COMPOSITES

ALUCOBOND®

MATERIAL FABRICATION GUIDE

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Introduction

This "How To" manual has been developed to assist fabricators to work with Alucobond Material in the most efficient and effective manner. The tips and suggestions contained in this manual are the result of many years of combined experience by fabricators in both the U.S. and Europe.

These recommended suggestions and product data are based on information which is, in our opinion, reliable. However, since skill, judgment, and quality of equipment and tools are involved, and since conditions and methods of using Alucobond Material are beyond our control, the suggestions contained are provided without guarantee. We recommend that prospective users determine the suitability of both the material and suggestions before adopting them on a commercial scale. 3A COMPOSITES USA INC. DOES NOT MAKE ANY WARRANTIES, EXPRESS OR IMPLIED, INCLUDING MERCHANTABILITY AND FITNESS FOR PURPOSE, WITH RESPECT TO ANY SAID SUGGESTIONS AND PRODUCT DATA. In no event shall 3A Composites USA Inc. have any liability in any way related to or arising out of said suggestions and product data for direct, special, consequential or any other damages of any kind regardless whether such liability is based on breach of contract, negligence or other tort, or breach of any warranty, express or implied.

Also, normal safety and health precautions practiced in any fabricating environment should be used when fabricating Alucobond Material. Goggles or other face protection, as well as hearing protection should always be worn.

MSDS for Alucobond Material are available through our Customer Service Department.

A UL RECOGNIZED COMPONENT

This "How To" manual is written to address the fabrication of 3mm, 4mm, and 6mm Alucobond Material. Although DIBOND Material (2mm, 3mm, 4mm) is a similar composite, it is not covered by this manual. Questions regarding DIBOND Material are answered in the DIBOND Material Processing Manual.

Considerate care should be taken in the layout and handling of ALucobond Material. Refer to Section VI of this manual for information on care and handling.

The use of coolants or lubricants is not required when sawing.

A. Sawing (For Sizing Panels)

Alucobond Material is manufactured with any one of several high quality finishes. It is best to move the saw blade rather than the material in most operations. Saw cutting can be accomplished with the following cutting equipment:

1. TABLE SAWS

Table saws are not recommended for cutting sheets larger than 4' x 4' in size.

2. PANEL SAWS

Panel saws provide an effective method of cutting. These saws, whether standard equipment or custom made, perform well and have the added advantage of space savings. If a panel saw is to be used as production equipment, an industrial model should be purchased in order to obtain adequate cutting tolerances and increase the longevity of the equipment.

3. MULTIPLE OPERATION RIP/V-GROOVING SAWS

In high production operations, equipment that is capable of performing more than one operation with a single pass through the machinery may be used. This equipment can make multiple saw cuts (sizing the panel) and V-Grooves (rout) at the same time.

4. PORTABLE SAWS

Cutting Alucobond Material with portable circular saws is another effective method. As mentioned, this equipment should also be production/industrial type equipment.

5. RECIPROCATING SAWS

Reciprocating saws work well for cutouts. Care should be aken with portable saws and reciprocating saws to prevent damage to the Alucobond Material surface. More than one sheet can be cut at a time by stacking panels. If center cutting (i.e., letter cutouts) is required, a foam pad may be placed under the material with the reciprocating blade cutting into the foam. The sheets may be clamped or secured with double-faced tape for the cutting operation. When clamping between jaws, protect the panel surface against damage.

B. Blade Recommendations

Consult **Table I** for recommended blades and cutting speeds for various types of saws.

TABLE 1

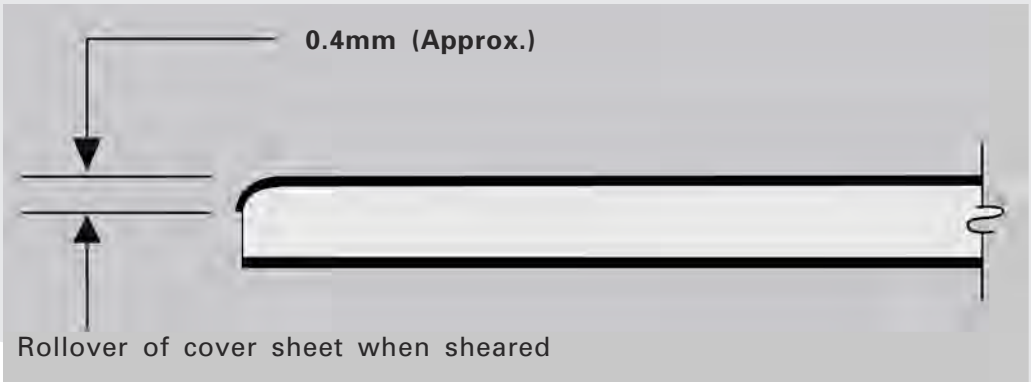
WORKING METHOD	CUTTING MATERIAL	BLADE OR BAND GEOMETRY	TOOTH GEOMETRY	CUTTING SPEED (MAX.)	CUTTING FEED (MAX.)
Circular saws	Carbid tipped or high-speed steel. (For anodized finish, use Carbide tipped only.)	8" x 14" blades with maximum number of carbide teeth available, designed for cutting nonferrous material. The blade should be ground thinner from the rim towards the center to prevent pinching.	Angle or circular tooth, alternate beveled, triple ground. Tooth gap wall rounded. Chip angle: 5° to 15°. Clearance angle: 10° to 30°. Tooth spacing: 3/16" to 1" (4mm to 25mm), fine spacing preferable.	5,500 RPM	16"/second
Bandsaws	Tempered spring strip steel.	Thickness: .03" to .047" (0.8mm to 1.2mm). Width: 9/16" to 1" (15mm to 25mm). Use racket or straight set.	Skip teeth, designed for nonferrous and ferrous materials (light metals & plastics). Tooth spacing: minimum ten teeth per inch.	10,000'/min.	10"/second
Reciprocating saws	High speed steel.	Thickness: .03" to .047" (0.8mm to 1.2mm). Width: 3/16" to 9/16" (15mm to 15mm). Use racket or straight set.	Hook or circular tooth with alternate angles, set or waved. Tooth spacing: .010" to .250" (2mm to 6mm). (Plywood blade).		4"/second

C. Shearing

Alucobond Material can be easily sheared. However, a slight roll-down of the aluminum cover sheet may occur on the impact side (Reference **Figure 1**). This roll-down area is often referred to as the "edge zone." In this area, the polythylene core is compressed and can lead to increased stress between the core and the aluminum cover sheet. Due to this additional stress, shearing should be avoided when the edge of the panel es exposed to the environment.

When shearing Alucobond Material, light markings on the material may be caused by the hold down pads. In order to avoid these markings, the hold down on the shear should be fitted with a shock-absorbing rubber pad which will help to prevent damage to the Alucobond Material.

Figure 1 - Shearing



D. Jointing or Filing of Edges

Floor model woodworking jointers are effective for edge finishing.

For finishing work, after contour cutting with a reciprocating saw (ordinary cutting files work best), the file profile should be from slightly to fulling rounded. The proper filing direction is length-wise along the edge.

E. Routing: For Bending

Unlike sheet metals which require the use of a large break press for folding fabrication, Alucobond Material can be accurately folded by hand after a simple routing operation is done on the back skin. Anytime a blueprint shows a fold line, this routing operation is done at the location of the bend. This fabrication method is unique to composite panel fabrication and is referred to as Rout & Return. Floor model woodworking jointers are effective for edge finishing.

Alucobond Material may be routed using one of the two following methods: (Either method should use high-quality industrial equipment.)

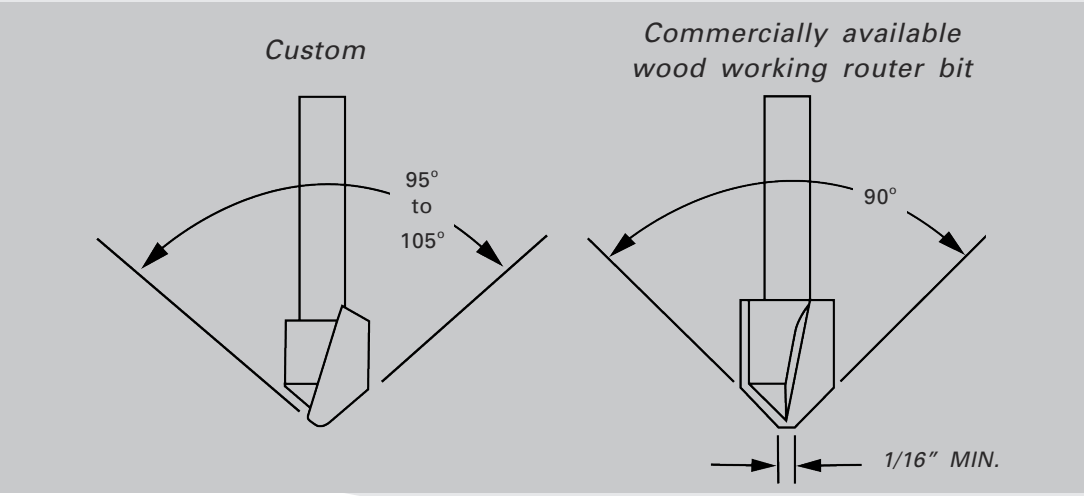
1. ROUTER

One procedure for routing Alucobond Material is to use an industrial or commercial grade, hand-operated router. For production operations this method is relatively slow. The recommended feed rate is 6' to 10' per minute using carbide tipped cutters.

Special custom cutters for Alucobond Material are available (Reference Section VII). These cutters have been specifically developed for Alucobond Material and will produce the required configuration for proper rout tolerances. Commercially available 90° wood working routing cutters, available from your local hardware store, may be modified to provide approximately the same function as the custom cutters, provided the tip is ground to a (or flattened) 1/16" minimum at the point (Reference **Figure 2**).

Keep router bit sharp to reduce heat build-up and the need to rerout fused ore material.

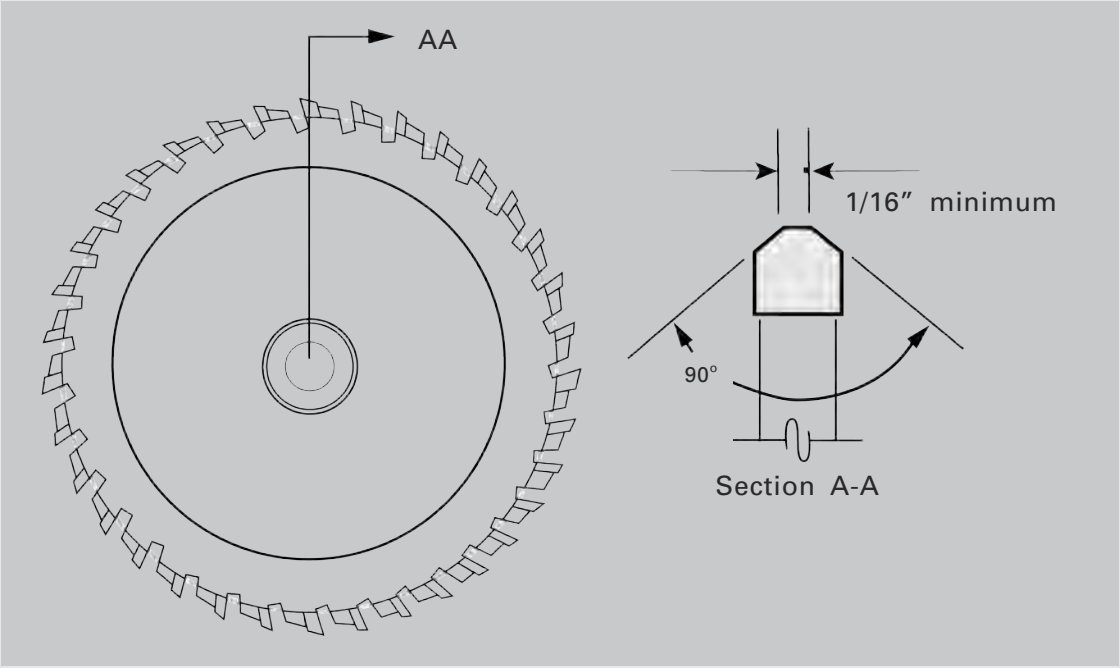
Figure 2 - Router Bits



2. CIRCULAR SAW (CUSTOM BLADE)

For fabrication of a large number of sheets that require routing, a portable circular saw fitted with a special blade is advisable. (Reference Figure 3). This blade is often referred to as a "V" Routing Blade. These blades, used with a quality industrial saw, you will produce the required tolerances at a much faster rate than hand routers (Reference Section VII). Many fabricators use a worm gear-driven industrial-quality saw, with a larger plastic base plate added for stability.

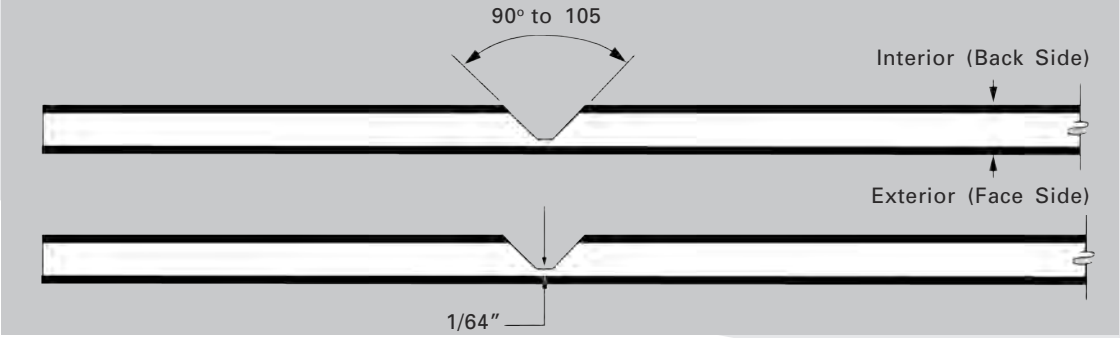
Figure 3 - Routing Saw Blade ("V" Routing blade)



The depth of the "V" rout is critical. As a rule of thumb, the exterior aluminum skin should be visible through the polyethylene core at the vallet of the rout; this visual appearance should be consistent along the entire length of the rout (Reference Figure 4). Extreme care should be taken not to touch the exterior aluminum skin with the router bit or saw blade. Slight variations can occur due to thickness changes in the Alucobond Material sheet; constant depth of the rout ensures a good smooth line when the edge is folded.

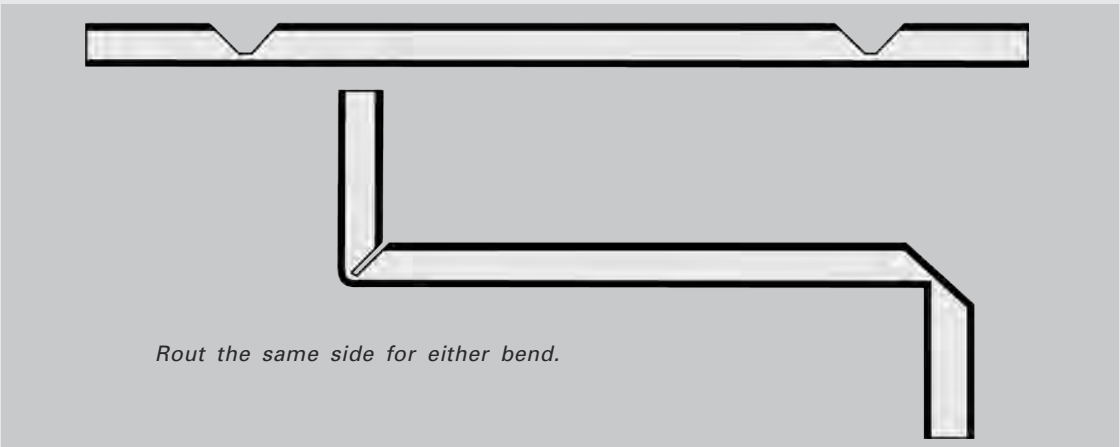
The same guidelines should be used when routing with a "V" Routing Blade on a portable circular saw or with a portable router. **Figure 4** indicates the finished rout required to develop a quality bend. Leave skin plus 1/64" of polyethylene.

Figure 4 - Routing



By routing only one side, Alucobond Material can be bent either upward or downward to create both an inside or outside corner as illustrated in **Figure 5.**

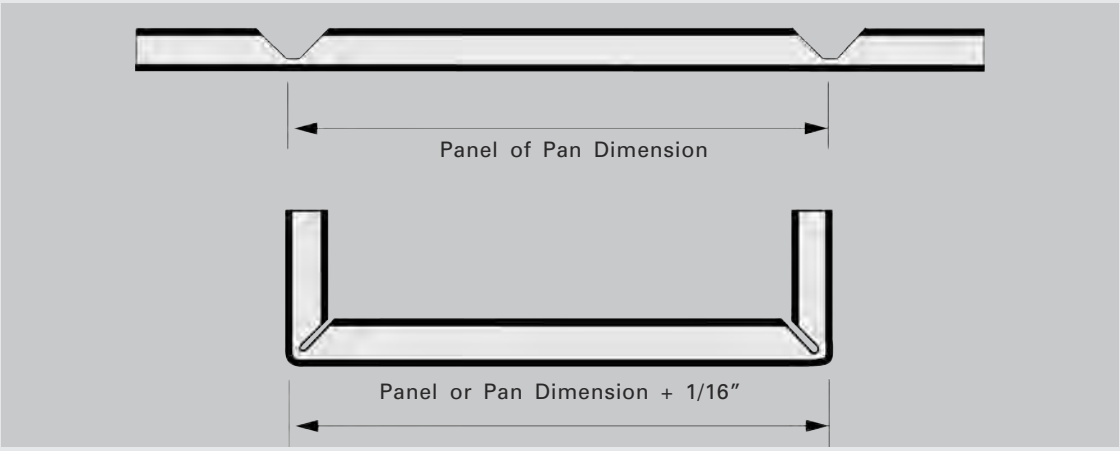
Figure 5 - "V" Routing



NOTE: *It is not necessary to reinforce the returned corner. The material is most easily bent when the rout is made at least one inch or more from the edge of the panel.*

An Alucobond Material "pan" is easily fabricated by routing all four sides, notching the corners (shown in **Figure 7** and **FIgure 8**), and folding or returning each of the routed sides (Reference Figure 6). This type of fabrication is commonly referred to as "Rout & Return."

Figure 6 - Routing



Note that as a result of the slight radius produced when bending, your finished panel dimension will be 1/32" to 1/16" larger when folded. This is determined by the profile of the cutter used to make the rout. Trial cuts should be made prior to production to determine any necessary adjustments in layout dimensions (Reference Figure 6).

On the following page, two different methods of fabrication are illustrated showing how corners may be handled on the folded or "returned" leg of the "pan."

Figure 7 - Square Corner Cutouts

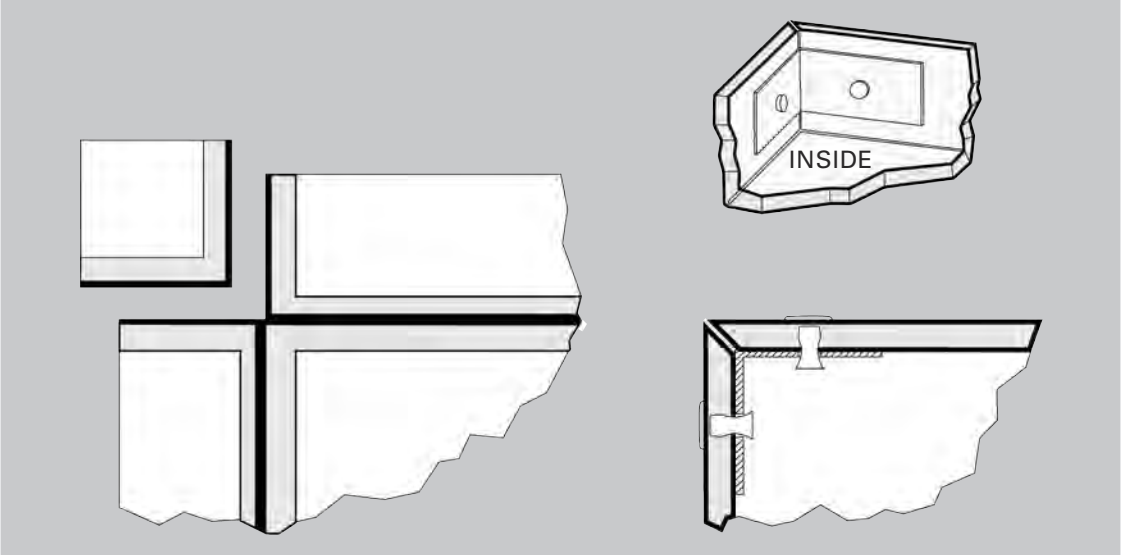
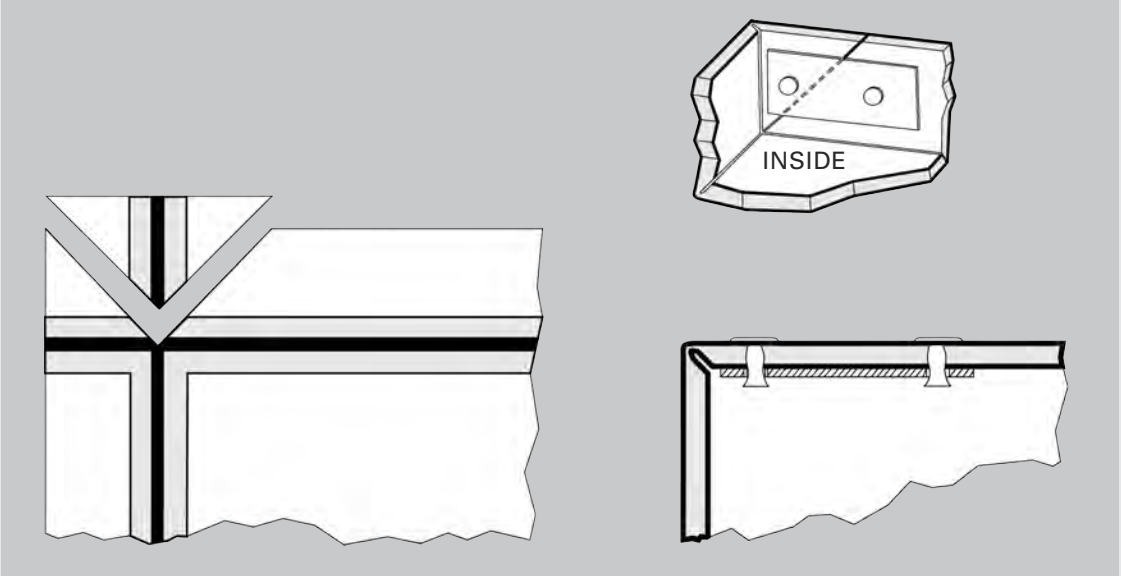


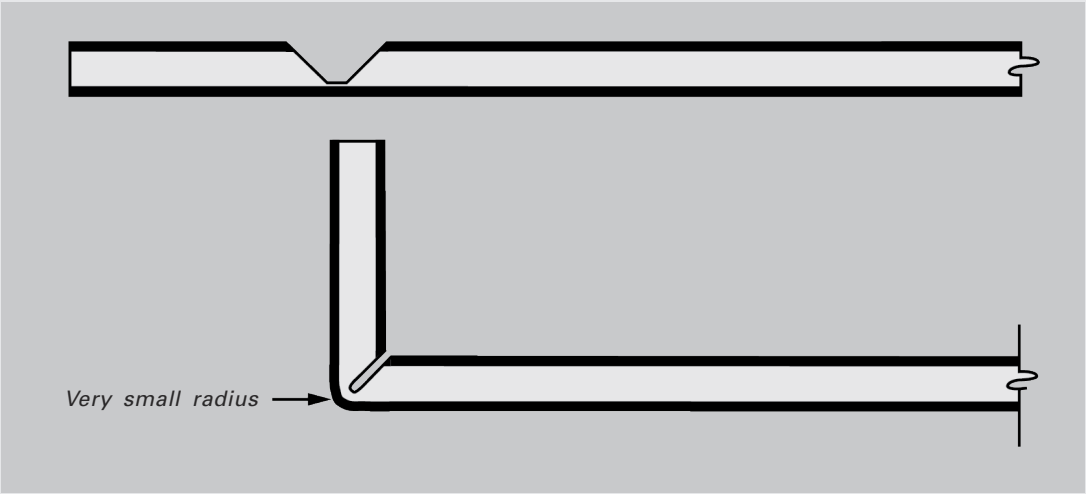
Figure 8 - Envelope Corner Cutous



F. Small Radius Bending (by routing)

A very small radius can be achieved by "V" routing and folding (reference **Figure 9**).

Figure 9 - "V" Routing



By changing the shape of the cutter used, a larger radius can be achieved. A flatter, wider cut will result in a smoother bend (Reference **Figure 10**). Care must be taken when sliding the router across the Alucobond Material to avoid surface scratches.

Figure 10 - Flat Routing

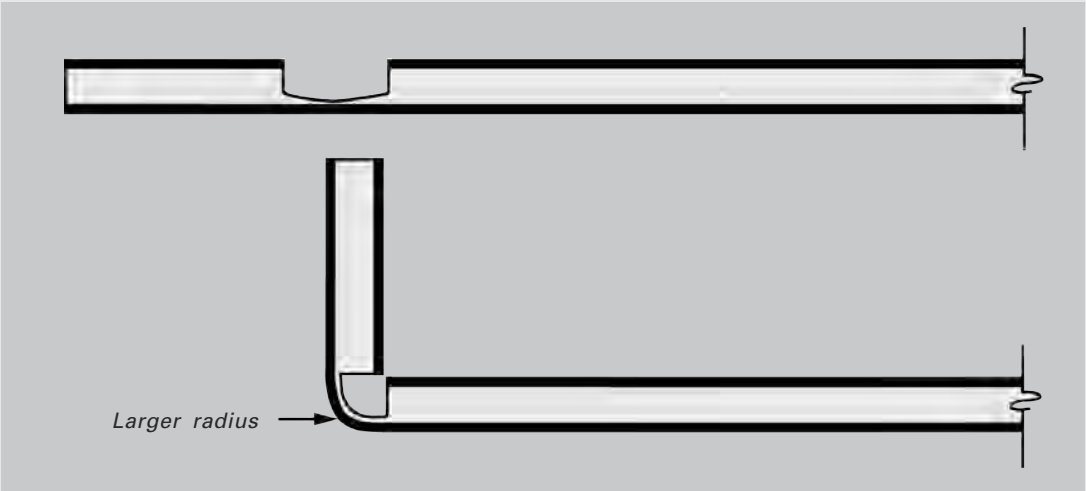
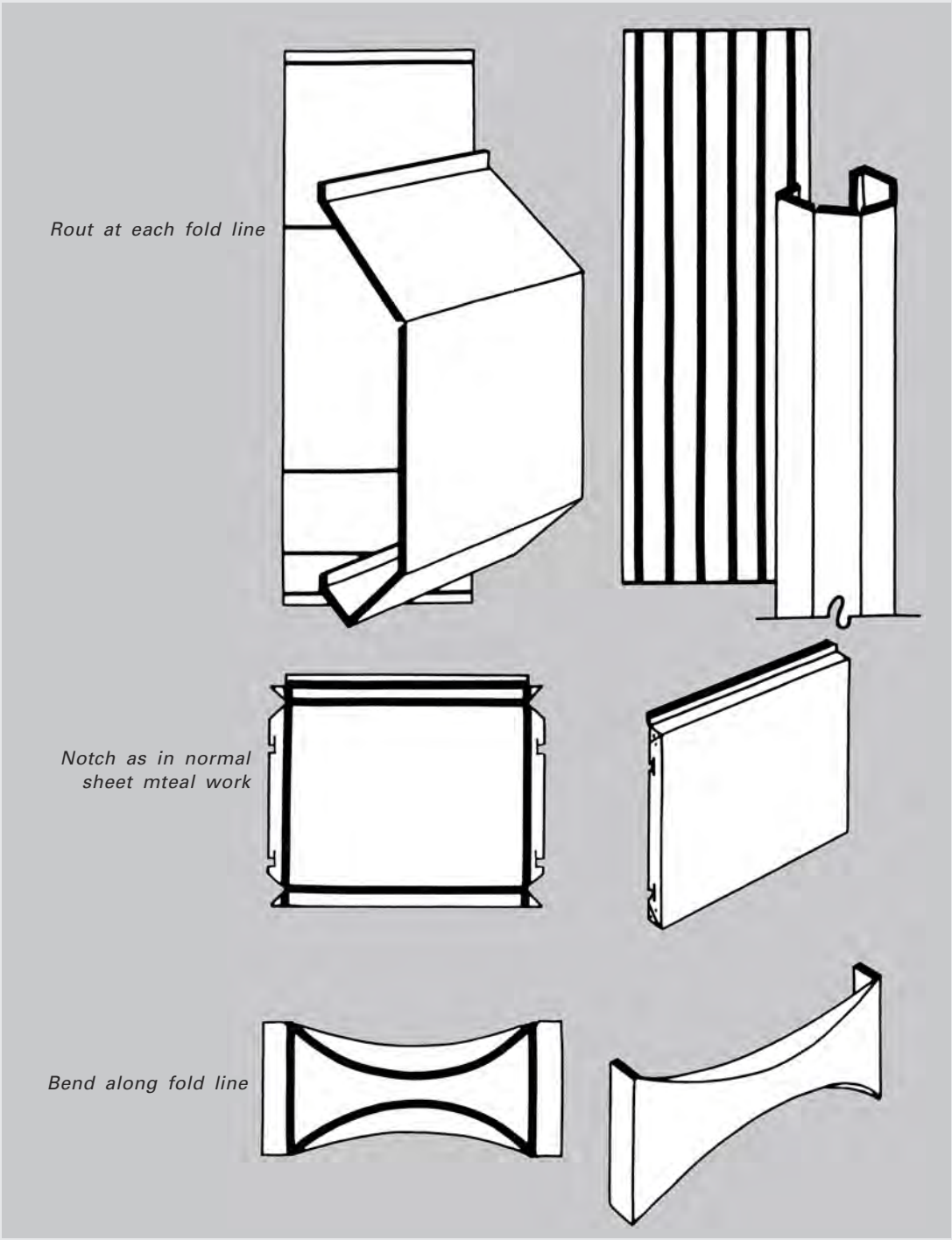


Figure 11 - Routing Concepts



G. Curving

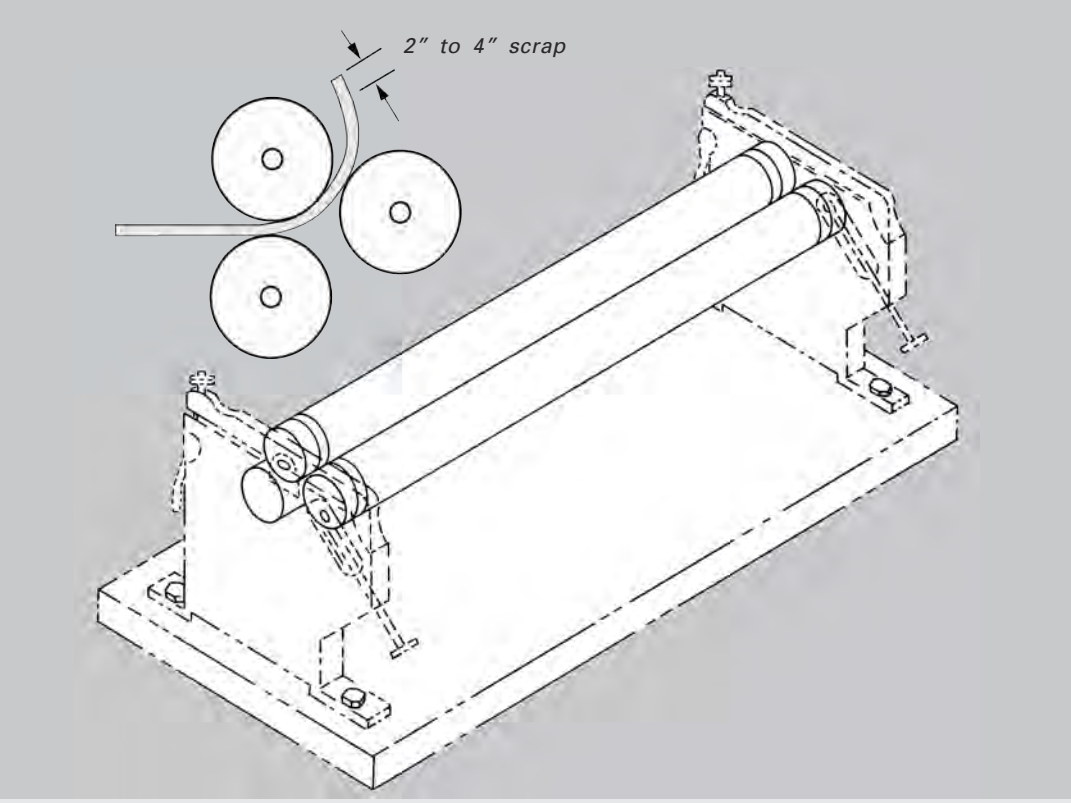
The minimum bending radius for 3, 4 & 6mm Alucobond Material without routing the back skin is fiteen times the thickness of the panel being curved (i.e., 3mm = 45mm (1.77") minimum radius; 4mm = 60mm (2.36") minimum radius; 6mm = 90mm (3.54") minimum radius).

Alucobond Material can be cold formed in a pyramid roller, a press brake, or over a clamped pipe (3mm only). The process is similar to the forming of aluminum; however, due to the sensitive surface, care should be taken to ensure rollers are clean, smooth, and free of defects to avoid damage to the surface finish.

1. PYRAMID ROLLER

As an extra precaution, a film should be used between the panel and the rollers to further protect the panel surface. Do not pinch the Alucobond Material between the rollers. Roll the panel 3° to 5° tighter to allow for a small amount of springback that will occur. Once the sheet is curved; however, it will remain curved (reference **Figure 12**).

Figure 12 - Pyramid Roller

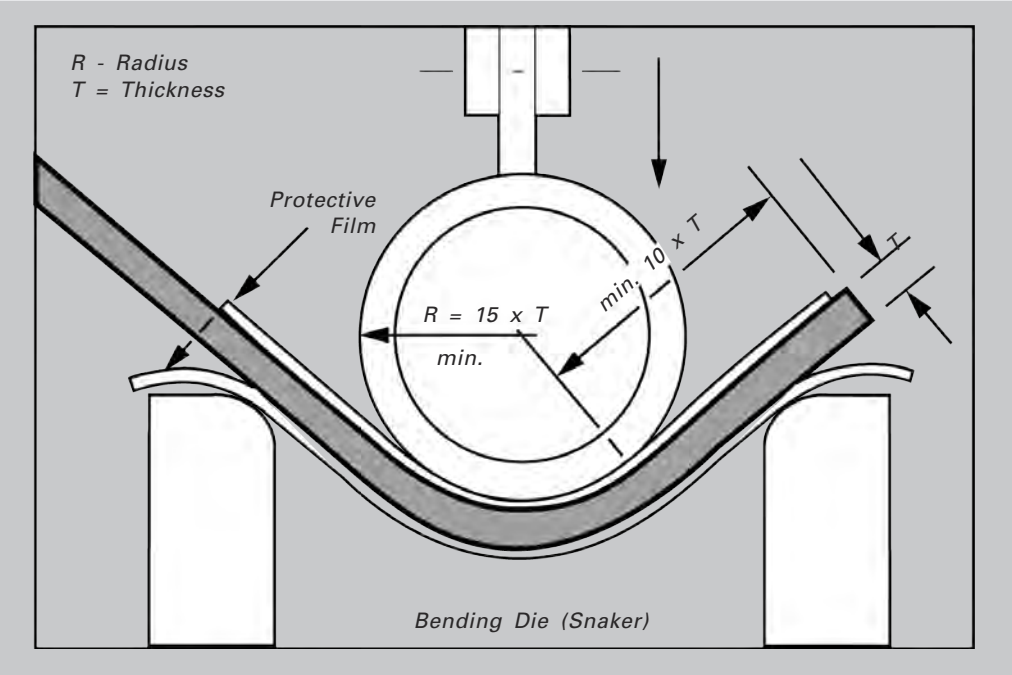


1. Make sure rollers are clean
2. Use protective material between rollers and Alucobond Material - top and bottom
3. Adjust rollers for thickness (3mm, 4mm, 6mm)
4. Allow 2" to 4" scrap at each end

2. PRESS BRAKE

As an extra precaution, a film should be used between the panel and the rollers to further protect the panel surface. Do not pinch the Alucobond Material between the rollers. Roll the panel 3° to 5° tighter to allow for a small amount of springback that will occur. Once the sheet is curved; however, it will remain curved (reference **Figure 12**).

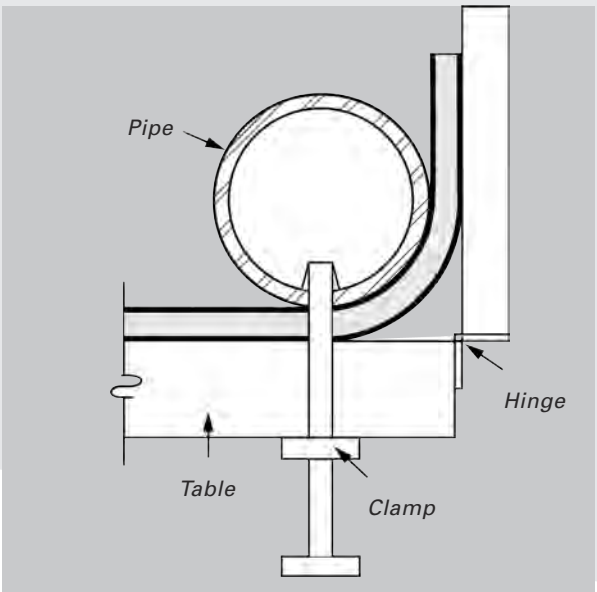
Figure 13 - Press Brake



3. BENDING OVER A CLAMPED PIPE (3MM ONLY)

Alucobond Material may be formed over a pipe of the proper diameter that is securely clampled to a work table. A hinged "leaf" attached to the end of the table will bend the material easily.

Figure 14 - Bending Over a Clamped Pipe



H. Drilling

Alucobond Material can be worked with twist drills usually used for aluminum and plastics, and on drilling machines customarily used for metals.

Working Specifications:

Drill Bit: Twist drill, high-speed steel
Tip Angle: 100° to 140°, or counterbore grind with centering tip
Cutting Speed: 164 RPM to 984 RPM

Quick removal of chips, particularly the polyethylene, can be achieved by a process of high revolution, slow feed and occasional lifting of the drill bit.

I. Punching

The punching of flat-formed parts from Alucobond Material is performed the same way as the solid aluminum sheet, using evenly ground tools and the narrowest possible cutting gap. Be sure to punch through the Alucobond Material to completely serrate the polyethylene core material. As with shearing, a slight roll down may occur. Refer to the section on shearing for additional information.

A. General Advice on Joining Elements

Use the following guidelines when other elements come in direct contact with the surface of Alucobond Material:

1. Acceptable joining element materials:
   - Aluminum
   - Plastic
   - Stainless Steel
   - Plated or coated steel with cadmium, zinc, or aluminum
2. Unacceptable joining element materials:
   - Copper
   - Brass
   - Bronze
   - Iron
   - Raw Steel

Unacceptable materials cause corrosion of joining surfaces due to electrolysis of dissimilar materials. Therefore, use "heavy" or "red" metals only with an electrically insulating intermediate layer.

When joining elements are to be anodized, assemble the materials after the anodizing process.

Proper consideration should be given to the thermal expansion characteristics of Alucobond Material when using any of the joining techniques. Refer to Section V, Subsection C for the method of determining thermal expansion of Alucobond Material.

B. Threaded Fasteners

The easiest method of joining sheets of Alucobond Material together or to an extrusion profile erection system is with machine screws or bolts (reference **Figure 15**). This method allows the panel to be removed. Use the largest possible flat washer to minimize surface pressure and eliminate possible compression due to cold flow of the core material. Arrange attachment screws at least 2.5 x the diameter of the fastener from the edge of the sheet, as shown in **Figure 16**.

It is not recommended to torque fasteners due to the cold flow of the core material. Two complete turns of the nut past finger tight is common practice (reference **Figure 17**.)

Figure 15

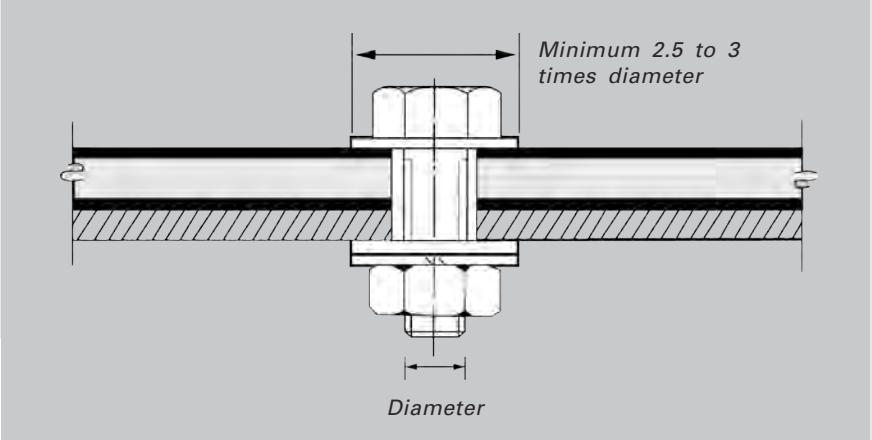


Figure 16

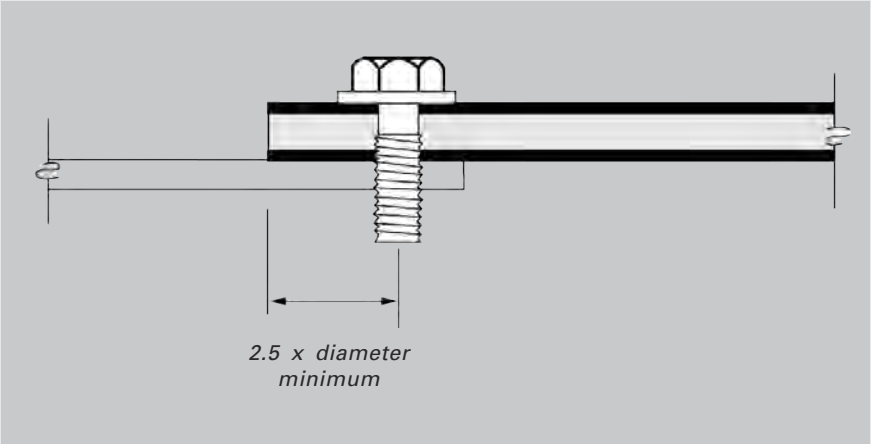
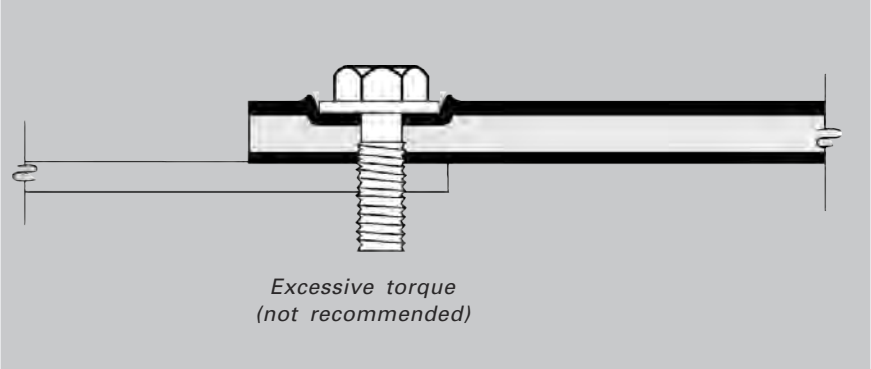
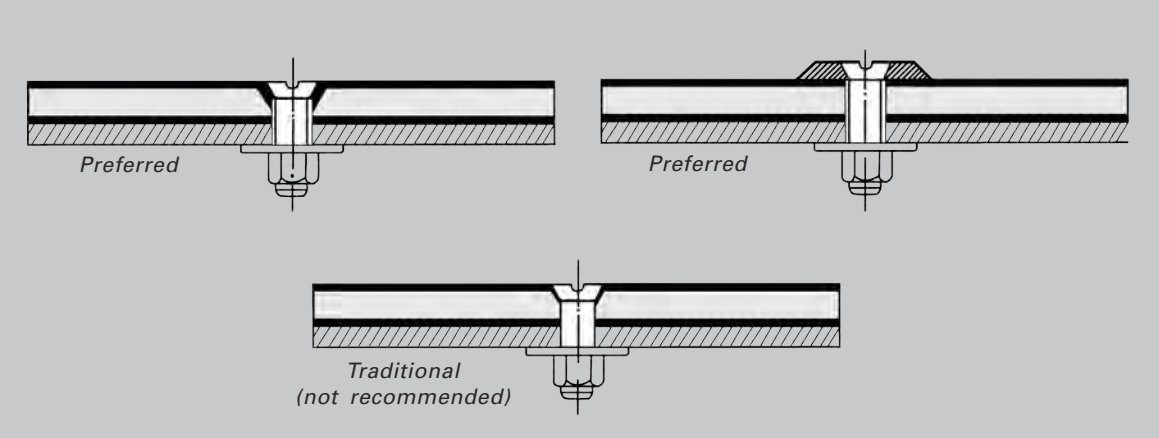


Figure 17



To countersink into Alucobond Material without prior preparation, tighten the nut and washer onto the bolt and draw the head of the fastener into the cover sheet. Countersink washers can also be used. Either method is preferable in lieu of traditional countersinking as shown in **Figure 18**.

Figure 18

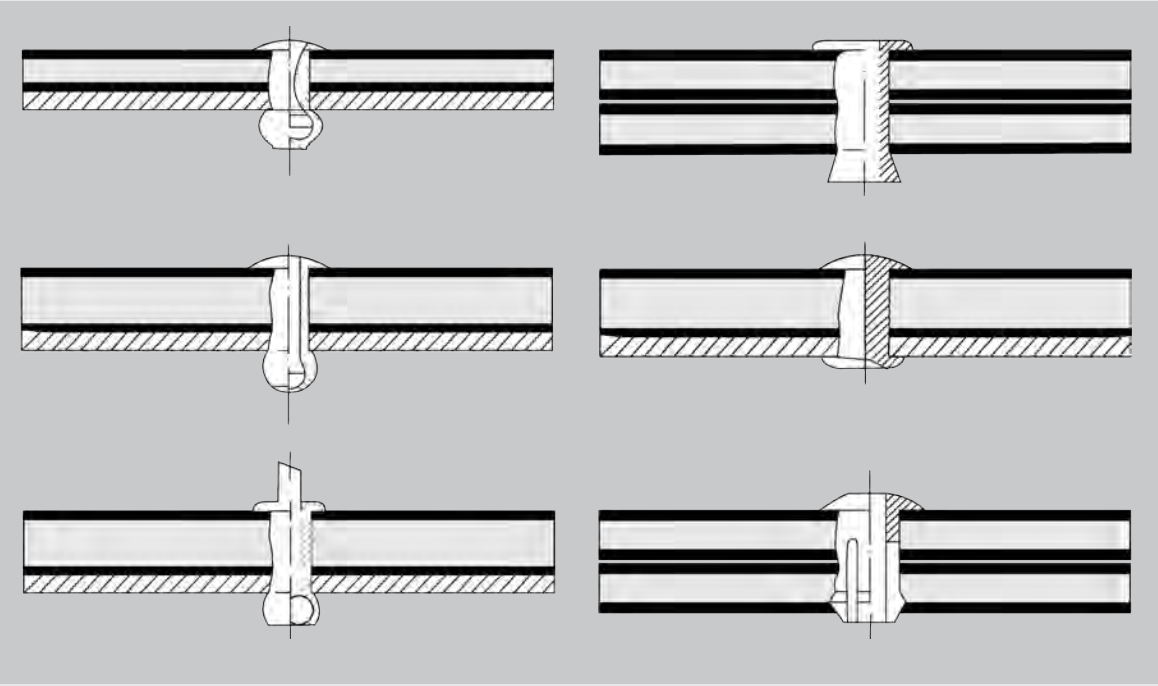


C. Rivets

Panels of Alucobond Material can be fastened together or joined to aluminum extrusion profiles or other sheet metals with rivets common to aluminum construction. Blind rivets provide the advantages of labor savings, one-sided working of the material, and the reduced potential of surface damage. Semi-tubular, solid and other types of rivets can also be effective on a production basis.

Place the closing or set-head on the side of the aluminum extrusion profile or sheet metal. When conditions do not permit this or when two pieces of Alucobond Material are to be joined together, use rivets with special wide closing heads as shown in **Figure 19** or with tightly fitting washers.

Figure 19



When blind rivets are subjected to tensile strength tests, the head tends to "unbutton" from the Alucobond Material, or pull through the hole. Since this would cause localized tearing of the Alucobond Material, use the largest possible rivet head for connections that will experience loading.

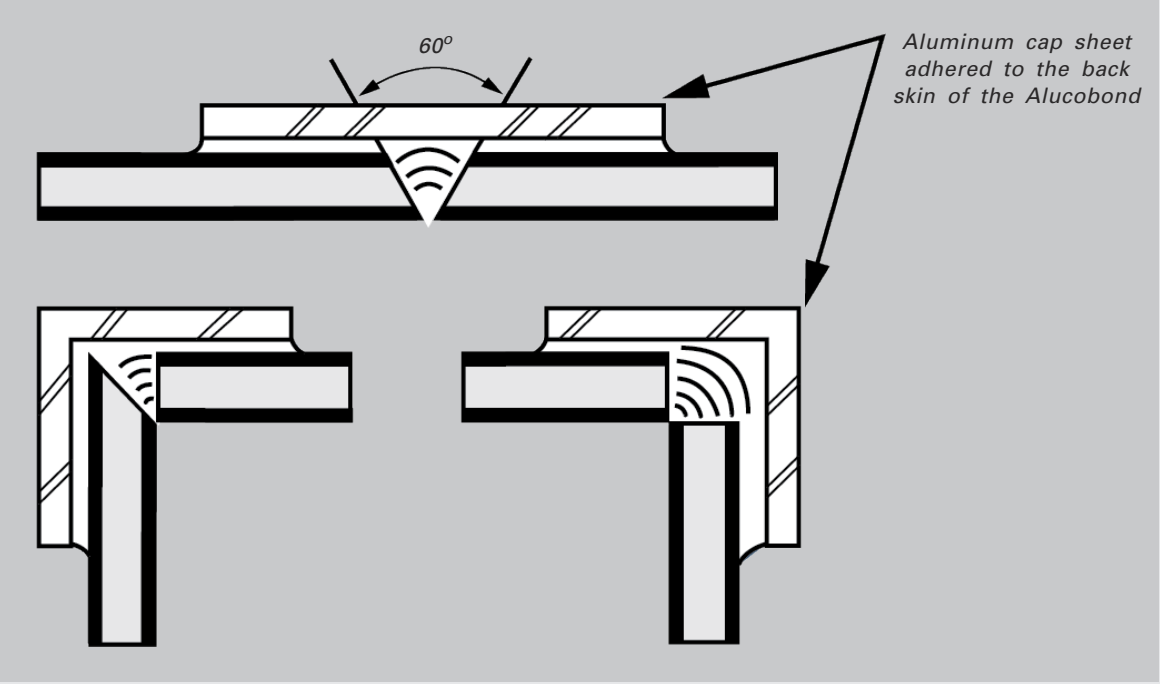
Aluminum alloys such as 5032 and 5154 are suitable rivet material. Due to stress corrosion, alloy 5056 should not be used if the temperature of the manufactured part is expected to rise over 140° F (60° C).

Rivet connections are well suited for parts that may be subjected to concussion or vibration. Colored plastic concealment caps are available for various types of blind and tubular rivets. Consult the rivet manufacturer for details. Follow the directions and determine suitability by pre-testing.

D. Hot Air Welding

Hot-air welding, although somewhat labor intensive, has proven as effective method for joining thermoplastic materials. Hand held, electrically heated, hot-air welding tools are used to heat the Alucobond core material and the welding rod (low density, UV stabilized PE) to its melting temperature. This allows the two components to fuse together. However, the strength of the welded core material alone is not capable of withstanding structural loading. To ensure a good weld, the correct diameter rod should be used. For 3mm Alucobond Material, use a 4mm (5/32") diameter rod. For both 4 and 6mm Alucobond Material, use a 5mm (3/16") diameter rod. Rod shapes other than round and diameters greater than 5mm are not suitable for this procedure. Temperature settings used should be approximately 500° F and the PE, both core material and rod, should be sanded to remove any surface contaminants. Figure 20 illustrates the process for "V" and corner seam hot-air welds. Although this process can be used to join two pieces of Alucobond Material, the joint created should be reinforced with an aluminum cap sheet if significant load is anticipated on the panel.

Figure 20



E. Concealed Fastening

Concealed fasteners may be used when a smooth, exposed surface is required, as in exterior building cladding, interior surfaces, signs, exhibits, store fixtures and furniture. Several fastening options are available, including adhesives and mechanical attachments. All of these methods have medium to low load transmitting capacity compared to conventional fasteners.

1. ADHESIVE BONDING

Most adhesives and sealing compounds do not adhere to thepolyethylene core material; therefore, bond to the aluminum skin of the Alucobond Material only (reference **Figure 21**).

To achieve reliable bonding, it is imperative to follow the adhesive manufacturer's instructions.

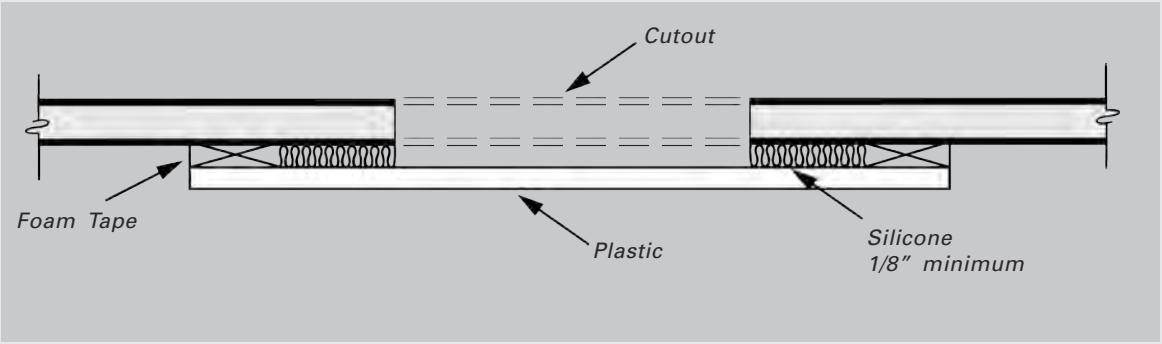
For interior design purposes, high strength contact adhesives that do not require lengthy setting times can be used to achieve particularly high shear strengths.

Where moderate cure times are acceptable, construction adhesives should be considered.

When longer cure times are not objectionable, silicones can be used successfully. However, it may be necessary to hold the components with foam tape while the silicone sets.

When using an adhesive to hold dissimilar materials, select one that will handle thermal movement without shearing. Use a low modulus sealant where greater amounts of movement are expected (i.e.., plastics to aluminum), and high modulus sealants if minimum movement is expected (i.e., bonding aluminum to aluminum).

Figure 21



One of the architectural and display features in great demand is the ability to attach Alucobond materials to a substrate without having exposed fasteners. Although there are some techniques to accomplish this using conventional fasteners, the vast majority of this type of connection is done using adhesives. To develop some general guidelines, 3A Composites USA Inc. has reviewed some well-known adhesives and can present the following information.

The following General Guidelines have been established based on the research done into the use of adhesives on Alucobond Material.

1. **To achieve reliable bonding, it is imperative to follow the adhesive manufacturers's application instructions.**

2. Although many adhesive materials work well on the coil coated paint finishes on Alucobond material, no product, either adhesive or tape, has been found that will adhere to the polyethylene core materials. **All attachments should be made through contact with the aluminum facers of Alucobond Material.**

3. Care must be taken in the selection of an adhesive regarding the expansion of the materials to be joined. Where significant thermal expansion can occur (i.e. exterior applications) adhesives should be of medium or low modulus materials to allow for movement without shear or loss of bond. For interior applications where thermal expansion is not a consideration, high modulus adhesives can be used to join materials.

4. Cure time is generally a consideration in the choice of adhesives. Silicones take a good deal of time to cure before a load can be applied whereas the faster curing adhesives do not have the movement capabilities to meet the project needs. In these instances, a combination of tape and adhesive is often used.

Example: Two pieces of Alucobond Material must be connected for a strong permanent bond in a short period of time. The adhesive area is 2" x 36".

Many times a strip of double-sided tape (approx. 3/4" wide) will be applied next to a bead of silicone adhesive. For the near term, the tape holds the Alucobond. For the longer term, the silicone adhesive will cure and relieve the load applied to the tape, which now acts as a joint filler.

The following adhesives have been shown to adhere to Alucobond Materials. On anodized Alucobond Material, a primer is necessary in certain cases. Please refer to the adhesive manufacturer guidelines or contact 3A Composites Technical Services.

Isopropyl alcohol two-cloth cleaning method is a minimal surface preparation for all adhesive bonding.

1- part Silicones, Adhesives and Sealants:

- Dow 995: 1-part silicone structural adhesive
- Pecora 864, 890, 895: 1-part silicone sealant
- Tremco Spectrem 1, Spectrem 2, Proglaze SG: 1-part silicone sealant
- Schnee Morehead SM5731: 1-part silicone sealant
- GE SCS2800, SCS9000, SCS2000, SCS2900, GE7000: 1-part silicone sealant

Isopropyl alcohol two-cloth cleaning method is a minimal surface preparation for all adhesive bonding.

1-part Silicones or Urethane Adhesives/Sealants Requiring a Primer:

- Dow 790, Dow 795: 1-part silicone sealant
  Surface preparation: Solvent wipe and Dow Corning 1200 Prime Coat required
- Tremco Dymonic: 1-part polyurethane sealant
  Surface preparation: Isopropyl alcohol two-cloth cleaning method, primer #6

2-part Methacrylate, Urethane and Epoxy Adhesives:

- Lord 406/19 (methacrylate), 7542AB, 7545AB (urethane)
- IPS Weld-On 45, Weld-On SS515 (methacrylate)
- Scotch Weld 3M 2216 (epoxy with long working time): Scuffing required

Isopropyl alcohol two-cloth cleaning method is a minimal surface preparation for all adhesive bonding.

The adhesive manufacturers have reported that Lord 406/19 and IPS Weld-On 45 may also be used on unprimed aluminum.

Synthetic Rubber and 1-part Urethane Adhesives:

- Lord 7610 (1-part urethane): Scuffing required
- Schnee Morehead SM7108 (1-part urethane)
- Liquid Nails LN-901 (synthetic rubber)

Isopropyl alcohol two-cloth cleaning method is a minimal surface preparation for all adhesive bonding.

Many different types of adhesives and tapes have been found to work well with Alucobond Material. It is important to follow the guidelines listed above and to experiment with any new adhesive or technique prior to generating the final product.

2. "STUD WELDING" ON ALUCOBOND MATERIAL

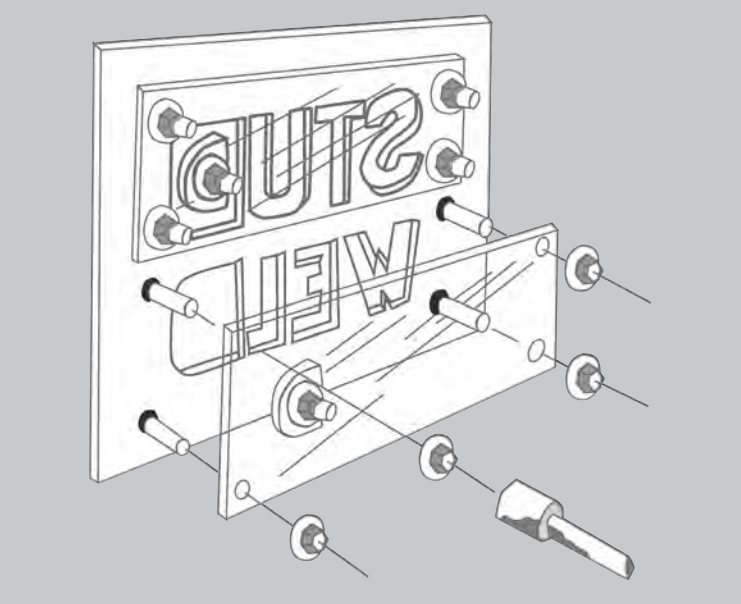
Another approach for attaching to Alucobond Material has been developed which is very fast and easy. This attachment method utilizes a special stud that has no threads, together with a push nut.

This non-threaded stud must be manufactured of the most compatible alloys to ensure the maximum weldability possible to the panel. The proper stud can be easily fastened or welded using a standard capacitor discharge stud welder. The use of a non-threaded stud eliminates the problems of finding the lead threads, paint in the threads, or of most importance, the possibility of over torquing the retaining nut which could shear the weld. Reference **Figure 22**.

The push nut has a built-in washer and locking function. Therefore, the use of a washer, lock washer and nut are not needed. Installing the push nut is a simple thrust with a nut driver.

To remove, the self-threaded push nut is unscrewed. Oversized holes are drilled in the material to be attached at the stud locations prior to installation. Paint should be removed at each stud location by mild abrasion or with the use of paint removers prior to welding. Care should be used to select the proper settings depending on the stud welding gun and the thickness of Alucobond Material.

Figure 22 - Stud Welding

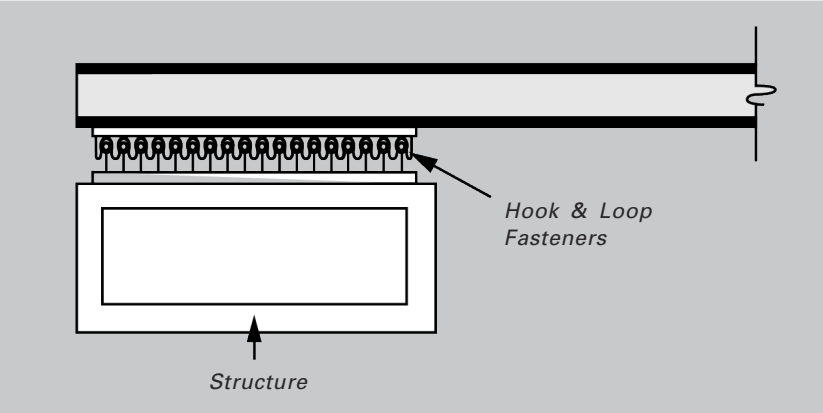


3. TAPES

For concealed attachment, double-faced high strength foam tapes are effective. The purpose for these various tapes are: 1) to hold material under limited load applications, 2) to hold material in line while silicone sets, and 3) for sealing (reference **Figure 21** & **Table 2**).

4. HOOK AND LOOP SYSTEMS

Hook and Loop systems and mounting systems may be used when simple demounting is needed (reference **Figure 23**).



5. BOND ON STUD

An alternative to stud welding is the bond on stud. These are available in various pad sizes as well as different bolt dimensions and are easily used to attach other materials to the back side of Alucobond Material (reference **Figure 24**).

Figure 24

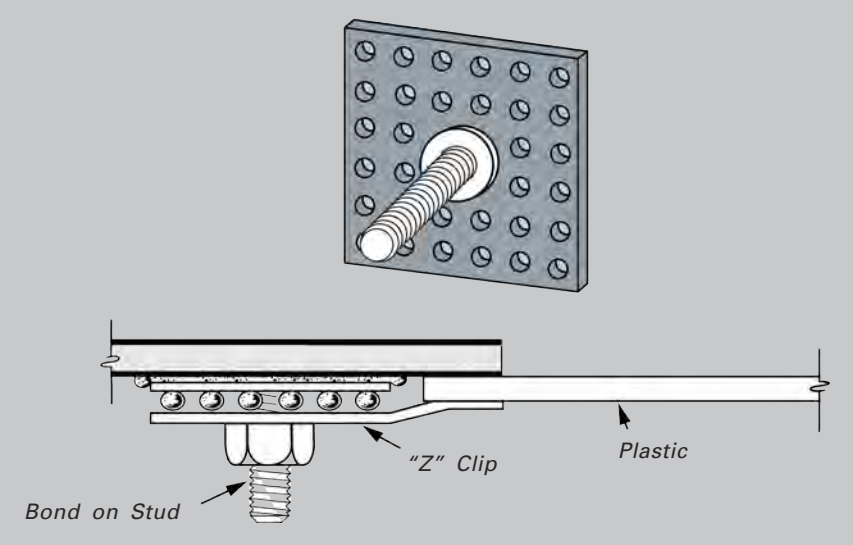


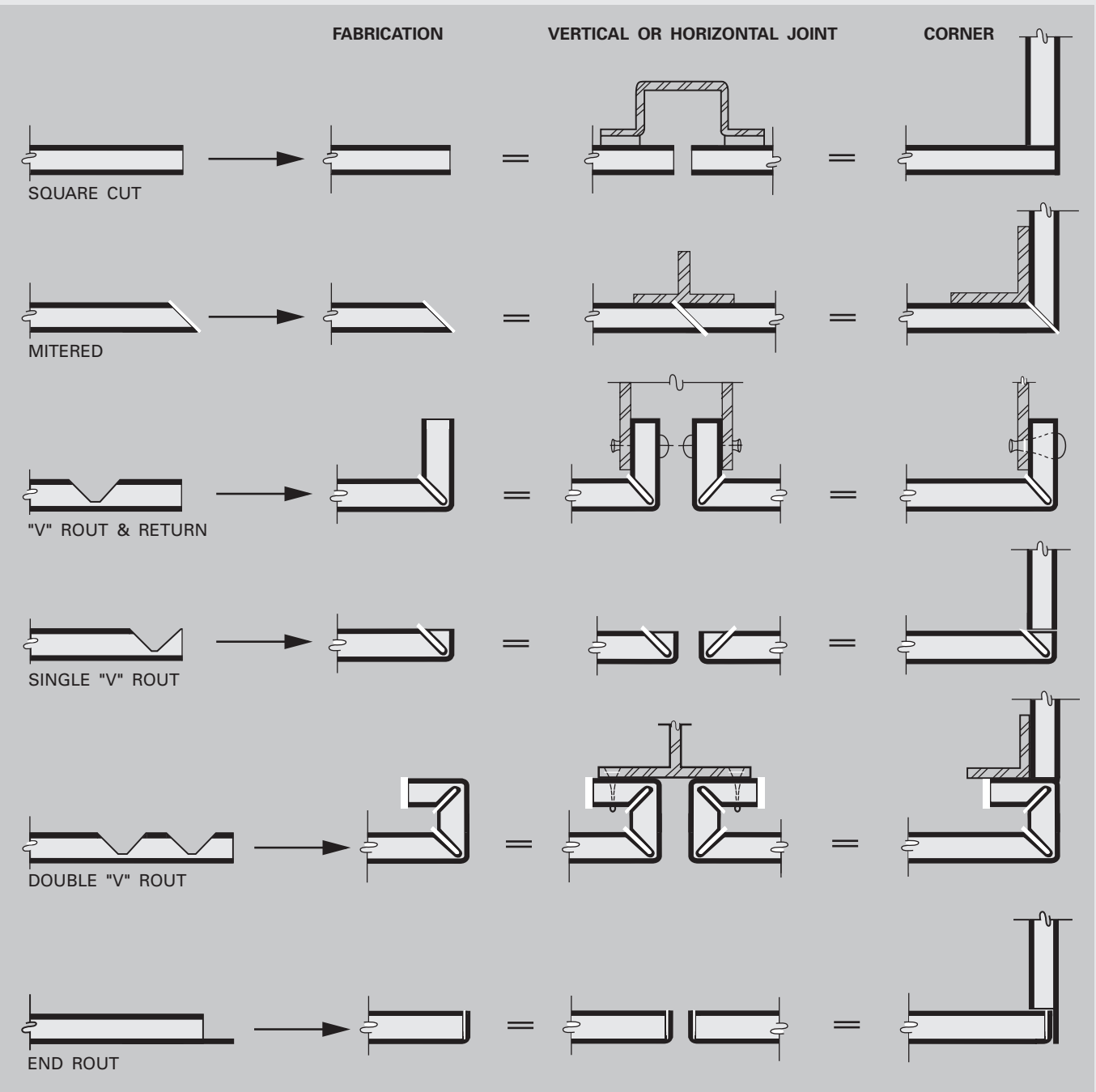
TABLE 2

3M - INDUSTRIAL TAPE & SPECIALTIES DIVISION	VHB DOUBLE COATED ACRYLIC FOAM TAPE
AVERY DENNISION - SPECIALTY TAPE DIVISION	FasTape ACRYLIC FOAM TAPE
MACTAC - TECHNICAL PRODUCTS DIVISION	MACmount DOUBLE-COATED FOAM TAPES
NORTON - NORTON PERFORMANCE PLASTICS CORPORATION	Normount

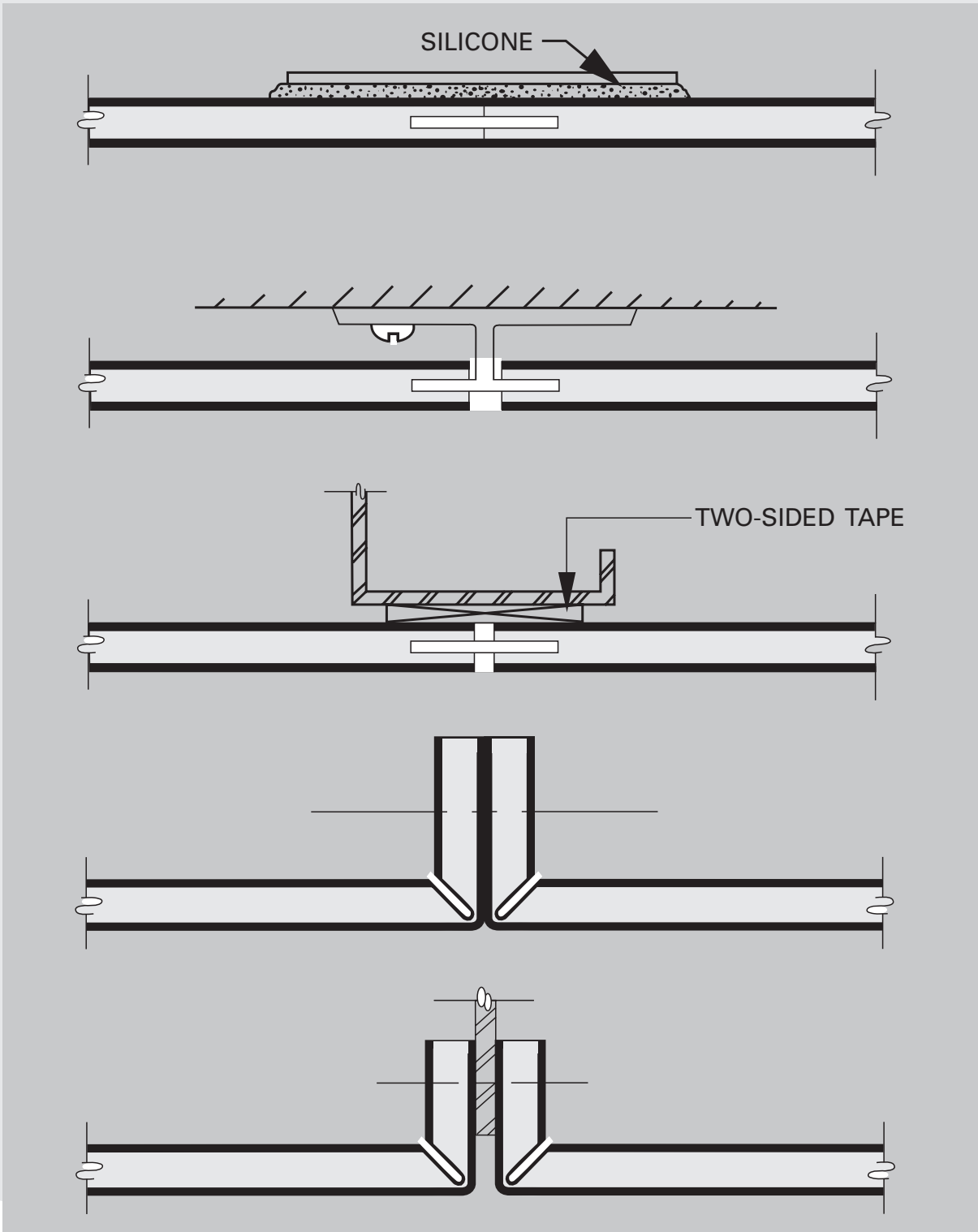
A. Details

The following details are provided for conceptual purposes only. These are not the only methods that can be used to attach Alucobond Material, nor can they be used generically without consideration for each individual application. Good design, thermal expansion, and engineering may preclude the choice of details used.

NOTE: The core material of Alucobond Material is UV stabilized, which eliminates the concern of core deterioration.

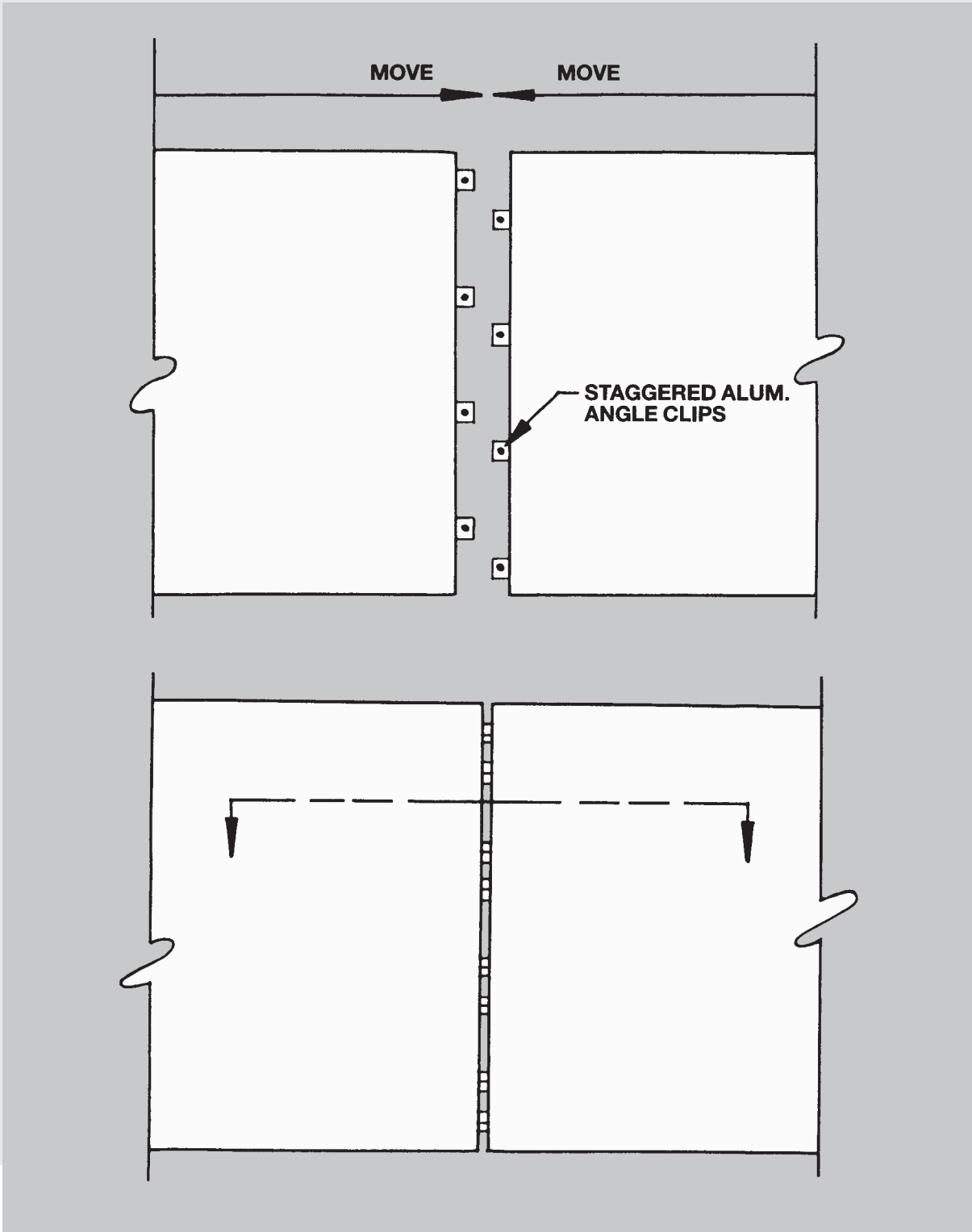


INTERIOR JOINTS - No allowance for Thermal Expansion

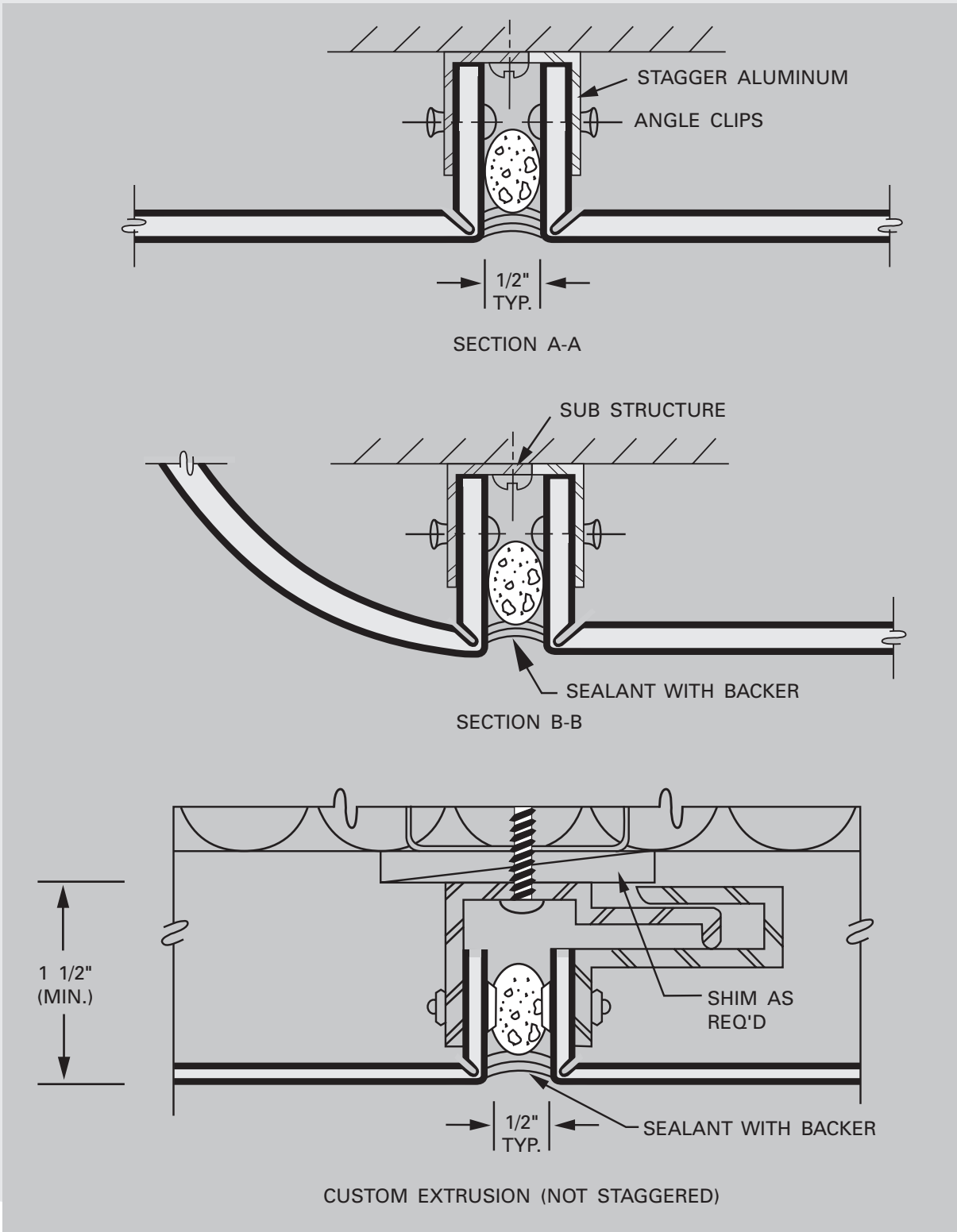


EXTERIOR JOINTS - Allows Thermal Expansion of Panels

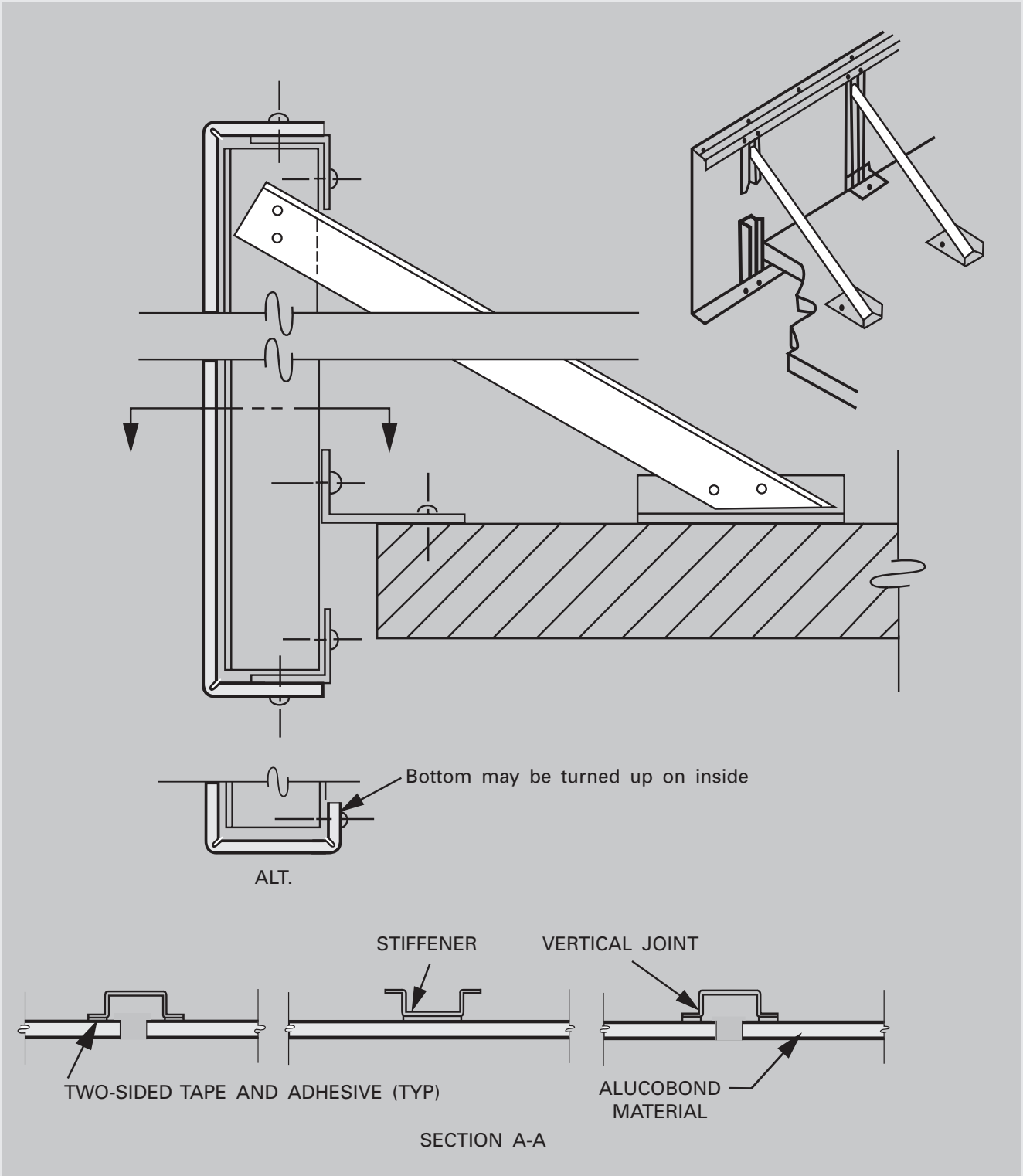
(Clips are at different locations on left and right side of panels to allow for easier installation.)

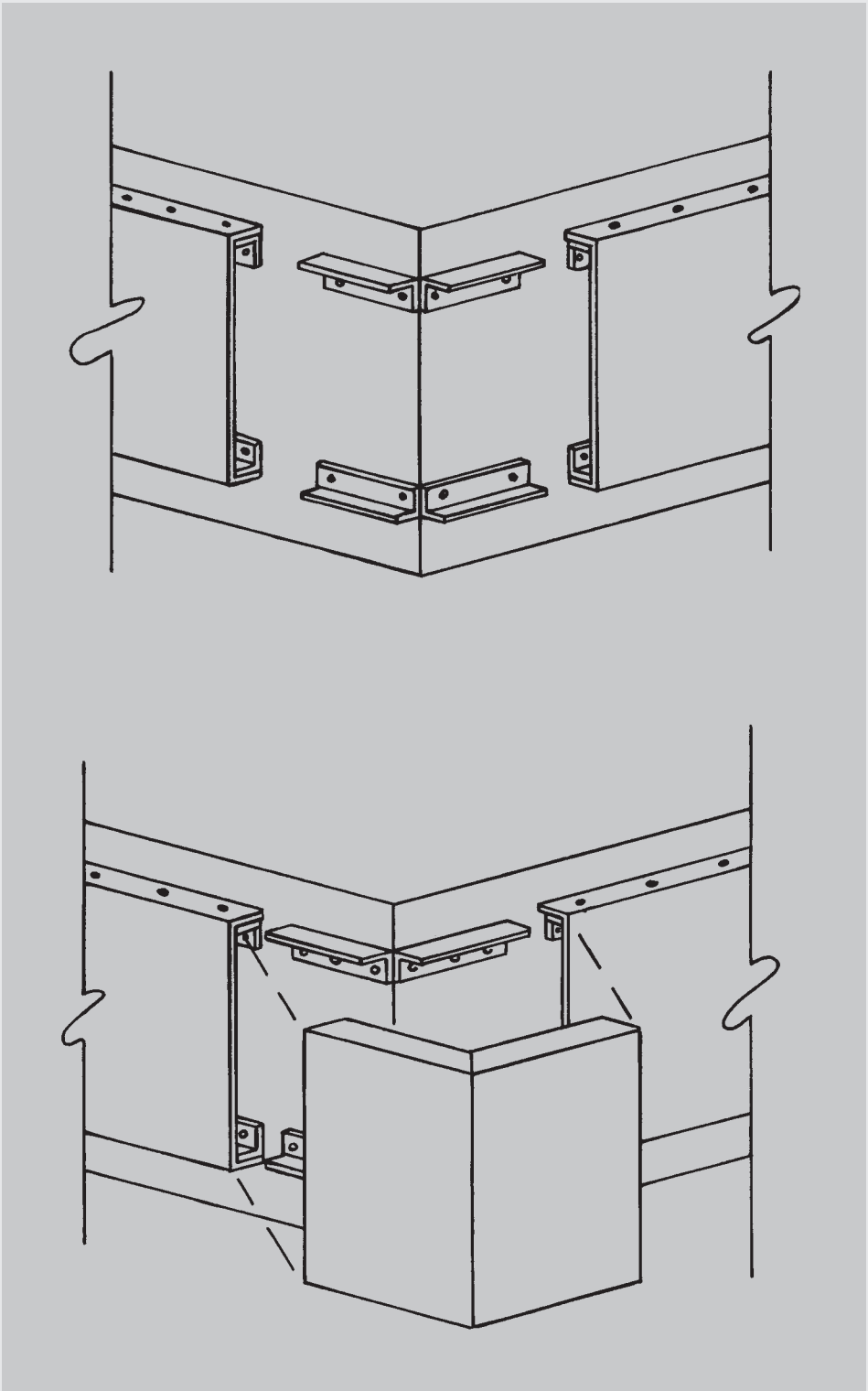


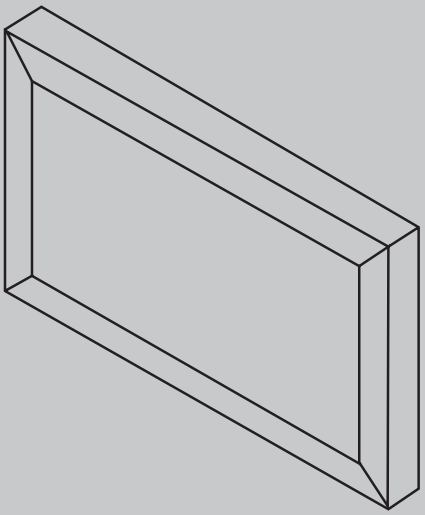
EXTERIOR JOINTS - Allows Thermal Expansion of Panels

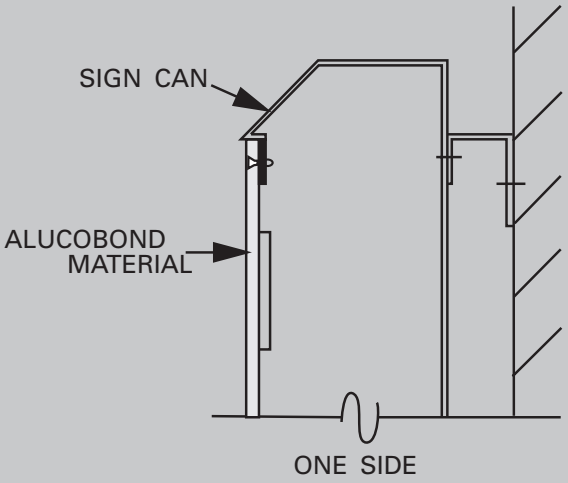


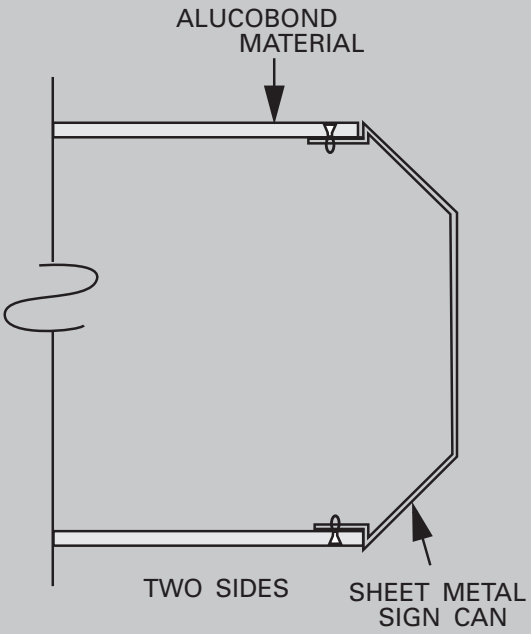
SIGN BAND

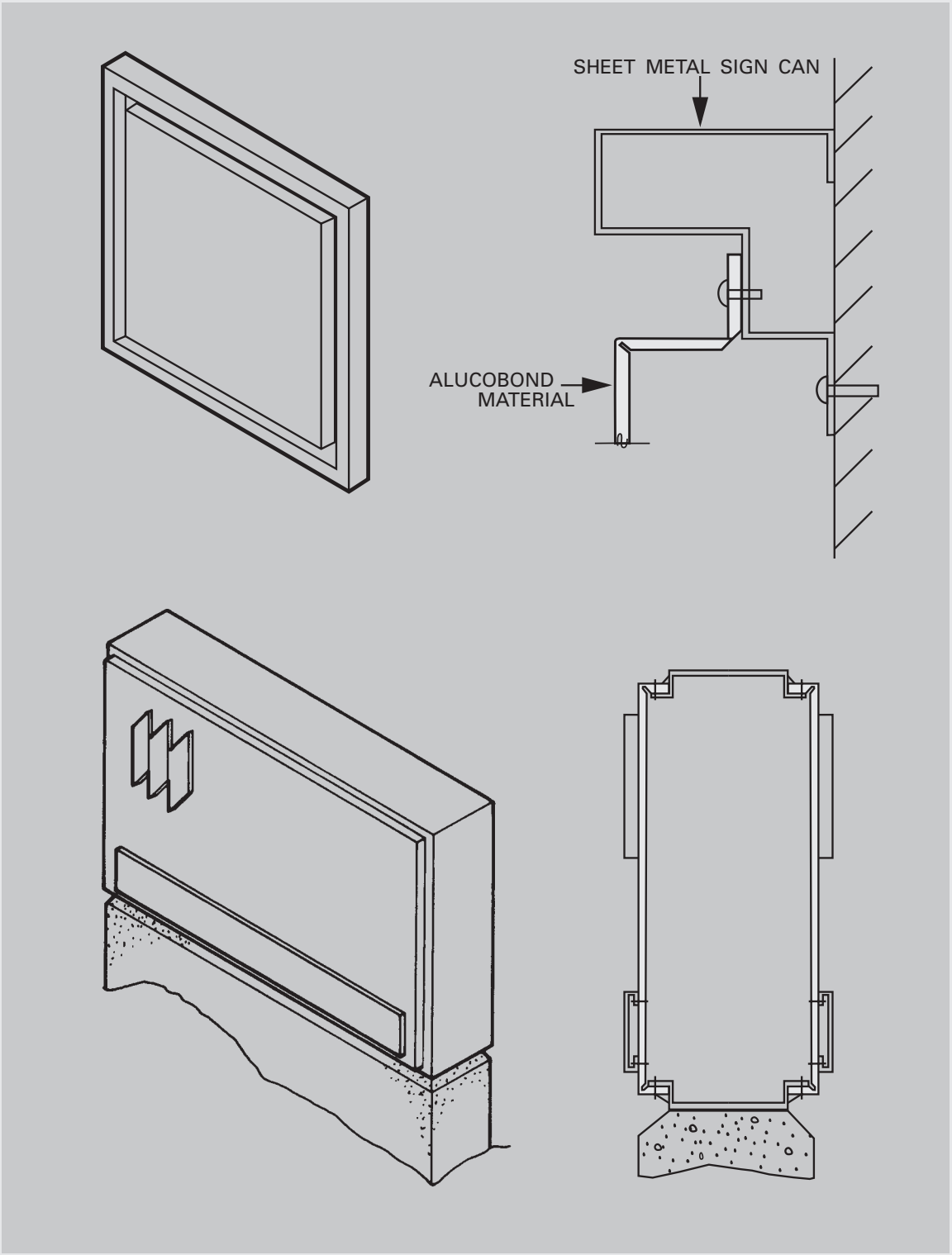

Bottom may be turned up on inside
ALT.
STIFFENER
VERTICAL JOINT
TWO-SIDED TAPE AND ADHESIVE (TYP)
ALUCOBOND MATERIAL
SECTION A-A

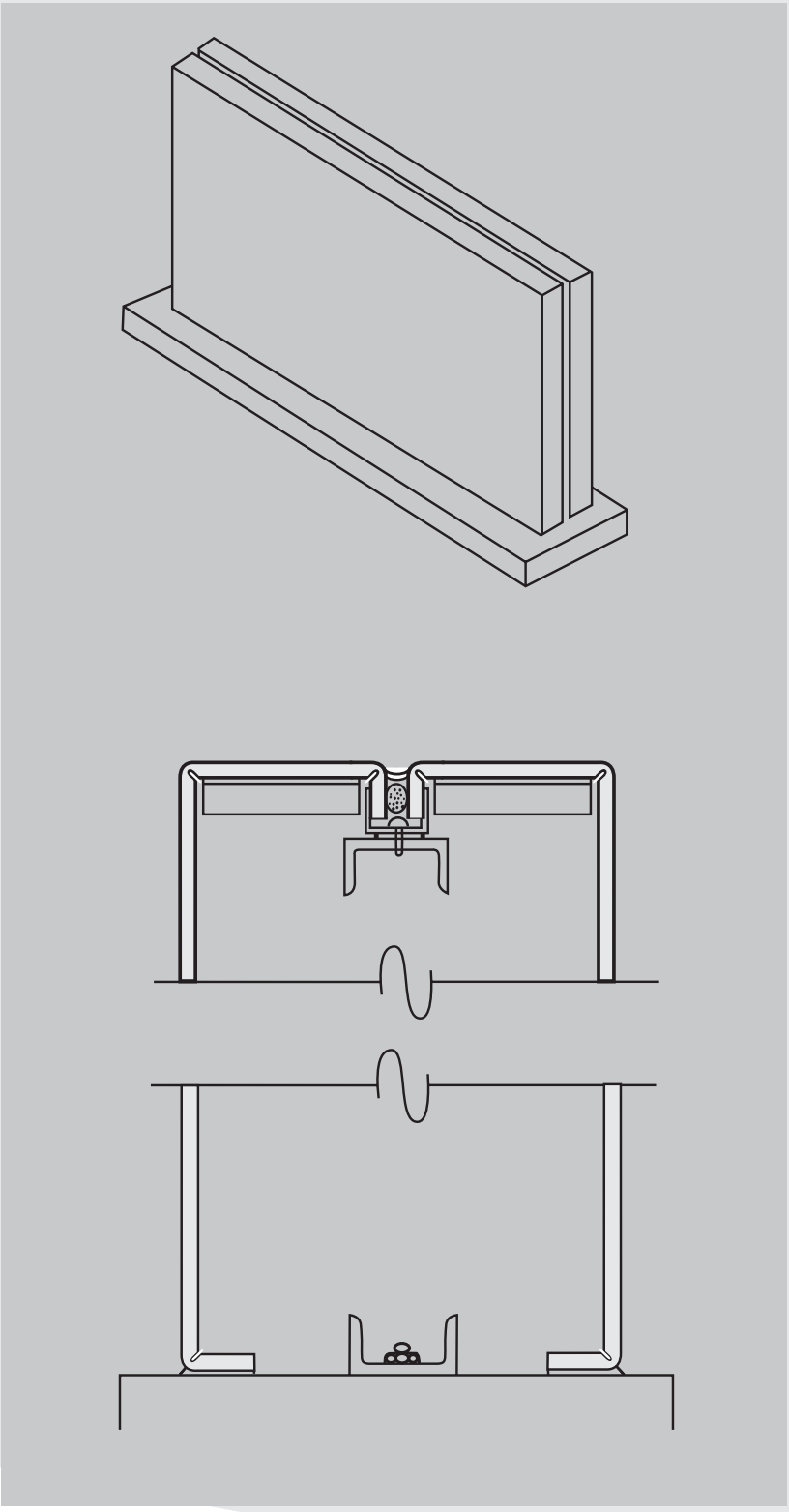


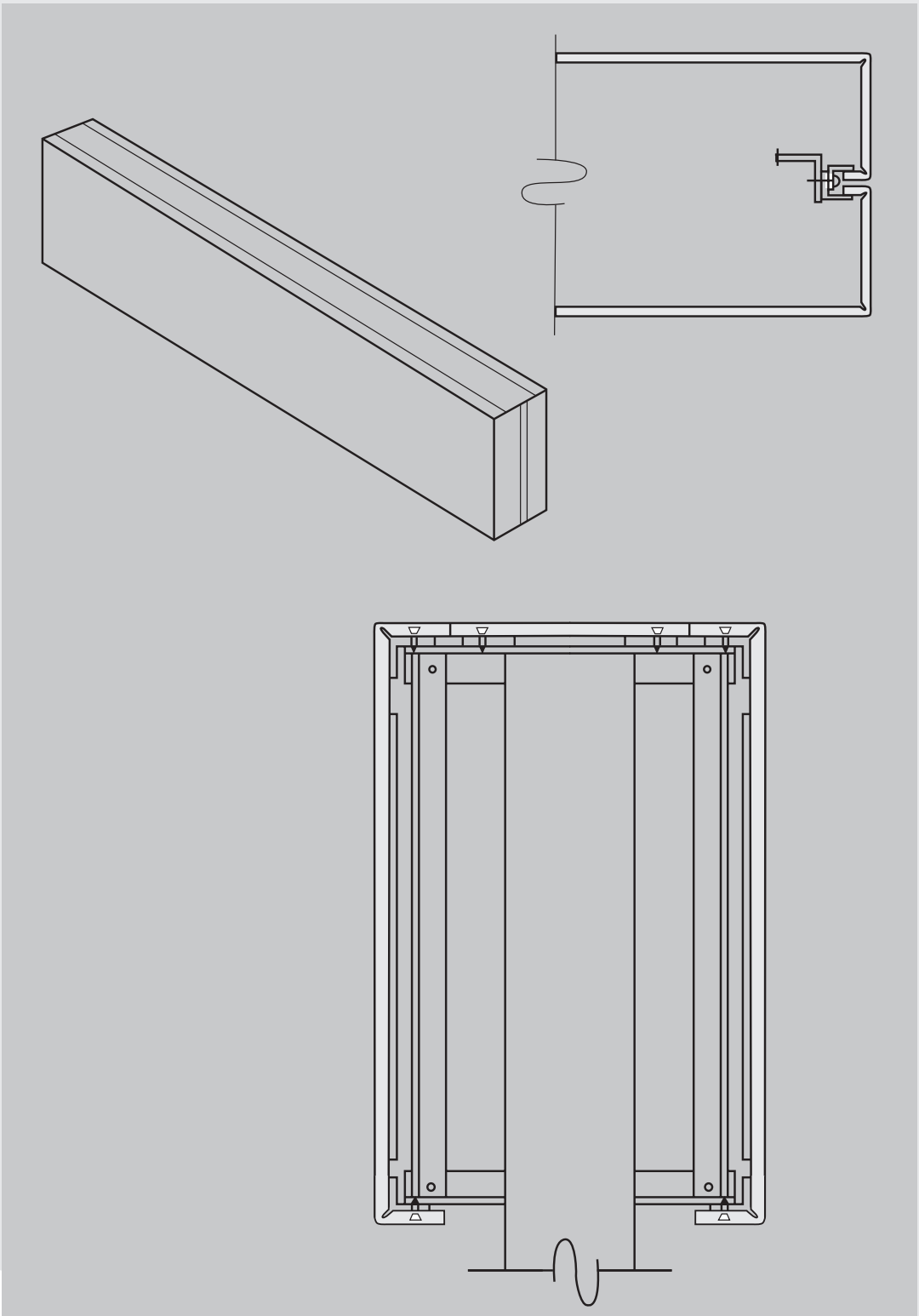



SIGN CAN
ALUCOBOND MATERIAL
ONE SIDE


ALUCOBOND MATERIAL
TWO SIDES
SHEET METAL SIGN CAN


SHEET METAL SIGN CAN
ALUCOBOND
MATERIAL





A. Painting

On many projects that involve Alucobond Materials, a small quantity of "custom color" panels are often required. Because of the limited quantity, it is often not practical to obtain the "custom color" from the factory and post painting is required. Several of the paint manufacturers have tested their products over the standard finishes coil coated by 3A Composites USA Inc. and also over anodized material. Following is a list of the Paint Supplier, Coil Coat Finish and the materials needed for post painting.

Painting should be done by qualified applicators with experience in this type of application.

Preparation

The first step in the post painting process is an assessment of the substrate concerning the cleaning, pretreating and priming required prior to application of the finish. There are no standard procedures for all possible situations due to the variety and condition of the surface to be painted. Before painting, testing should be done on a small area to determine that the preparation, application, and adhesion of the finish are satisfactory. The coating adhesion between the post paint finish and the original coating must be carefully evaluated using common coating adhesion testing procedures. Also, color/gloss matching needs to be evaluated to provide an acceptable final appearance. If testing indicates poor adhesion, do not proceed. Contact your coating representative or Alucobond Technical Services.

Application

Before painting, always check the coating manufacturer's application guidelines and follow the specific instructions shown on the product data sheet and application instructions. For specific recommendations or questions, contact your coating representative.

Surface to be painted must be clean, dry and free of dust, dirt, oil, grease and foreign contaminants. Clean the surface according to the paint manufacturer application guidelines.

If recommended by the paint manufacturer, the curing of paintings may be accelerated through a moderate increase in temperature. For composite material, the temperature must never exceed 140° F.

Where sanding is necessary, do not sand through coating to metal substrate.

TABLE 3

COIL COATING FINISH	SURFACE PREPARATION	PRIMER	TOP COAT
AKZO NOBEL 800-233-3301 or 770-662-8464			
Polyester	Degrease with Grip-Gard® M-600 Wax & Grease Remover. Sand surface with 320-360 grit paper dry.		Grip-Gard®
	Degrease with Grip-Gard® M-600 Wax & Grease Remover.		Grip-Gard® HS Grip-Gard® Plus Meta-Flex®
Duranar®	Degrease with Grip-Gard® M-600 Wax & Grease Remover. Sand surface with 320-360 grit paper dry.	Grip-Gard® HB Surfacer	Grip-Gard® Grip-Gard® HS Grip-Gard® Plus Meta-Flex®
Duranar® XLE	Degrease with Grip-Gard® M-600 Wax & Grease Remover. Sand surface with 320-360 grit paper dry.	Grip-Gard® HB Surfacer	Grip-Gard® Grip-Gard® HS Grip-Gard® Plus Meta-Flex®
Megaflon®	Degrease with Grip-Gard® M-600 Wax & Grease Remover.		Grip-Gard® Grip-Gard® HS Grip-Gard® Plus Meta-Flex®
Clear Anodized	Degrease with Grip-Gard® M-600 Wax & Grease Remover. Sand surface with 320-360 grit paper dry.	Grip-Gard® Washprimer	Grip-Gard®
Benjamin Moore & Co. 800-334-0400			
Polyester Duranar® Duranar® XL & Anodized		M15 Bonding Primer	M22 Urethane Alkyd Gloss Enamel, others also available
Carbit Paint Co. 312-280-2300			
Polyester Duranar® Duranar® XLE Megaflon® Clear Anodized	Clean surfaces with a 50/50 blend of isopropyl alcohol and water.		Carbithane 11® Series Carbithane 12® Series
Dupont Industrial Coatings 800-338-7668			
Polyester Megaflon Clear Anodized	Scuff sand with red Scotch Brite pad, clean with H-69 isopropyl alcohol.		Imron® 333 Line Polyurethane Enamel, Imron® 1.2 Waterborne Copolymer WG
Polyester Duranar® Duranar® XLE Megaflon® Clear Anodized	Scuff sand with red Scotch Brite pad, clean with H-69 isopropyl alcohol.	Imron® 1.5 Waterborne Copolymer WF	Imron® 1.5 Waterborne Copolymer WG
Polyester® Duranar® Duranar® XL Megaflon® Clear Anodized	Scuff sand with red Scotch Brite pad, clean with H-69 isopropyl alcohol.	Corlar® VHS 90P Epoxy Mastic Primer	Imron® 333 Line Polyurethane Enamel

TABLE 3 (continued)

COIL COATING FINISH	SURFACE PREPARATION	PRIMER	TOP COAT
Matthews Paint Co. 800-323-6593 or 262-947-0700			
Polyester Duranar® Duranar® XLE Megaflon®	Wipe down with 45330SP Speed Prep Cleaner, abrade with 320/400 grit or red Scotch Brite pad, then wipe again with Speed Prep Cleaner		MAP® VOC MAP® Satin VOC MAP®
One Shot, LLC 219-949-1684			
Polyester Megaflon®	Lightly scuff sand with gray Scotch Brite pad and wipe down with isopropyl alcohol.	5005 Acrylic Bonding Primer White	1 SHOT Lettering Enamels, CHROMATIC Bulletin Colors
Duranar® Duranar® XLE	Lightly scuff sand with gray Scotch Brite pad and wipe down with isopropyl alcohol.		1 SHOT Lettering Enamels, CHROMATIC Bulletin Colors
Clear Anodized	Lightly scuff sand with gray Scotch Brite pad and wipe down with isopropyl alcohol.	5005 Acrylic Bonding Primer White, 4331011 TiCote Clear Primer Flat	1 SHOT Lettering Enamels, CHROMATIC Bulletin Colors
PPG Industries 800-441-9695			
Polyester® Duranar® Duranar® XL Megaflon®	Lightly scuff sand and remove all forms of contamination, clean with solvent		PPG Duracryl® Acrylic Lacquer
T.J. Ronan Paint Corp. 800-247-6626 or 718-292-1100			
Polyester Duranar® Duranar® XLE Megaflon® Clear Anodized	Wipe with isopropyl alcohol (91%)	Metro Vinyl Primer (water borne), Universal Primer, Sticktite White Primer	Bulletin Color, Lettering Enamel, Aquacote (water borne)
Sherwin-Williams 700-331-7979			
Polyester Duranar® Duranar® XLE		DTM Bonding Primer	DTM Acrylic coating Metalatex semi-gloss coating
Clear Anodized		DTM Wash Primer	DTM Acrylic coating Metalatex semi-gloss coating
Polyester Duranar® Duranar® XLE Megaflon® Clear Anodized	Cleaning per SSPC-SP1 (solvent cleaning)		Bond-Plex water based acrylic coating
Spraylat Corp. 800-336-1936 or 914-699-3035			
Polyester Duranar®	Must be sanded or primed.	Series 20/30 Wash Primer	Series 20 Acrylic Lacquer Series 30 Polyurethane
Duranar® XLE Anodized	Clean contaminate free.	Series 20/30 Wash Primer	Series 20 Acrylic Lacquer Series 30 Polyurethane
Polyester® Duranar® Duranar® XL Megaflon®	Scuff sand using Scotch Brite pad.		Polycryl
Clear Anodized		Series 20/30 Wash Primer	Polycryl

B. Screen Printing

Anodized or coil coated Alucobond Material can easily be screen printed. Any screen printing ink used must be cured by air drying, jet drying under 40 seconds at a maximum air or panel temperature of 250° F, or UV cured at maximum panel temperature of 140° F. Temperature or dwell times in excess of these limits may cause warping or distortion of the panel.

It is recommended to contact the ink manufacturer to determine the products best suited for a particular application.

Proper surface preparation prior to screen printing is essential. Wipe the printing surface with isopropyl alcohol to remove any surface residue; allow isopropyl alcohol to dry (visual inspection) and screen print as usual.

Alucobond Materials are often screen-printed when used in the signage and display industry. Although it would be impossible for any ink or panel manufacturers to run a trial using all of the different types of inks available, 3A Composites USA Inc. has worked in cooperation with several different ink manufacturers to determine the performance of various inks on standard finish material.

As always, it is strongly suggested that a trial runk of any ink process to be completed prior to commitment to a full production run. 3A Composites USA Inc. recommends that you consult with the ink manufacturer if there are any questions regarding the use of a particular ink and to test any application prior to initiating a production run.

The information found in Table 4 is the summary from the recommendations of screen print ink manufacturers for printing on Polyester, Duranar, Duaranar XL, and Anodized Alucobond. Please use these recommendations as a guide only. No warranty, guarantees, or claims concerning the practicality, merchantability, or fitness of any off-line coating material or process are made by 3A Composites USA Inc.

TABLE 4

	POLYESTER	DURANAR	DURANAR XL	ANODIZED
NAZ-DAR/KC (913) 422-1888	3200 w/5% NB 80	3200 w/5% NB 80	3200 w/5% NB 80	7200
	3600 w/5% NB 80	3600 w/5% NB 80	3600 w/5% NB 80	
	System 2	System 2	System 2	
	7200	7200	7200	
	9700		9700	
SERICOL (913) 342-4060	Fascure Satin			
	Gloss Poly	Gloss Poly	Gloss Poly	
	MR Matte	MR Matte	MR Matte	
	Polydyne	Polydyne2	Polydyne2	
	Uvipak PE	Uvipak PE	Uvipak PE	
	Fast Dry Enamel	Fast Dry Enamel	Fast Dry Enamel	Fast Dry Enamel
	HGXE	HGXE	HGXE	
		Polyscreen TP w/ catalyst	Polyscreen TP w/ catalyst	Polyscreen TP w/ catalyst
	SP Enamel	SP Enamel	SP Enamel	
			Fascure	
			Fascure PB	
			PEL	
			Plastical	

C. Panel Repair

Painted Alucobond Material of any thickness can be repaired. Any small areas damaged during fabrication or erection may be repaired using materials recommended by the particular paint system manufacturer supplying the off-line paint finish. These minor repairs are generally done with an automotive glazing putty between the primer and finish coat. The glazing putty is applied to the sanded, dented area. Allow applied putty to dry, then sand, prime and paint much like the methods used in an auto body repair.

Larger and deeper dents may be filled using an automotive polyester body filler. Once again, auto body repair practices are used. Generally, a larger dented area is sanded with a rough grit paper and drilled with small diameter holes and then filled, sanded, primed and painted.

This method of repair should be used only after all fabrication is done on the panel. Any rolling, drilling, shearing, or punching operations through a filled area may cause damage to the repair.

A. Deflection

Deflections of Alucobond Material under load are demonstrated by the following charts. The charts are developed to demonstrate the amount of spacing between supports across the short dimension of the panel in comparison to the panel deflection. Deflections in excess of 2" should not be allowed as such excess may stress the aluminum skin beyond allowable limits.

B. Windload Data

Charts 1 through 6 contain data relative to the use of all thicknesses of Alucobond Material under two types of support conditions where the panel is fixed or attached along two sides only: Single span with flexible ends and twin span with flexible ends.

To determine support spacing, choose the chart for the appropriate thickness of Alucobond Material and type of support planned. At the bottom of the chart labeled "Space in Feet," enter the chart with anticipated support spacing, then follow this value of spacing upward until it intersects the curve, labeled according to design windload. Read the corresponding deflection at the left side of the chart labeled "Deflection in Inches." At no time should the intersection of the planned support distance and the windload be above the line marked "Maximum Tension." Adjust anticipated design spacing and supports as needed to avoid exceeding "Maximum Tension." If this deflection value exceeds the allowable deflection, adjust spacing accordingly.

Example:

What is the maximum deflection of a sheet of 6mm (1/4") Alucobond Material supported on two sides, every 3'-0" with flexible ends, under a windload of 40 psf?

Locate the chart for 6mm single span condition. At the bottom of the chart find the "Spacing in Feet." Follow the 3.00' line upward until it intersects the 40 psf curve, then line over to the left side of the chart and read the "Deflection in Inches" of 1.150".

CHART 1 - WINDLOAD CHART: 3MM, SINGLE SPAN

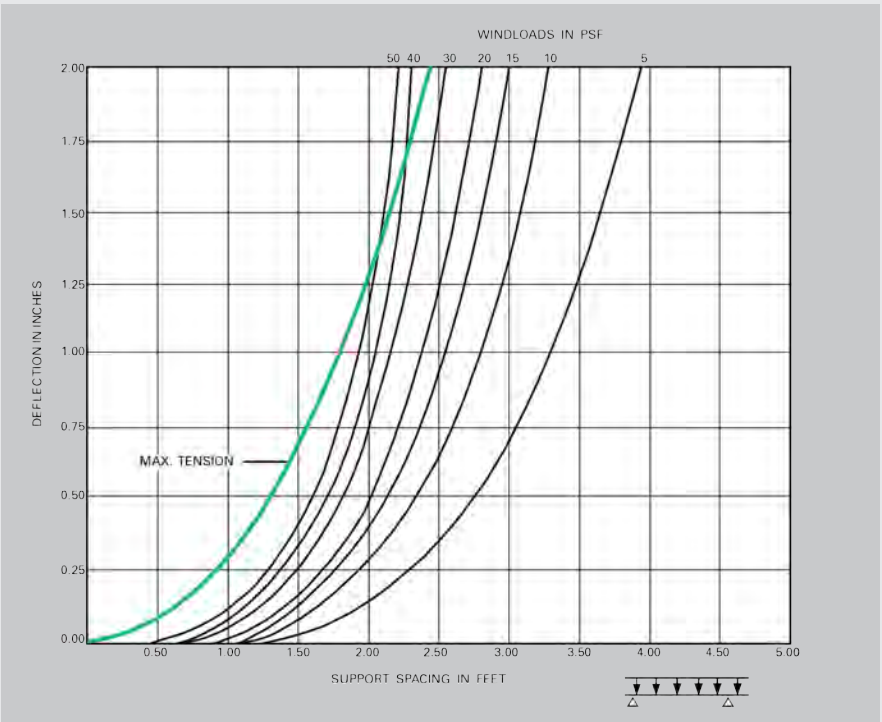


CHART 2 - WINDLOAD CHART: 3MM, TWIN SPAN SIMPLY SUPPORTED

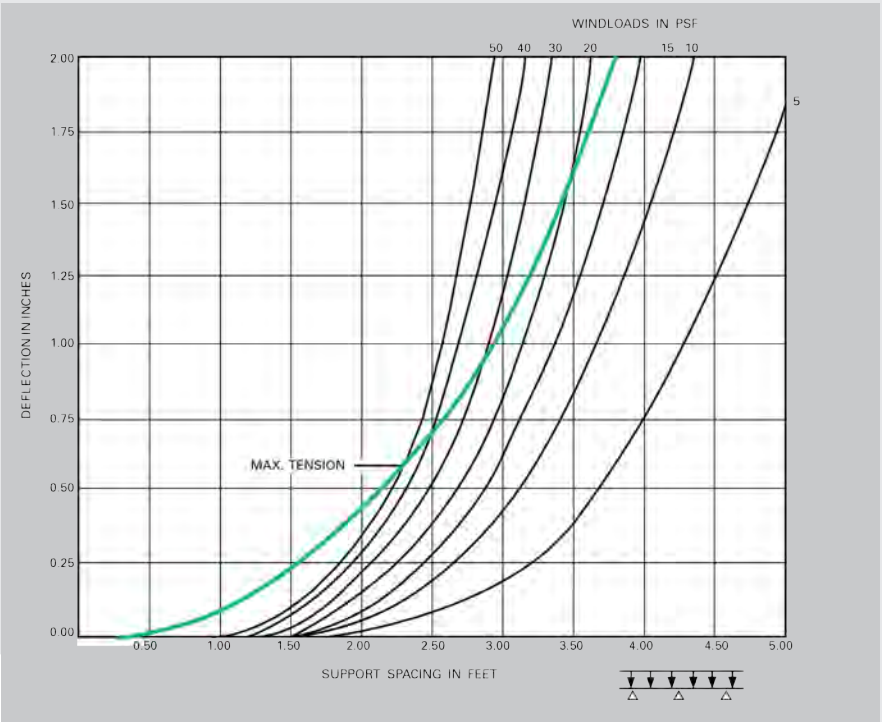


CHART 3 - WINDLOAD CHART: 4MM, SINGLE SPAN

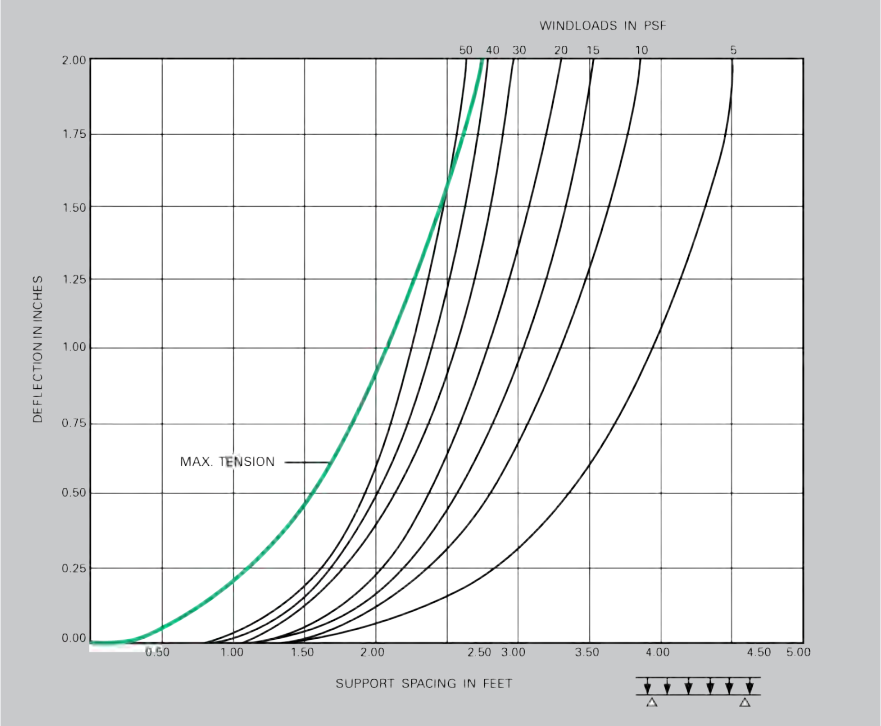


CHART 4 - WINDLOAD CHART: 4MM, TWIN SPAN SIMPLY SUPPORTED

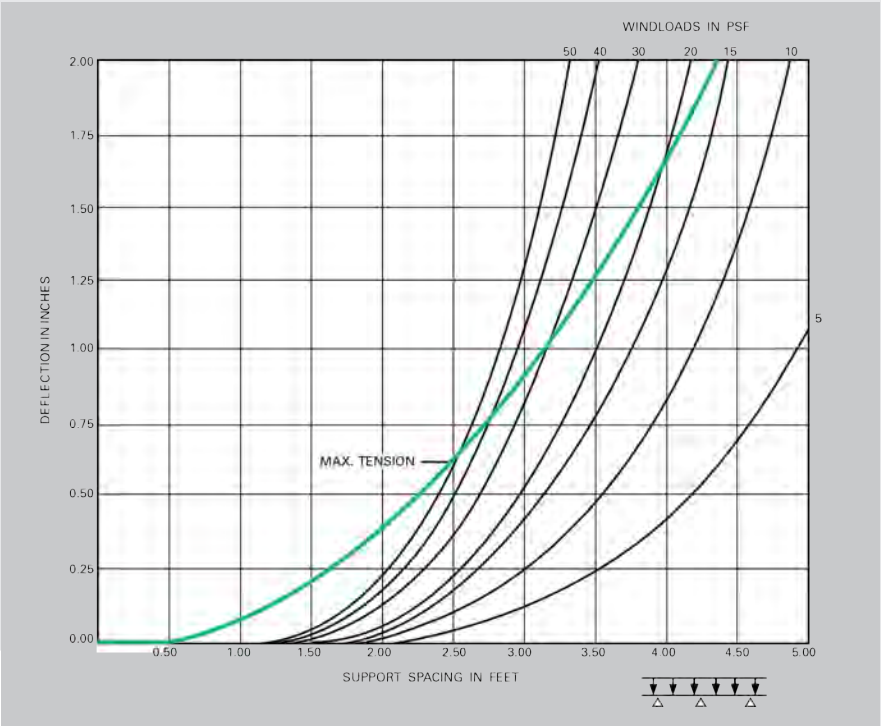


CHART 5 - WINDLOAD CHART: 6MM, SINGLE SPAN

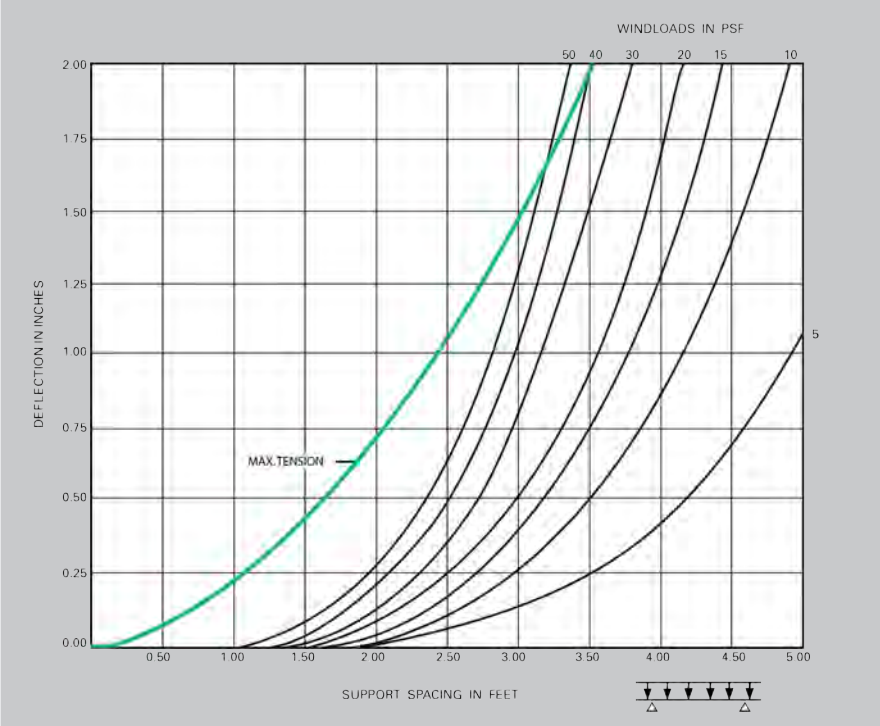
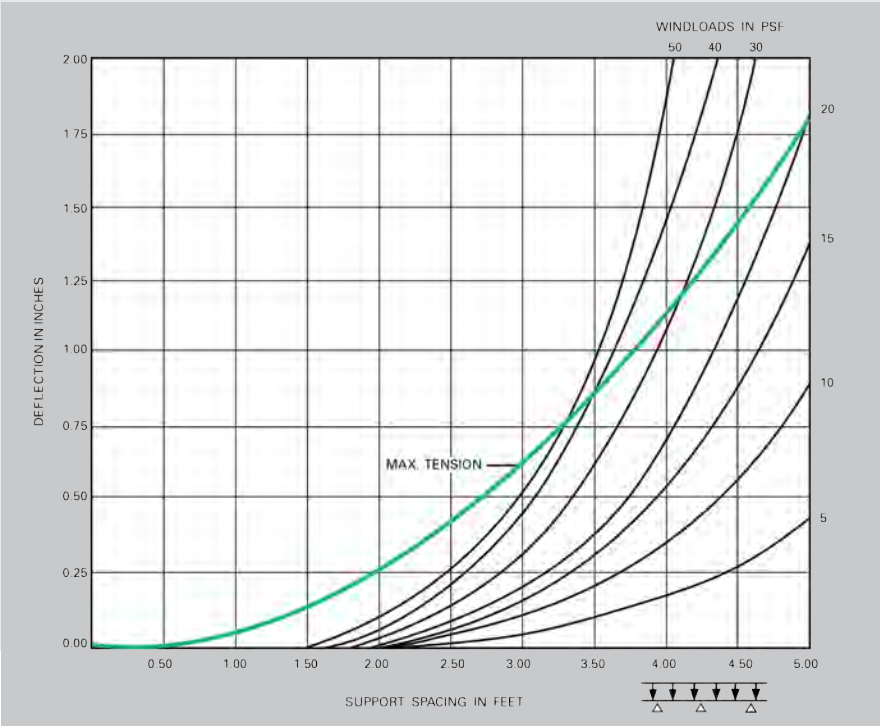


CHART 6 - WINDLOAD CHART: 6MM, TWIN SPAN SIMPLY SUPPORTED



C. Thermal Expansion

Thermal expansion should always be considered in designs using Alucobond Material. Alucobond Material has been tested and has a Rate of Expansion of 0.000158"/ft/° F. That translates into 1/8" movement in an 8 foot panel with a 100° F temperature change. Temperature differences must be considered between shop (fabrication) temperatuer and the highest or lowest temperature the panel is expected to achieve. An example of this concept is listed below. Care should always be taken to avoid restricting thermal movement of the panel to eliminate unacceptable bowing and overstressing of the fasteners. The coefficient for unlike materials should be considered in joint design.

Panel Length @ Shop Temperature: 10' (120")
Panel Width @ Shop Temperature: 4' (48")

Maximum Panel Temperature (including reflected heat): 180° F
Minimum Panel Temperature: -20° F
Fabrication Shop Temperature: 60° F

Maximum Panel Lenth Dimensions

+ Temperature change: 180° F - 60° F = 120° F
Total Expansion: 0.000158" x 10' x 120° F = +0.190"

- Temperature change: 60° F - (-20° F) = 80° F
Total Contraction: 0.000158" x 10' x 80° F = 0.126"

Panel Width at extreme temperature: 9' - 11 7/8" @ -20° F
10' - 0 3/16" @ -180° F

Total Panel Length change is .190" + .126" = 0.316" (From -20° F to 180° F)

Maximum Panel Width Dimensions

+ Temperature change: 180° F - 60° F = 120° F
Total Expansion: 0.000158" x 4' x 120° F = +0.076"

- Temperature change: 60° F - (-20° F) = 80° F
Total Contraction: 0.000158" x 4' x 80° F = 0.050"

Panel Width at extreme temperature: 3' - 11 61/64" @ -20° F
4' - 0 5/64" @ 180° F

Total Panel Width change is .076" + .050" = 0.126" (From -20° F to 180° F)

D. Technical Data

ENGINEERING PROPERTIES OF ALUCOBOND MATERIAL

Alucobond Material is an aluminum composite material (ACM) consisting of two cover sheets of .020" (nominal) gauge aluminum with a low density polyethylene core. It is produced with various core thicknesses in a continuous process. All material is supplied with a mill edge.

THICKNESS (mm)	3 mm (.1182")	4 mm (.1576")	6 mm (.2364")
WEIGHT (lb/ft²)	0.92	1.12	1.49
TENSILE YIELD (psi)	7820	6020	4590
ULTIMATE TENSILE YIELD (psi)	8010	6180	4730
ELONGATION (%)	4.9	7.6	9.3
TENSILE MODULUS (psi)	1.98×10^5	1.38×10^5	0.87×10^5
FLATWISE TENSILE (psi)	2030	1820	1700
ULTIMATE FLEXURAL (psi)	18350	14510	10490
FLEXURAL MODULUS (psi)	1.69×10^5	1.66×10^5	1.52×10^5
FLATWISE COMPRESSION (psi)	1750	2030	2230
COEFFICIENT OF EXP. ("/°F)	1.31×10^{-5}	1.15×10^{-5}	1.22×10^{-5}
FLATWISE SHEAR (psi)	990	920	890
DEFLECTION TEMPERATURE (°F)	415	>500	>500
WATER ABSORPTION	Nil	Nil	Nil
THERMAL CONDUCTANCE (Btu / hr. °F ft.²)(U)	24.3	20.5	10.5
THERMAL RESISTANCE (hr. °F ft.² / Btu)(R)	.041	.049	.096
CONDUCTIVITY (Btu-in. / hr. °F ft.²)	2.86	3.21	2.46

D. Technical Data

FIRE TESTING

Alucobond Material has been subjected to a number of severe fire tests by independent laboratories. All of the tests discussed here were conducted using nationally recognized and standardized procedures. In the tests listed below, Alucobond Material, or a wall assembly incorporating Alucobond Material, was judged to successfully meet the pass/fail criteria imposed.

ASTM E84

Alucobond Material in 3mm, 4mm, and 6mm thicknesses achieved zero ratings for flame spread, fuel contribution and smoke density.

The resultant building material's surface burning classifications are NFPA Class A and UBC Class 1.

ASTM E162

In a test designed to measure surface flammability, Alucobond Material was exposed to a radiant heat source for 15 minutes. No burning resulted.

ASTM E108, Modified

This test impinges a gas flame on a vertically erected panel with a typical construction joint to simulate an exterior installation. In tests of both 4mm and 6mm Alucobond Material, the basic 15-minute test objective was exceeded. Neither thickness contributed to vertical or horizontal flame spread, and no significant outgassing was observed.

UBC 17-5 ROOM FIRE TEST

In tests of wall assembles incorporating Alucobond Material, no flame spread along the interior face or penetration through the wall ocurred during the 15-minute test. Alucobond Material successfully met the criteria for this test.

UBC 17-3 THERMAL BARRIER EVALUATION, Modified

In a test which placed Alucobond Material wall assemblies directly above a furnace that reaches 1400° F, Alucobond Material successfully met test criteria of no penetration of aluminum skin by fire during the 15-minute test.

UL 94

In a test of 6mm Alucobond Material, all test criteria were passed, resulting in a 94 V-0 rating for Alucobond Material.

D. Technical Data

BENDING STRENGTH

The following formula can be used to calculate bending stress:

M_b = Bending Moment
t_1 = Total Thickness
Z = Section Modulus
t_c = Thickness of Core
W = Width

$$S_b = \frac{M_b}{Z} = \frac{6t_1 \times M_b}{(t_1^3 - t_c^3)\ W}$$

TEMPERATURE RESISTANCE

Withstands environmental temperature changes from -55° F to + 175° F. Changes dimensionally 0.000158" per foot per degree Farenheit. The coefficient of linear expansion is governed by the aluminum cover sheets.

BOND INEGRITY

Alucobond Material has been tested to ASTM D-1781 for bond integrity, simulating its resistance to delamination. The following minimum values have been established:

Bond Strength: 214 PSI (Vertical Pull)/ASTM C-297
Peel Strength: 115 Nmm/mm o ASTM D-1781

No appreciable loss of bond strength has been determined due to normal weather conditions.

SOUND TRANSMISSION AND VIBRATION CHARACTERISTICS

Sound Transmission Class for Alucobond Material has been determined by ASTM E-90. Vibration damping loss factor was determined using the procedure of ASTM STP-378.

	Loss Factor at 100 HZ	STC No.
3mm	.060	25
4mm	.280	28
6mm	.440	28

A. Storage

Alucobond Material should always be stored in a cool dry area where temperatures are relatively stable. Excessive temperature fluctuations may cause condensation to form on the stored sheets, possibly resulting in permanent surface damage, especially on anodized material. Do not allow moisture to reach stored material.

Ideally, crates of Alucobond Material should be stored horizontally with adequate support to prevent sagging, and not more than four skids high; or if the panels are 16' or longer, not more than four skids high. Long-term storage with the panels sagging could create a permanent bow in the material. However, small quantities of material may be stored on edge if adequately supported with an "A" frame rack. The "A" fram must have a solid base and back rest.

B. Fabricating Tables

Several approaches can be used for Alucobond Material fabrication tables. These depend primarily on need, cost, and space.

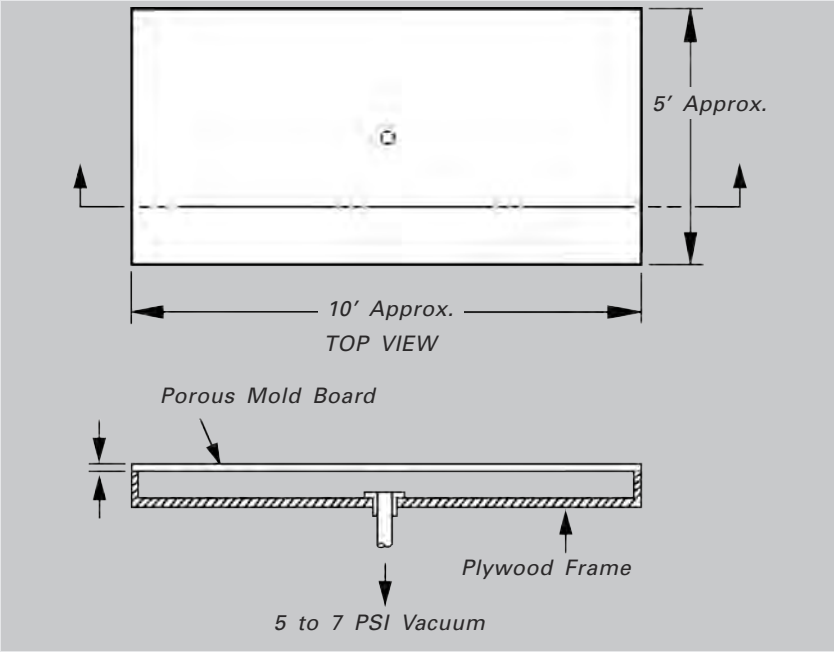
Vacuum or suction tables can be built with minimal expense and used effectively to speed up processing. Vacuum tables can be hand built utilizing PVC pipes, an industrial-type vacuum, and a porous top surface, as shown in **Figure 26**.

Tables should be well supported and laterally stable. The surface needs to be capable of being easily cleaned. The material used for the surface should be of a type that will not accumulate chips and other debris that could damage the surface of the sheets.

The use of spring clamps, screw clamps, and "C" clamps should always be done in conjunction with a flat, or other flat spacers, to avoid point compression on the Alucobond Material. Point clamping may cause a dimpling in the surface. The flat bar can also be used as a straight edge for routing or cutting. Care should be taken to avoid shifting of the panel while fabricating.

Avoid sliding the panels as they are placed on or removed from the table.

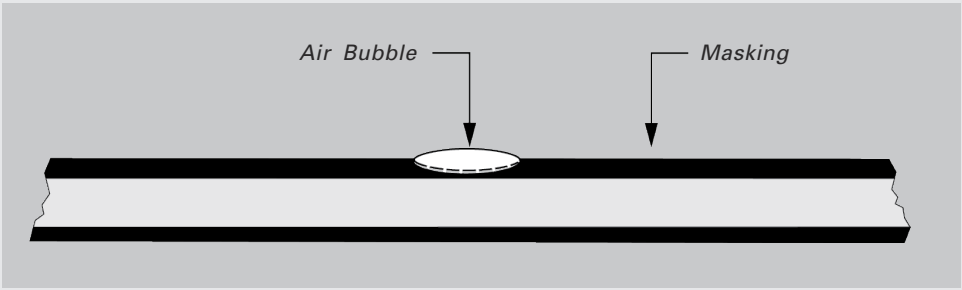
Figure 26 - Simple Vacuum Table



C. Masking

Masking prior to fabrication is highly recommended to avoid surface damage. Under most circumstances, masking can be applied at the factory. If masking is applied at the fabrication point, the paint manufacturer should be consulted for compatibility. Incorrect masking selection may damage the panel finish. For standard polyester finishes, polyvinyl or Polyethylene film is recommended. Adhesive strength should be of the least amount available and tested to ensure compatibility with the surface finish. Applicators of sufficient quality to apply a smooth bubble-less film are needed since trapped air bubbles can leave a permanent mark on the paint finish (reference **Figure 27**).

Figure 27 - Masking Techniques



Caution should be taken when the fabricated product is exposed to ultraviolet light. Masking should be removed immediately after installation. Certain masking films are not compatibile with anodized surfaces and one should consult the suppluer prior to use. Although this masking material protects the surface from minor scratches and dirt accumulation, some markers will penetrate and stain the painted surface.

Section VII: Sources

The following list of products and sources is for your reference, and is not intended as a complete listing of either satisfactory products and materials or of possible sources of supply.

A. Adhesives

1. Two Part-Adhesives

Dymax Corporation
51 Greenwoods Road
Torrington, CT 06790
860-626-6326

National Starch & Chemical Corp.
Finderne Avenue
Bridgewater, NJ 08807
908-685-5000

Sika Corporation
201 Polito Ave.
Lyndhurst, NJ 07071
201-933-8800

2. Construction Adhesives

Construction & Sub Floor Adhesive

Sovereign Engineered Adhesives
123 W. Bartges Street
Akron, OH 44331-1081
800-323-5158

TACC
56 Air Station Industrial Park
Rockland, MA 02370
800-503-6991

3. Structural Adhesives

Dow Corning Corp.
Product Information
P.O. Box 0994
Midland, MI 48686-0997
989-496-6000

GE Silicon Products
260 Hudson River Road
Waterford, NY 12188
800-332-3390

LEECH Products, Inc.
P.O. Box 2147
Hutchinson, KS 67504-2147
620-669-0145

4. Other (Epoxy, Etc.)

Lord Corp.
Industrial Adhesives Dept.
2000 West Grandview Blvd.
Erie, PA 16509
814-868-3611

B. Blades, Router Bits and Drill Bits

1. Custom Routing Blades and Cutters, Saw Blades

Drake Corp.
1913 N. Van Buren Street
Huntingburg, IN 47542
812-683-2101

2. Drill Bits

(Standard: High speed steel bits)

C. Extrusions

ABC Sign Products, Inc.
2028 Southeast Frontage Road
Fort Collins, CO 80525
970-482-5225
800-248-9889

APCO
388 Grant Street Southeast
Atlanta, GA 30312-2227
404-688-9000
800-215-4039

Excellart Sign Products, LLC
1654 S. Lone Elm Road
Olathe, KS 66061
913-764-2364
800-627-9044

Futura Industries Corp.
P.O. Box 160350
Building H-11 Freeport Center
Freeport Center Station
Clearfield, UT 84016-0350
801-773-6282

Signcomp
2925-A Walkent Court
Grand Rapids, MI 49544
616-784-0405
877-784-0405

D. Fasteners

1. Bond on Stud

Midwest Fasteners
P.O. Box 73238
Cleveland, OH 44193
937-866-0463

2. Stud Welding

Southern Stud Weld
3910-H North Freeway
Houston, TX 77022
713-691-0897

E. Fabricating Tables

1. Porous Mold Board

Diamond Supply Inc.
200 Dalton Ave.
P.O. Box 5115
Charlotte, NC 28206
704-376-2125

F. Hot Air Welding

1. Welding Rod

Ain Plastics
249 E. Sandford Blvd.
Mount Vernon, NY 10550
914-668-6800
800-431-2451

Seelye, Inc.
333-C Enterprise Street
Ocoee, FL 34761
800-258-2936

2. Hot Air Gun

Seelye, Inc.
333-C Enterprise Street
Ocoee, FL 34761
800-258-2936

HAPCO, Inc.
390 Portage Blvd.
Kent, OH 44240
800-345-9353

G. Machinery

1. Press Brake

(Available through commercial sources)

2. Pyramid Rollers

(Available through commercial sources)

3. Routers

Black & Decker
Skil
Sears
Miller Falls

4. Panel Saws

Colonial Saw
122 Pembroke Street
P.O. Box A
Kingston, MA 02364
781-585-4364

W.W. Thayer Co.
1444 Hoelzer Court
Pacific, MO 63069
636-257-3311

HOLZ-HER U.S. Inc.
5120 Westinghouse Blvd.
Charlotte, NC 28273
704-587-3400
Fax: 704-587-3412

5. Multiple Operations

Rip/V - Grooving Saws

Multiscore
15-7157 Honeyman St.
Delta British Columbia V4G1E2
604-946-6130

H. Masking

Bischof & Klein
2 Anderson St.
Monmouth Beach, NJ 07750
732-229-8126

IVEX Novacel
55 Tower Rd.
Newton, MA 02464
610-268-3698

Main Tape
P.O. Box 379
Plymouth, WI 53073
800-858-0481

I. Paints

AKZO Nobel
5555 Spalding Dr.
Norcross, GA 30092
770-662-8464

Benjamin Moore & Co.
51 Chestnutridge Rd.
Montvale, NJ 07645
800-334-0400

E.I Dupont Nemours, Co.
1007 Market Street
Wilmington, DE 19898
800-441-7515

Matthews Paint Company
8201 100th Street
Pleasant Prairie, WI 53158
262-947-0700
800-323-6593

PPG Industries
#1 PPG Place
Pittsburgh, PA 15272
800-441-9695

T.J Ronan Paint Corp.
749 East 135th Street
Bronx, NY 10454
718-292-1100
800-247-6626

Sherwin Williams
10 Midland Building
101 Prospect Ave.
Cleveland, OH 44115
216-566-2151

Spraylat Corporation
716 South Columbus Ave.
Mount Vernon, NY 10550-4795
914-699-3030

J. Sealants

Dow Corning Corp.
Product Information
P.O. Box 0994
Midland, MI 48686-0997
989-496-6000

General Electric Co.
260 Hudson River Road
Waterford, NY 12188
800-332-3390

IPS Corporation
455 W. Victoria Street
Compton, CA 90220
800-898-3300 / 310-898-3300
Fax: 310-898-3392

Lord Corporation
Industrial Adhesives Division
2000 West Grandview Blvd.
P.O. Box 10038
Erie, PA 16509
814-868-3611

Pecora Corp.
165 Wambold Road
Harleysville, PA 19438
800-523-6688

Rhodia
259 Prospect Plains Rd.
Cranbury, NJ 08512-CN7500
609-860-4000
800-634-5705

Schnee Morehead Inc.
111 North Nursery Road
Irving, TX 75060
1-800-TRUST SM
972-438-9111
Fax: 972-554-3939

Sika Corporation
201 Polito Ave.
Lyndhurst, NJ 07071
201-933-8800

Tremco Corp.
3735 Green Road
Beachwood, OH 44122
216-292-5000

K. Screen Print Inks

Naz-Dar
925 Roselawn Ave.
Toronto, ON M6B1B7
Canada
416-789-5111

Naz-Dar
8501 Hedge Lane Terrace
Shawnee, KS 66227
913-422-1888

Sericol
1101 West Cambridge Circle Drive
Kansas City, KS 66110
913-342-4060

L. Tapes

3M
Industrial Tape and Specialties Div.
900 Bush Avenue
St. Paul, MN 55144
800-362-3550

Avery Dennison
Specialty Tape Division
250 Chester Street
Painesville, OH 44077
440-639-2600

Mactac
Technical Products Division
4560 Darrow Road
Stow, OH 44224-1898
800-401-5005

Saint Gobain
Performance Plastics Corp.
One Sealants Park
Granville, NY 12832
800-724-0883
518-642-2200