to the steel studs and blocking with $1^5/_8$-inch-long (41 mm), No. 6, Type S drywall screws spaced at 8 inches (203 mm) on center along the perimeter and joints and 12 inches (305 mm) on center in the field of the sheathing. The second layer must be attached to the steel studs and blocking with $2^1/_4$-inch-long (57 mm), No. 6, Type S drywall screws spaced at 8 inches (203 mm) on center at the perimeter, and 12 inches (305 mm) on center in the field of the sheathing. The joints of the face layer must be taped and treated with joint compound complying with ASTM C 474 and ASTM C 475. The screw heads must be treated with same joint compound.
4. The wall cavity between the steel studs must be filled with $3^5/_8$-inch-thick (92 mm), 16-inch-wide (406 mm), R-13 fiberglass batt insulation.
5. The Alpolic®/fr wall panels must be attached to the exterior face of the wall assembly in accordance with Sections 4.1 and 4..

4.5.2 One-hour Fire-resistance-rated Nonload-bearing Wall Assembly:

1. Minimum 43-mil [0.0428 inch minimum base-metal thickness (1.09 mm)], $3^5/_8$-inch-deep (92.1 mm), cold-formed steel C-shaped studs spaced a maximum of 16 inches (406 mm) on center.
2. The interior side of the wall must be covered with one layer of $^5/_8$-inch-thick (16 mm), Type X gypsum wallboard, applied vertically with horizontal joints blocked and fastened to the steel studs and blocking with $1^5/_8$-inch-long (41 mm), No. 6, Type S drywall screws spaced at 8 inches (203 mm) on center along

the wallboard perimeter and joints and 12 inches (305 mm) on center in the field of the wallboard. The wallboard joints must be taped and treated with joint compound complying with ASTM C 474 and ASTM C 475. The screw heads must be treated with the same joint compound.

3. The exterior side of the wall must be covered with one layer of $^5/_8$-inch-thick (16 mm), Type X gypsum sheathing, applied vertically with horizontal joints blocked and attached to the steel studs and blocking with $1^5/_8$-inch-long (41 mm), No. 6, Type S drywall screws spaced at 8 inches (203 mm) on center along the sheathing perimeter and joints and 12 inches (305 mm) on center in the field of the sheathing. The sheathing joints must be taped and treated with joint compound complying with ASTM C 474 and ASTM C 475. The screw heads must be treated with the same joint compound.
4. The wall cavity between the steel studs must be filled with $3^5/_8$-inch-thick (92 mm), 16-inch-wide (406 mm), R-13 fiberglass batt insulation.
5. The Alpolic®/fr wall panels must be attached to the exterior face of the wall assembly in accordance with Sections 4.1 and 4.2.

5.0 CONDITIONS OF USE

The Alpolic®/fr wall panels described in this report comply with, or are suitable alternatives to what is specified in, the code indicated in Section 1.0 of this report, subject to the following conditions:

5.1 Installation must comply with this report, the manufacturer's published installation instructions, the applicable code and approved plans. The design of the structural support system (building framing, attachment accessories, and silicone adhesive) and panel connections provided by the MCM systems fabricator must be submitted to and approved by the code official for each project.

5.2 The allowable transverse load capacity for the MCM panels and their interlock with their attachment accessories must be submitted to and approved by the code official for each project. The allowable transverse load capacity must equal or exceed the design loads determined in accordance with Chapter 16 of the IBC.

5.3 Where Alpolic®/fr wall panels are installed on exterior walls on buildings of Type I, II, III and IV construction, the walls must be constructed in accordance with Section 4.3 of this report.

5.4 The MCM system fabricator must provide a certificate of compliance to the code official attesting that the MCM system fabrication includes the use of adhesives approved for use, that the adhesive application complies with the adhesive manufacturer's installation guidelines, and that the MCM system fabrication complies with approved construction documents. Additionally, should the use of adhesives extend beyond the installation of stiffeners to the back of the panels for the purpose of increasing panel stiffness only, special inspections are required in accordance with IBC Section 1704.2, or the fabricator must be approved by the code official in accordance with IBC Section 1704.2.2.

5.5 Where a fire-resistance-rated exterior wall is required, walls must be constructed in accordance with Section 4.5 of this report. Additionally, Alpolic®/fr wall panels are permitted on the outer face of a fire-resistance-rated exterior wall assembly provided the panel assembly attachments do not penetrate through the entire exterior wall assembly.

5.6 Evidence of weather tightness of the wall cladding system in accordance with Section 1407.6 of the IBC must be submitted to the code official.

5.7 The panels are manufactured by Mitsubishi Plastics Composites America, Inc., in Chesapeake, Virginia, and by Mitsubishi Plastics Inc. in Ueda City, Japan, under a quality control program with inspections by Southwest Research Institute (AA-665).

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Metal Composite Material (AC25), dated October 2010.

7.0 IDENTIFICATION

The panels are identified by a label noting the company name of Mitsubishi Plastics Composites America, Inc., or Mitsubishi Plastics, Inc., the applicable manufacturing address, product name, thickness, flame-spread index, the name of the inspection agency (Southwest Research Institute), and the evaluation report number (ESR-2653).

8.0 OTHER CODES

8.1 Evaluation Scope:

In addition to the code referenced in Section 1.0, the products described in this report were evaluated for compliance with the requirements of the 2006 *International Building Code*® (2006 IBC).

The Alpolic®/fr exterior and interior wall panels described in this report comply with, or are suitable alternatives to what is specified in, the 2006 IBC, subject to the provisions of Sections 8.2 through 8.7 as noted below.

8.2 Uses:

See Section 2.0.

8.3 Description:

See Section 3.0.

8.4 Installation:

See Section 4.0 except that, in the last paragraph of Section 4.3, the floor level cavity at the intersection of the floor slab and the exterior wall framing system must be completely filled with an approved material or system meeting the criteria specified in IBC Section 713.4.

8.5 Conditions of Use:

See Section 5.0 but replace the wording in Section 5.5 with the following:

Where a fire-resistance-rated exterior wall is required, walls must be constructed in accordance with Section 4.5 of this report.

8.6 Evidence Submitted:

See Section 6.0.

8.7 Identification:

See Section 7.0.

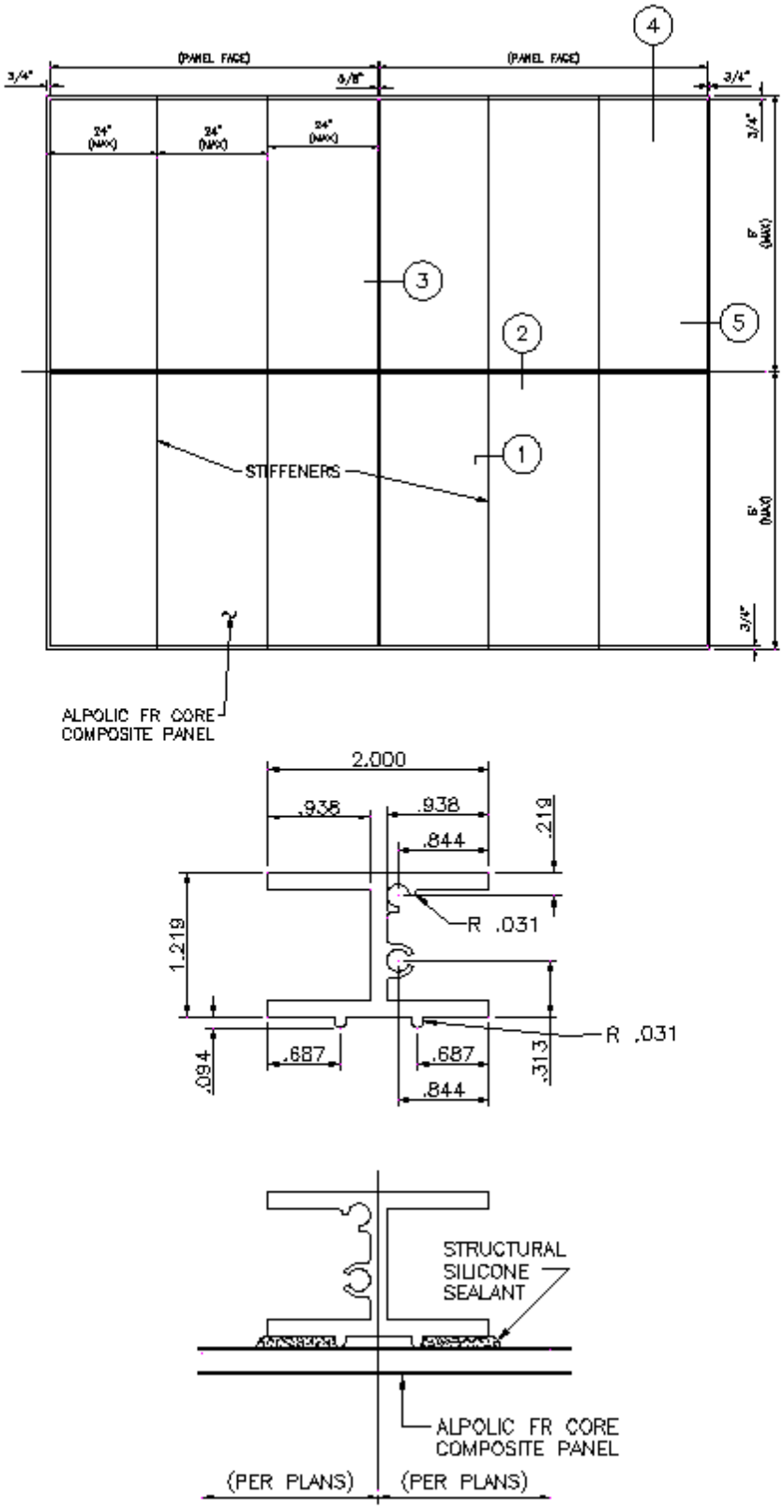
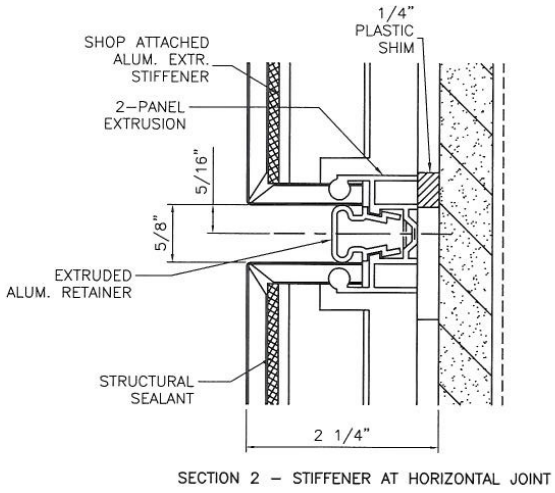
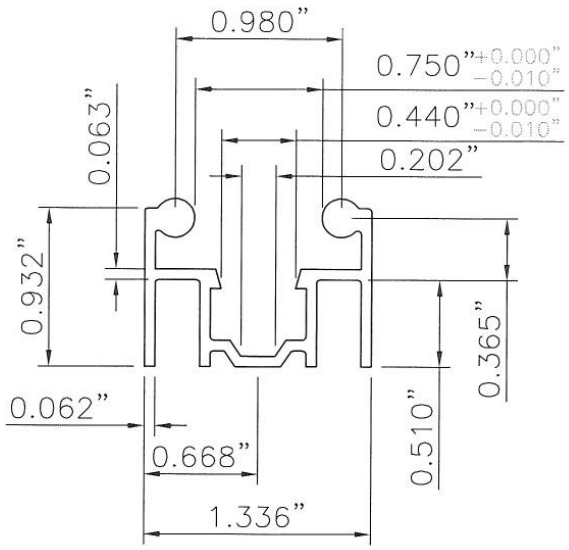


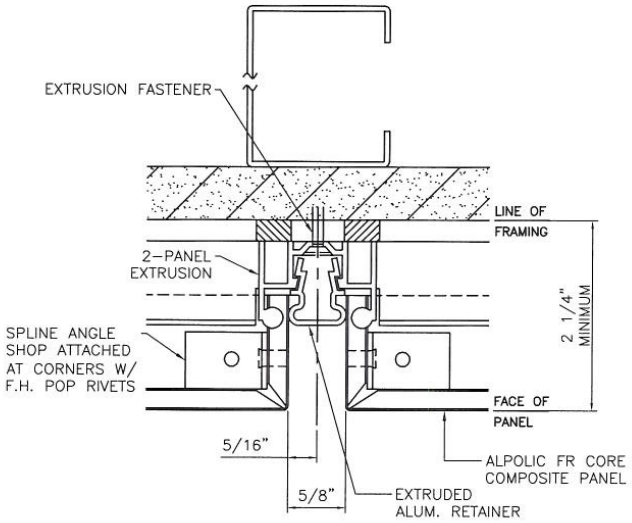
FIGURE 1—STIFFENER



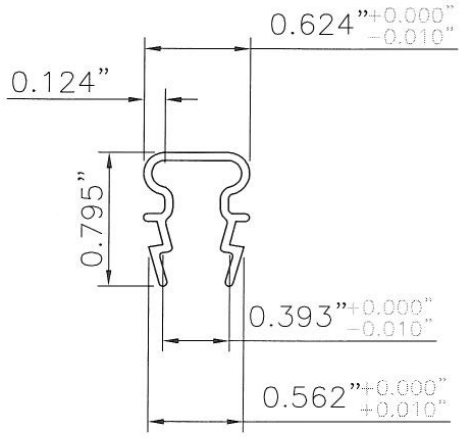
SECTION 2 – STIFFENER AT HORIZONTAL JOINT



DETAIL OF 2—PANEL ALUMINUM EXTRUSTION

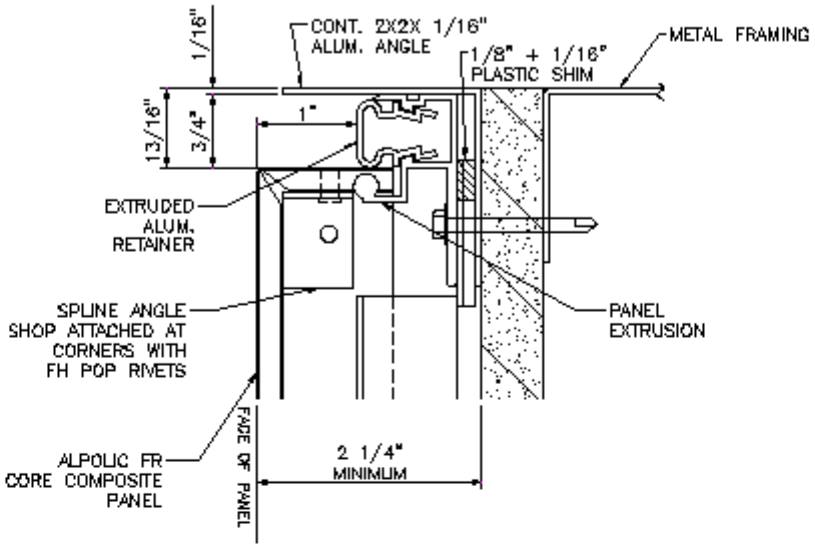


SECTION 3 – VERTICAL JOINT

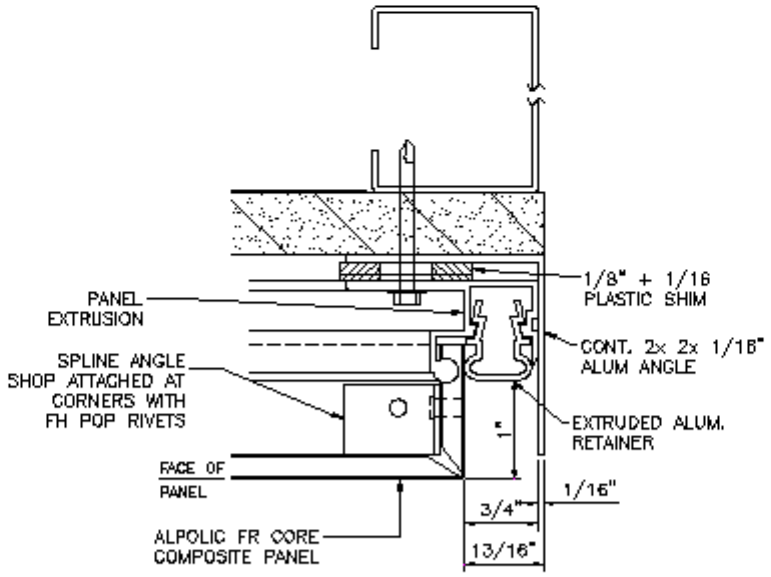


DETAIL OF EXTRUDED ALUMINUM RETAINER

FIGURE 1—STIFFENER (Continued)



SECTION 4 – HORIZONTAL TOP JOINT



SECTION 5 – SIDE JOINT

FIGURE 1—STIFFENER (Continued)