

ICC-ES Evaluation Report

ESR-1114

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A Subsidiary of the International Code Council®

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 42 43—Composite Wall Panels

REPORT HOLDER:

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EVALUATION SUBJECT:

ALUCOBOND® PE ALUMINUM COMPOSITE MATERIAL (ACM)

1.0 EVALUATION SCOPE

1.1 Compliance with the following code:

- 2015 *International Building Code*® (2015 IBC)
- 2012 *International Building Code*® (2012 IBC)
- 2009 *International Building Code*® (2009 IBC)
- 2006 *International Building Code*® (2006 IBC)

Properties evaluated:

- Structural
- Interior Finish Classification

1.2 Evaluation to the following green code(s) and/or standards:

- * ■ ~~2016 California Green Building Standards Code (CALGreen), Title 24, Part 14~~
- * ■ ~~2015, 2012 and 2008 ICC 700 National Green Building Standard™ (ICC 700-2015, ICC 700-2012 and ICC 700-2008)~~

Attributes verified:

- See Section 3.1

2.0 USES

Alucobond® PE aluminum composite material can be used as exterior wall cladding or interior wall finish in accordance with the code 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:

Alucobond® PE is a metal composite material (MCM) consisting of two nominally 0.020-inch-thick (0.51 mm) aluminum skins, bonded to both surfaces of a black extruded polyethylene plastic core having a nominal density of 65 pounds per cubic foot (1041 kg/m³) and a nominal thickness of 0.079 to 0.197 inch (2 to 5 mm), depending on the finished panel thickness. The aluminum skins may have a painted or anodized finish. The polyethylene core is extruded continuously and is bonded to the aluminum skins in a continuous process.

Alucobond® PE aluminum composite material is manufactured in a variety of sizes and the overall panel thicknesses are 0.118, 0.157 and 0.236 inch (3, 4 and 6 mm). The panels have a flame-spread index of less than 25 and a smoke-developed index of less than 450 when tested in accordance with ASTM E84. ~~Alucond PE has a self-ignition temperature of greater than 650° F (343° C) when tested in accordance with ASTM D1929. Alucobond PE conforms to the combustibility classification of CC1 or CC2 when tested in accordance with ASTM D635.~~

~~The attributes of the Alucobond® PE aluminum composite panels have been verified as conforming to the provisions of (i) CALGreen Sections A4.405.1.3 (prefinished materials) and A5.406.1.2 (reduced maintenance); (ii) ICC 700-2015 and ICC 700-2012 Sections 601.7, 11.601.7, and 12.1(A).601.7 (site applied finishing materials); and (iii) ICC 700-2008 Section 601.7 (site applied finishing materials). Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. The code may provide supplemental information as guidance.~~

3.2 Framing: Installation of the Alucobond® PE as a wall panel requires the following materials that are supplied by the MCM system fabricator for the Rout and Return with Clips, Continuous Rout and Return Extrusions and Continuous Edge Grip installation methods:

3.2.1 Rout and Return with Clips: The following materials must be used in a rout and return panel installation method (see Figure 1):

- Attachment clips equivalent to the 1-inch-by-1-inch-by-1/8-inch-thick-by-2-inch-long (25.4 mm by 25.4 mm by 3.2 mm by 50.8 mm) extruded aluminum angles shown in Figure 1 to attach the panel to the building structure or framing.

- I-shaped extruded aluminum (6063-T5 aluminum alloy) reinforcement intermediate stiffener equivalent to that shown in Figure 1.

3.2.2 Continuous Rout and Return Extrusions: The following materials must be used in a continuous rout and return panel installation method (see Figure 2):

- Continuous rout and return extrusions.
- I-shaped extruded aluminum (6063-T5 aluminum alloy) intermediate stiffener reinforcement equivalent to that shown in Figure 2.
- Attachment clips equivalent to the 1¹/₂-inch-by-¹/₂-inch-by-¹/₈-inch-thick (38.1 mm by 38.1 mm by 3.2 mm) extruded aluminum clips shown in Figure 2 to attach the I-shaped extruded aluminum reinforcement to the return edge of the panel.

3.2.3 Continuous Edge Grip: The following materials must be used in a continuous edge grip panel installation method (see Figure 3):

- Continuous grip extrusions similar to those shown in Figure 3.
- I-shaped extruded aluminum (6063-T5 aluminum alloy) intermediate stiffener reinforcement equivalent to that shown in Figure 1.

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

4.0 DESIGN AND 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 on the jobsite at all times during installation.

Alucond is attached to the exterior building walls by use of attachment accessories designed and installed on the aluminum composite material, forming an MCM panel, by the MCM systems fabricator at the time of panel fabrication. There are two basic types of attachment accessories that can be used with Alucobond®: the "continuous edge grip" or the "rout-and-return" methods of attachment as described in Sections 4.3.1 and 4.3.2.

4.2 Design:

The maximum allowable design transverse wind load pressure for Alucobond®, both 4 millimeters ~~and 6 millimeters~~, installed using the rout-and-return method with clips in accordance with this report, is 25 psf (1.2 kPa), positive or negative. The maximum allowable design wind load pressure for Alucobond®, 4 millimeters and 6 millimeters, installed using the rout-and-return method with aluminum extrusion frames or installed with the continuous edge grip method in accordance with this report, is 20 psf (0.96 kPa), positive or negative. Support framing, such as wall studs, must be designed in accordance with the applicable code to be adequate for these loadings.

4.3 Installation:

The MCM panel and system must be fabricated in a shop by an MCM systems fabricator. Such fabrication involves cutting and forming the Alucobond aluminum composite material, as well as installing panel stiffeners and other attachment accessories as needed to attach the MCM

panels to the exterior of the building in the field. The two basic types of attachment are the rout-and-return and the continuous edge grip (CEG) method of support described in Sections 4.3.1 and 4.3.2.

4.3.1 Alucobond® Rout-and-Return: The rout-and-return assembly consists of flat aluminum composite material formed by the MCM fabricator into shallow "pans" by means of routing a groove in the back face of the Alucobond, along each perimeter edge, and mechanically folding all four edges. MCM panel stiffeners must be installed at spacing up to 24 inches (610 mm) on center on the backside of the aluminum composite material with silicone sealant. The minimum folded edge width shall be of sufficient depth so that the fasteners will not be closer to the edge of the panel than 2.5 times the fastener diameter. The MCM panels are attached to the building frame in one of two methods.

In one method of attachment, the fabricated MCM panels shall be attached to the building frame with aluminum clip angles that are attached to the folded edges of the panel by the MCM systems fabricator by two pop rivets for each clip angle. The clip angles must be fastened to the building frame with a mechanical fastener such as a No. 12, self-drilling, corrosion-resistant metal screw. Other fasteners are permitted for use when the performance is demonstrated to be equivalent by engineering calculations. See Figure 1 of this report for an example of this installation. The pop rivets are ³/₁₆-inch-diameter (4.8 mm), 5052 Alloy aluminum rivets with 7178 Alloy mandrels. Clip angles must be fabricated from 6063 Alloy-T5 Temper aluminum of the size noted in Figure 1 of this report. The clip angles must be attached to each panel edge at 4 inches (102 mm) from each corner and 24 inches (610 mm) on center. The maximum panel size is 60 inches wide by 144 inches long (1524 mm by 3658 mm).

In the other method of attachment, a 0.06-inch-thick aluminum extrusion of 6063 Alloy-T6 Temper must be cut to size, mitered and attached by the MCM systems fabricator using structural silicone sealant between the back of the Alucobond and folded edge and the extrusion. The extrusion must be hooked into an aluminum clip that is attached to the building frame with two No. 12, self-drilling, corrosion-resistant screws along the length of the extrusion. See Figure 2 of this report for an example of this installation.

4.3.2 Continuous Edge Grip Method: A 0.06-inch-wide-by-0.30-inch-deep (1.5 mm by 8 mm) groove must be routed into the edge of the Alucobond core material by the MCM systems fabricator. An extruded aluminum frame must be cut to size, mitered and attached with structural silicone sealant between the back of the aluminum composite material and the extrusion. Panel stiffeners must be installed at spacing up to 24 inches (610 mm) on center on the backside of the panels with silicone sealant. The MCM panels must be attached to structural framing in the field using No. 12-24, self-drilling fasteners along the perimeter. Minimum screw penetration beyond the structural support shall be twice the shank diameter. See Figure 3 of this report for an example of this installation.

4.3.3 Buildings of Type I, II, III or IV Construction: Where exterior walls are required to be noncombustible construction, installation is limited to the following heights:

- A maximum of 40 feet in height above the grade plane, under the limitations specified in Section 1407.11.1 of the 2015, 2012, 2009 and 2006 IBC.

* Deleted by City of Los Angeles

- A maximum of 50 feet in height above the grade plane, under the limitations specified in Section 1407.11.2 of the 2015, 2012, 2009 and 2006 IBC.
- A maximum of 75 feet in height above grade plane, under the limitations specified in Section 1407.11.3 of the 2015 and 2012 IBC.

Where interior walls are required to be noncombustible construction, the Alucobond[®] ACM which has a Class A interior finish classification must be installed in accordance with 2015 IBC Section 803.13, 2012 and 2009 IBC Section 803.11 or 2006 IBC Section 803.4.

4.4 Interior Wall Covering:

Alucobond[®] PE aluminum composite material 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 Section 4.3 above. The panels have a Class A interior finish classification.

5.0 CONDITIONS OF USE

The Alucobond[®] PE aluminum composite material described in this report comply with, or are suitable alternatives to what is specified in, those codes specifically listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation must comply with this report, the manufacturer's published instructions, the applicable code and the approved plans.
- 5.2 The design of the structural support system (building framing, attachment accessories, silicone sealant and panel connections provided by the MCM systems fabricator) and fasteners used to attach the panels to the supports must be submitted to and approved by the code official for each project.
- 5.3 The MCM systems fabricator must provide a certificate of compliance to the code official attesting that the MCM systems' 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 systems' fabrication complies with approved construction documents. Additionally, when the attachment methods employ adhesives other than to adhere stiffeners to the back of the panel, special inspections are required in accordance with 2015 and 2012 IBC Section 1704.2.5 or 2009 and 2006 IBC Section 1704.2, or the fabricator must be approved by the code official in accordance with 2015 IBC Section

1704.2.5.1, 2012 IBC Section 1704.2.5.2 or 2009 and 2006 IBC Section 1704.2.2, as such operations are outside the scope of this report.

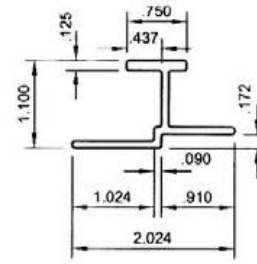
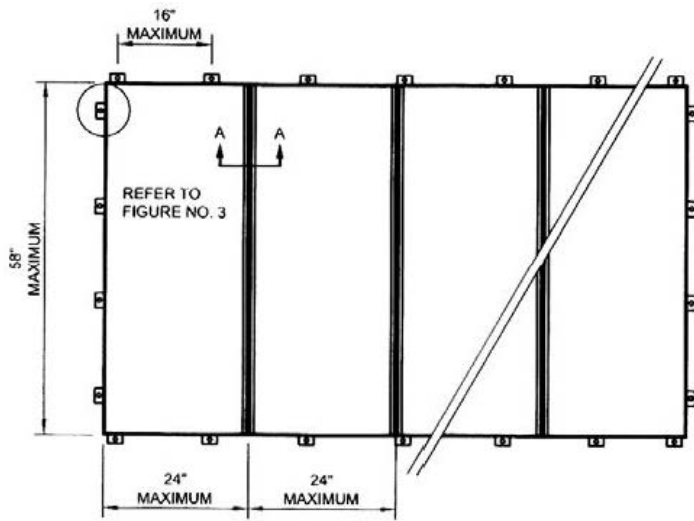
- 5.4 Alucobond[®] PE may be used as an interior finish where Class A, B and C materials are permitted under Chapter 8 of the IBC.
- 5.5 Evidence of weather tightness of the wall cladding system in accordance with Section 1407.6 of the IBC shall be to the satisfaction of the code official.
- ~~5.6 Alucobond[®] PE aluminum composite material may be used as plastic panels and signs under the limitations specified in Section 402.6.4 of the 2015 and 2012 IBC Section 402.16 of the 2009 IBC or Section 402.15 of the 2006 IBC.~~ *
- 5.7 Where Alucobond[®] PE aluminum composite material is installed on exterior walls on buildings of Type I, II, III or IV construction, the walls must be installed in accordance with the provisions in Section 4.3.3.
- 5.8 Alucobond[®] 3-millimeter-thick wall panels are limited to interior use.
- 5.9 Alucobond[®] PE aluminum composite material used as components of kiosks must be installed under the limitations specified in Section 402.6.2 of the 2012 IBC, Section 402.11 of the 2009 IBC or Section 402.10 of the 2006 IBC.
- 5.10 The Alucobond[®] PE aluminum composite material is produced in Benton, Kentucky, under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

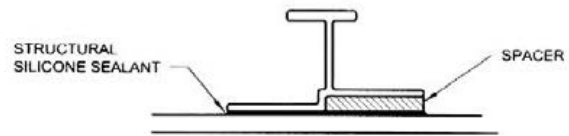
- 6.1 Data in accordance with the ICC-ES Acceptance Criteria for Metal Composite Material (AC25), dated October 2010 (editorially revised November 2015).
- 6.2 Data in accordance with ASTM D1929 and ASTM D635.

7.0 IDENTIFICATION

Alucobond[®] PE aluminum composite material identified by a label indicating the name and address of 3A Composites USA Inc.; the product name; the thickness of the ACM; the evaluation report number (ESR-1114); and the flame-spread and smoke-developed indices.

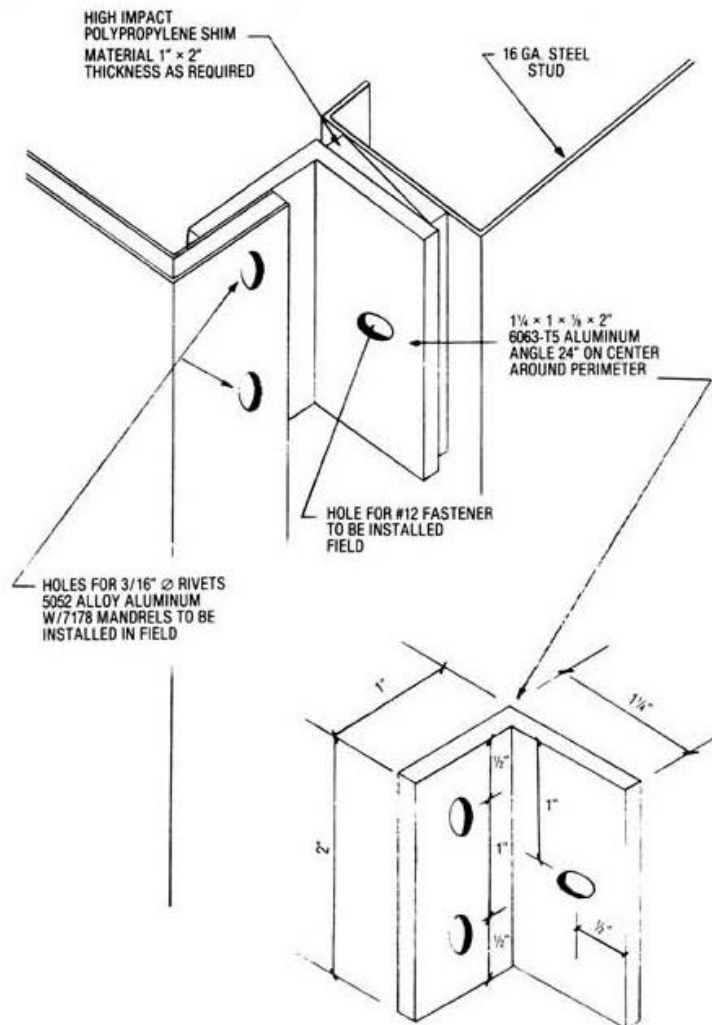


SECTION A-A
INTERMEDIATE STIFFENER PROFILE
(ALL WALLS .063 UNLESS NOTED)



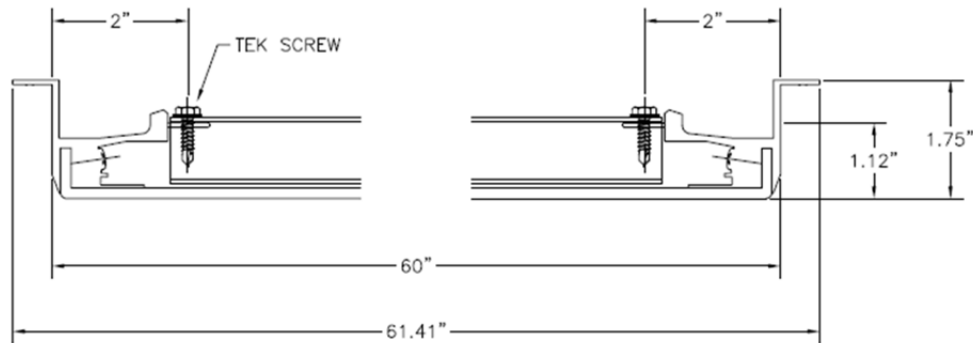
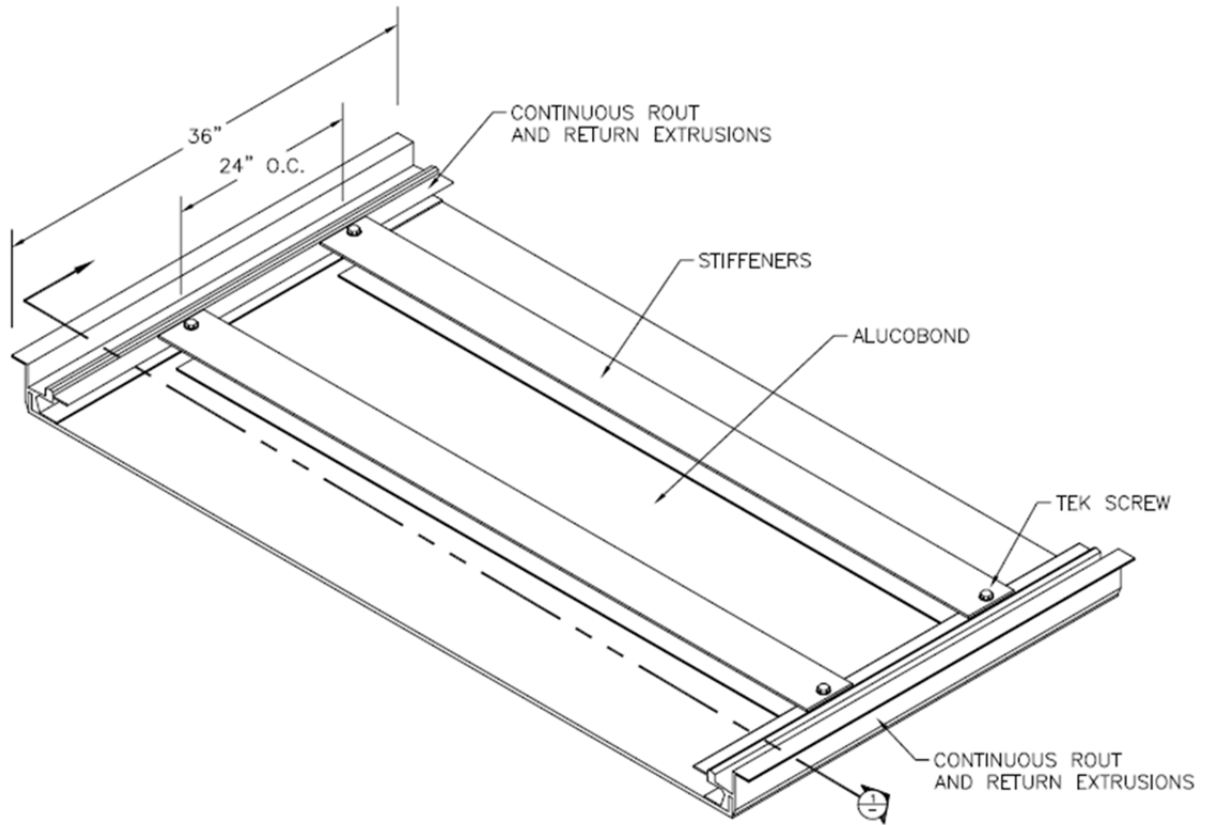
ALUCOBOND WALL PANEL

ROUT-AND-RETURN ATTACHMENT SYSTEM



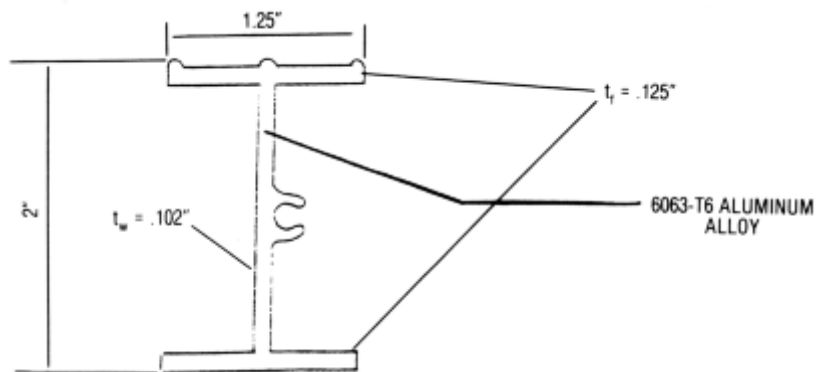
ROUT-AND-RETURN SYSTEM ALUCOBOND PANEL ANCHORAGE

FIGURE 1



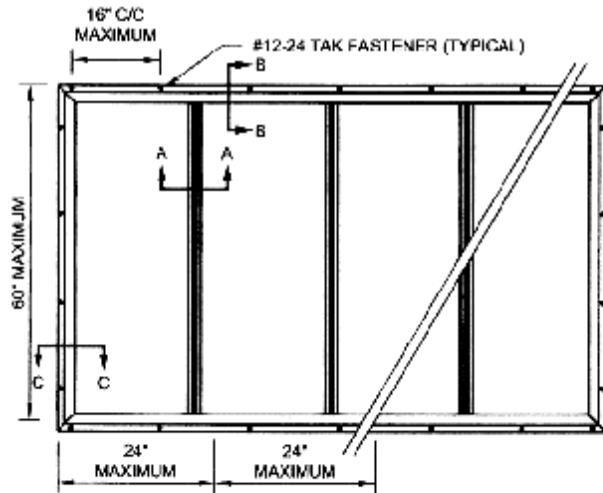
1 SECTION

CONNECTION DETAIL

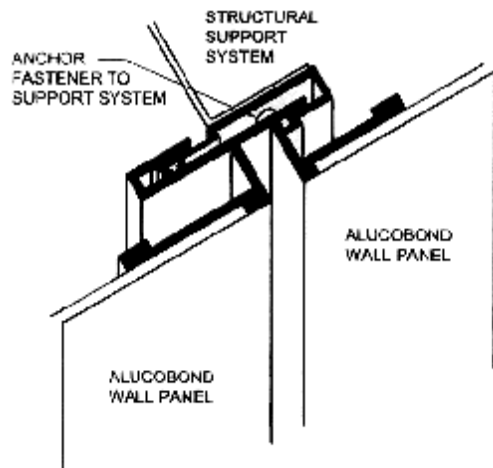


INTERMEDIATE STIFFENER REINFORCING EXTRUSION

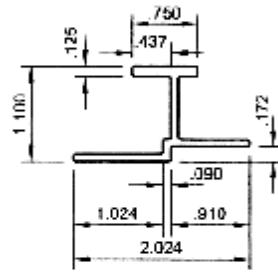
FIGURE 2—CONTINUOUS ROUT AND RETURN



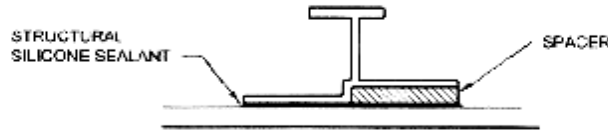
PANEL EXTRUSION LAYOUT



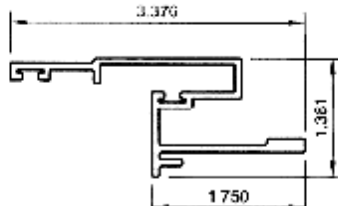
TYPICAL PANEL - PANEL JOINT PROFILE



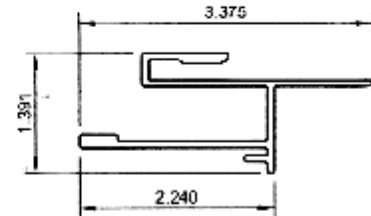
SECTION A-A
INTERMEDIATE STIFFENER PROFILE
(ALL WALLS .063 UNLESS NOTED)



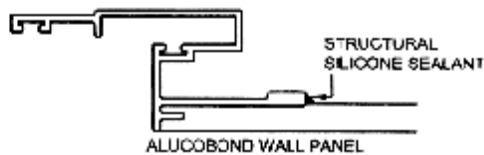
ALUCOBOND WALL PANEL



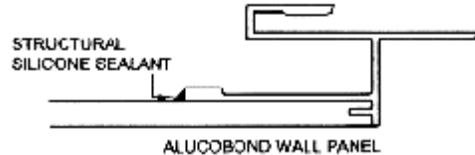
SECTION B-B
FRAME PROFILE
(ALL WALLS .063 UNLESS NOTED)



SECTION C-C
FRAME PROFILE
(ALL WALLS .063 UNLESS NOTED)



ALUCOBOND WALL PANEL



ALUCOBOND WALL PANEL

CEG ATTACHMENT SYSTEM

FIGURE 3