Alubond U.S.A
Fire Rated Metal Composites

PROCESSING AND TECHNICAL DATA FRA2

World's largest metal composite brand

Alubond U.S.A is the world's largest brand of Aluminum Composite Panels with a production capacity of 20 million square meters per annum and the global production bases in UAE, Europe, India,, China, Africa and Saudi Arabia. Alubond U.S.A aluminum composite panels have been installed in more than 90 countries worldwide, and are a distinguishing feature of iconic buildings around the world. Alubond U.S.A is the preferred option of reputed international architects in more than 90 countries of exterior facades of landmark projects.

Alubond U.S.A. Is a global leader in a variety of cladding applications – Interiors, Exteriors and Corporate Identity applications, Cladding substructure solutions and Solar power systems; with products like Alubond U.S.A. Fire Rated, Alubond U.S.A. Green, Alubond U.S.A. Nano Premium, Alubond U.S.A. Stainless Steel, Alubond U.S.A. Titanium, Alubond U.S.A. Lite, Alubond U.S.A. Interior Mirrors, ABTI Open Groove and Mechanical Systems, Alubond U.S.A. Parabolic Troughs and Photovoltaic System Boosters. The strong R&D efforts have resulted in the development of new patented technologies for innovative applications in Acoustics, Solar and BIPV Market Segments.

Content

STORAGE /HANDLING

- The pallets must be handled carefully during transport and unloading. (Caution: Do not handle open pallets).
- Do not accept if the pallets are received in open condition, If damaged condition, then independent surveyor must be called and inspected for claims
- On Arrival of cargo please check if the cargo has arrived in good condition. In case the goods have arrived in wet condition, the packing needs to be wrapped immediately to avoid further damage due to dampness. If found wet, the sheet need to be left to dry on its own. The sheets should be handled only once it is fully dried up.

Packing of Alubond USA

- Upon arrival, the sheets should be completely protected from moisture during storage. The sheets should not be stored in wet/moist conditions be it in indoor or outdoor.
- While opening the packages, if any moisture /water particles are present in between the sheet surface, then wipe with dry cotton sponges/clothes to remove that. Once again the sheets need to left open to dry.
- Store the pallets stacked one over the other with a maximum 4 Pallets of the same format stacked on top of each order.
- The Pallets should be stored only on flat surface in horizontal condition. Longer specification sheets should be stored at bottom.
- Individual pallets must be lifted off the pallet by two people holding all four corners and not dragged over each other. Carry the panels vertically. wear gloves to avoid staining
- No foreign particles should be there in between sheets while storage as this would leave scratches /mark on the sheet surface
- In order to avoid the processing failures strictly follow the Alubond Fabrication Instructions Manual
- If the sheets are exposed the wet conditions for a longer period (Eg: more than 24 Hours) therefore the water penetrating to the core of the panel, then the product warranty will not be applicable.

The following should be observed with respect to the ALUBOND USA FR A2® protective film:

Protective Film of Alubond USA

- Storage exceeding 6 months should be avoided.
- Please make sure the protective film stays intact during transit or while handling the sheets. If the protective film is torn area of the sheet exposed could accumulate dirt/dust further damaging the panels. In order to avoid that manually stick the protective film & aluminum composite sheet edges together using high adhesion package tape. In case of an unlikely situation of protective film received totally damaged condition , please contact our technical team immediately for solution
- Do not mark the protective film with ink (markers), tape labels, Solvent or plastic material it can affect the surface of the material.
- Due to mishandling the protective film partially can come off during processing or after assembly, broken edges can occur in the course Of time, which may be difficult to remove
- Remove protective film as soon as possible after Installation.

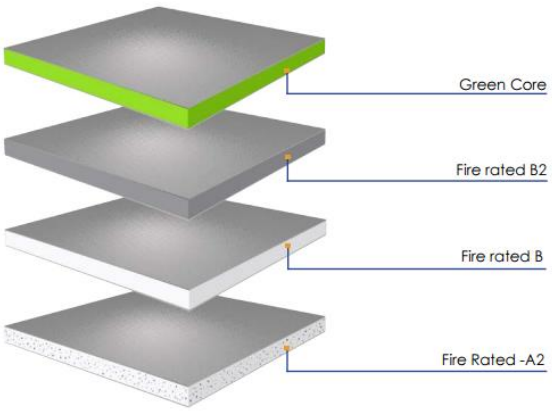
PANEL DIMENSIONING

When it comes to know the exact dimensions of the panel the under given should be kept in mind:

Dimensional tolerances
Thickness ± 0.2 mm
Width ± 2 mm
Length ± 4 mm

When cutting and routing, the thermal expansion in length of **ALUBOND** must be taken into account/notice to ensure the dimensional accuracy of the components during assembly. So that it fits perfectly. It is recommended that prior to processing the panels should be stored at room temperature for at least one day.

Trimming and Panel Edges

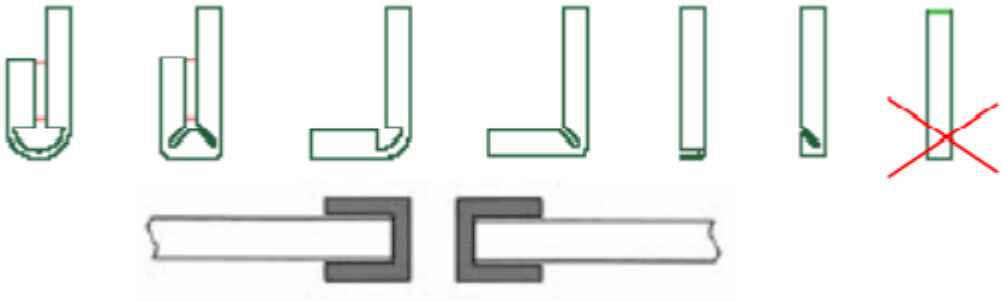


The panels have to be trimmed from all sides to ensure that it is accurately in shape of rectangular and precisely cut edges are given. The sides should be ensure and checked properly so that further processing can be done. The trimming cuts must be taken into account when dimensioning the panel. Due to the manufacturing process lateral displacement of the cover sheets of max. 2mm is possible at the panel edges.

OPEN EDGE PROTECTION

Note: Perforation and edges open to atmosphere is not recommended in ALUBOND USA FR-A2 panels due to the characteristic water permeability of the fire retardant core.

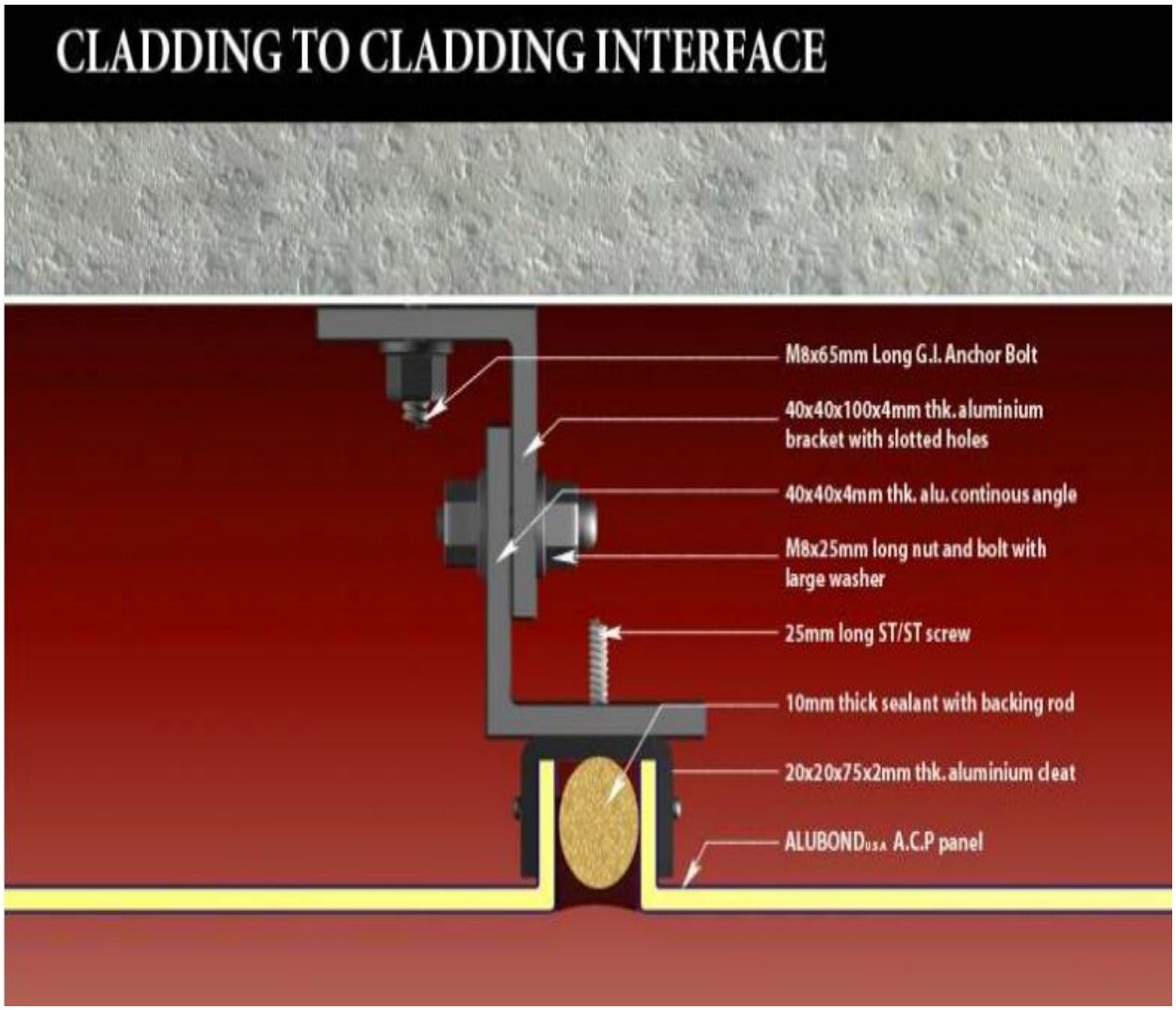
It is strongly advised to protect the edges by folding them as per below drawn recommendations or by covering the edges with suitable aluminum or rubber profiles/gaskets.

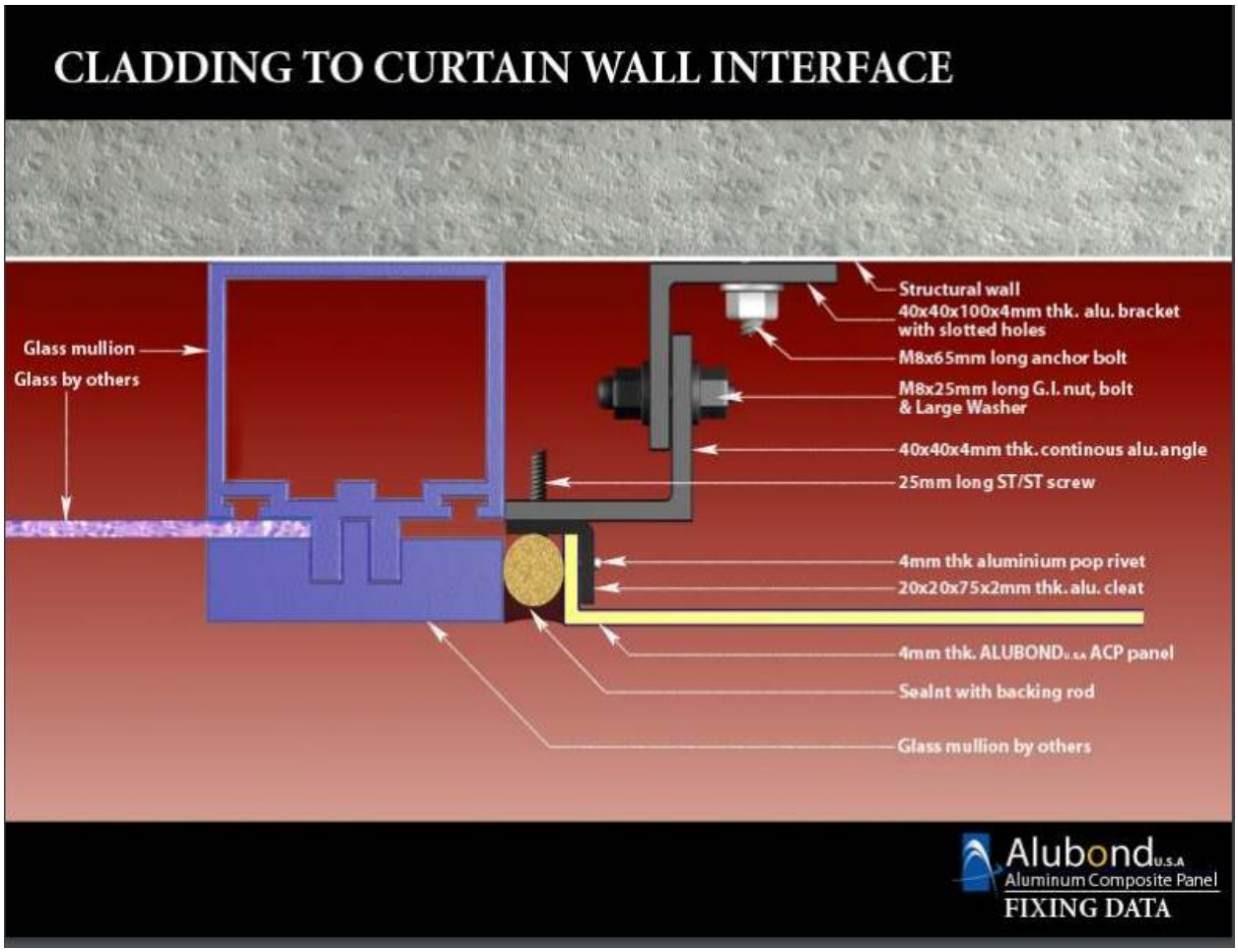


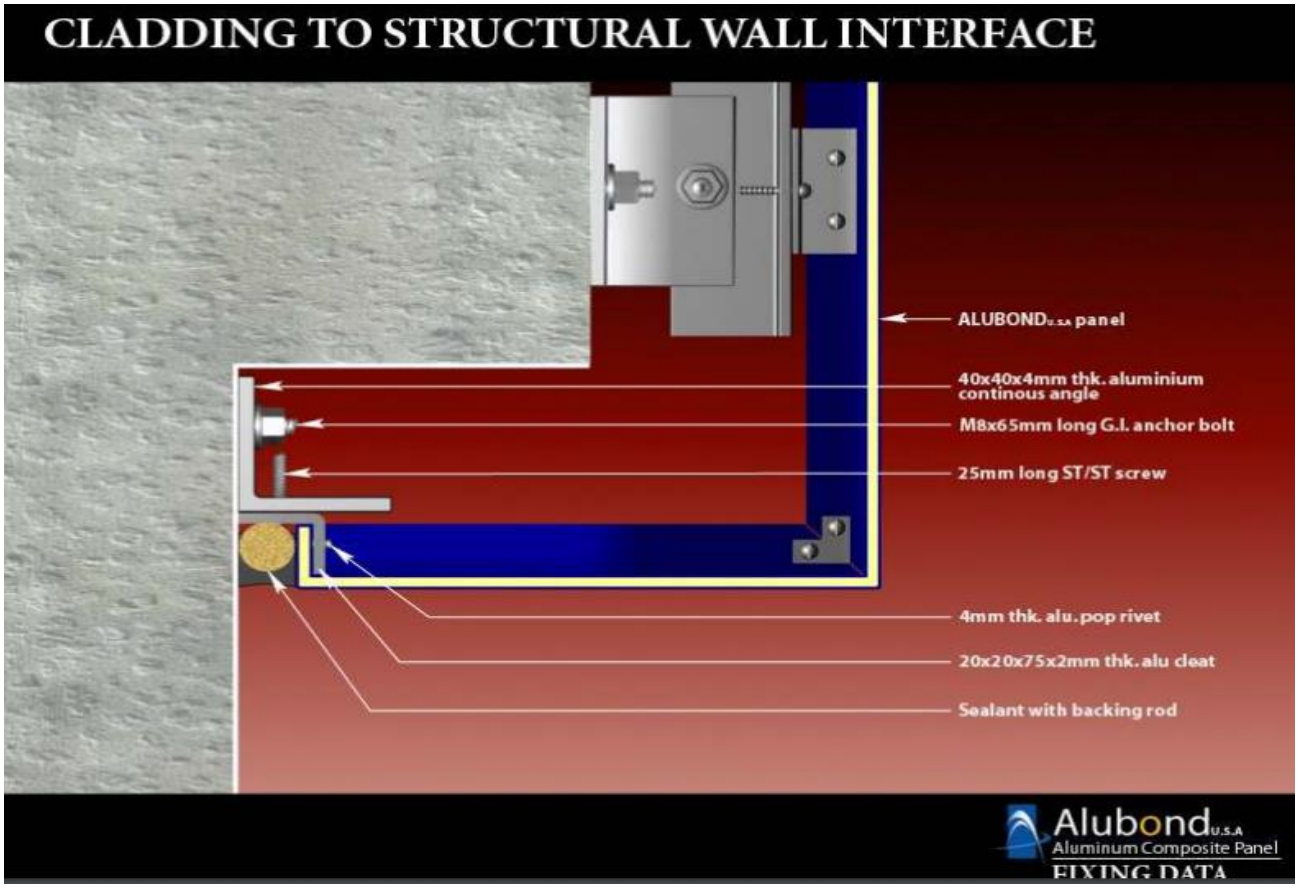
PANEL INSTALLTION METHODS

WHEN INSTALLING THE PANELS, THE FOLLOWING SHOULD BE NOTED

To avoid possible reflection differences (for metallic, Solid, Metallic, and Special colours), we recommend that the composite panels should be installed in the same direction as marked on the protective film.




CLADDING TO CURTAIN WALL INTERFACE
Glass mullion
Glass by others
Structural wall
40x40x100x4mm thk. alu. bracket with slotted holes
M8x65mm long anchor bolt
M8x25mm long G.I. nut, bolt & Large Washer
40x40x4mm thk. continous alu. angle
25mm long ST/ST screw
4mm thk aluminium pop rivet
20x20x75x2mm thk. alu. cleat
4mm thk. ALUBOND U.S.A ACP panel
Sealnt with backing rod
Glass mullion by others
Alubond U.S.A
Aluminum Composite Panel
FIXING DATA


CLADDING TO STRUCTURAL WALL INTERFACE
ALUBOND U.S.A panel
40x40x4mm thk. aluminium continous angle
M8x65mm long G.I. anchor bolt
25mm long ST/ST screw
4mm thk. alu. pop rivet
20x20x75x2mm thk. alu cleat
Sealant with backing rod
Alubond U.S.A
Aluminum Composite Panel
FIXING DATA

- **Fixing elements without jamming**
- The minimum gap depends on the expected expansion of the panel
- Larger hole diameters in the panel must be taken into account when fixing the panel with screws and rivets
- Holes in the panel and in the substructure must be drilled centrically (use drilling jigs)
- Distance between panel and rivet head 0.3 mm
- Be careful not to over-tighten the screws on the panel
- Arrange the butt joints of the supporting sections at the panel joints to avoid jamming due to opposing thermal expansion
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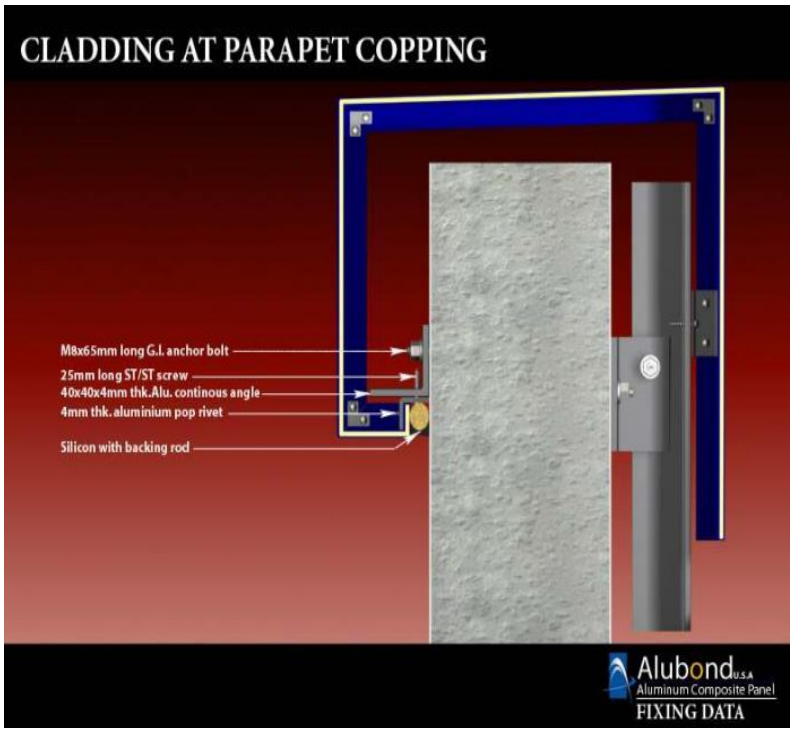

- For fixing the supporting sections, pay attention to fixed point holders (FP) and sliding point holders (SP).
- Joints in the substructure must be taken into account when fixing facade elements. They must not be skipped, i.e. the façade elements must not be fixed to the lower or upper supporting section! Butt joint of supporting section = panel joint
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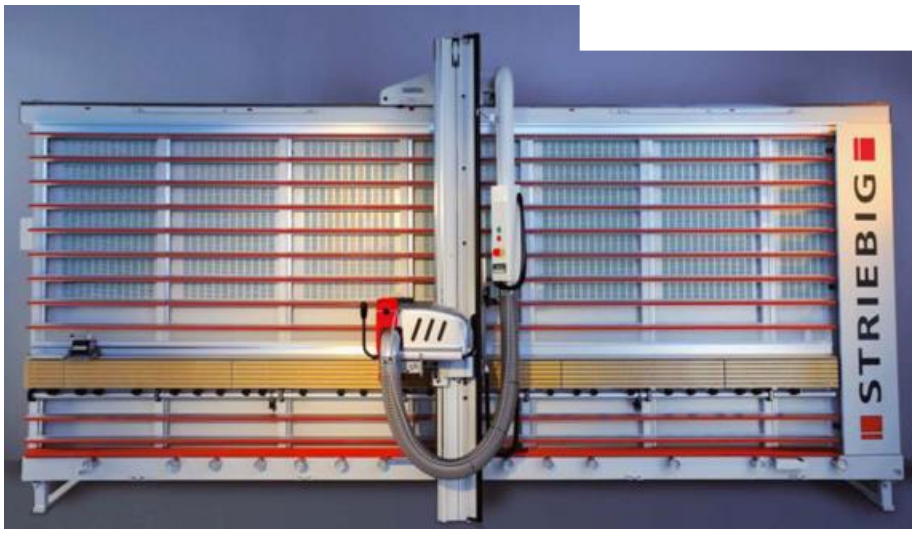
PROCESSING

Sawing & Routing

➢ SAWING WITH VERTICAL PANEL SAWS

- **Holz-Her vertical panel saws with routing device**
- When purchasing a new system was commend the following panel saw:
-
- **Please pay attention:** saw blade–Ø250mm
- **Retrofitting existing machines**
- Since 1993 Striebig saws have been equipped with dustproof bearings. On older machines, a dustproof tracing roller bearing flange must be provided for. Owing to the speed regulation from 4,800 to 2,400 rpm, retrofitting to a 2-speed, pole-changing saw motor will be required.



- SAWING WITH VERTICAL PANEL SAW – HOLZ – HER VERTICAL PANEL SAWS WITH ROUTING DEVICE

Please pay attention: sawblade–Ø300mm

RETRO FITTING EXISTING MACHINES

Since1993 Strie big saw shave been equipped with dust proof bearings. On older machines, a dust proof tracing roller bearing flange must be provided for. Owing to the speed regulation from 4,800 to 2,400 rpm, retro fitting to a 2-speed, pole-changing saw motor will be required.

DUST EXTRACTOR SYSTEMS FOR CIRCULAR PANEL SAWS

Were commend a dust extractor with filter shaker for sawing and milling

ALUBOND USA® FRA2

For example: **AL-KO POWER UNIT 200P/250P** for ALUBOND USA® FRA2 and **SCHUKOV acomat 200XP** (mobile system) with special equipment for

ALUBOND USA®FRA2

➢ SAW BLADE FOR CIRCULAR PANEL SAWS

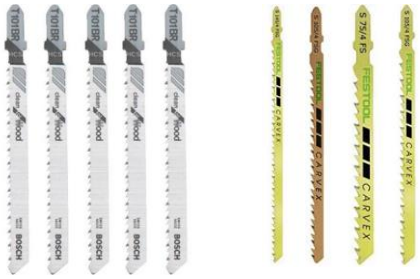
- Saw blades for ALUBOND USA A2
- carbide tipped circular saw blades, trapezoid/flat tooth
- flat teeth 45° chamfered for burr-free edges
- saw blade – Ø = 300 mm for Striebig saw, type Standard II
- t = 72 (for stack cutting),
- t = 96 (for neat single cuts),
- saw blade – Ø = 250 mm for Holz-Her saw,
- t = 60 (for stack cutting),
- t = 80 (for neat single cuts),

- bore – Ø = 30 mm - tooth thickness 3.2 mm
- clearance angle 15°- rake angle 10° positive
- speed 5,000 rpm

Sawing

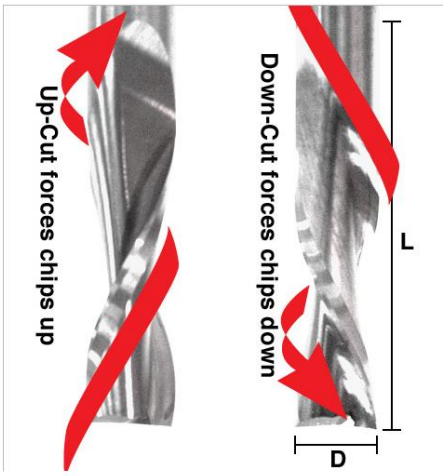
Carbide tipped (CT) saw blades	
Blade geometry	Tooth thickness approx. 2 – 4 mm, tapered to the inside to prevent jamming.
Tooth geometry	trapeze tooth / flat tooth
Pitch t	10 – 12mm
Clearance angle (x)	15 °
Rake angle g (y)	10 ° positive
Maximum cutting speed v	5000 m/min
Maximum feed s	30 m/min
Carbide tipped (CT) saw blades for HOLZHER and Striebig circular panel saws	
Trapezoid/flat tooth saw blade, flat teeth 45° chamfered for burr free edges	
Saw blade dia.	D = 300mm (for Striebig vertical panel saw Standard II)
Number of teeth	t = 72 (for cuts of up to 5 panels) t = 96 (for single cuts without burrs)
Saw blade dia.	D = 250mm
Number of teeth	t = 60 (for cuts up to 5 panels) t = 80 (for cuts without burrs)
Bore dia.	D = 30mm
Tooth thickness	3.2mm
Clearance angle	15°
Rake angle	10° positive

Sawing with Jig Saws



Jig saw blades for wood or plastics, e.g. T101 B (Bosch), tooth thickness 2.5 mm for precision cuts. Image (1)

ROUTING



Up-Cut vs Down-Cut Geometry (Courtesy Eagle America)

ALUBOND USA FR A2 can be routed on conventional routing machines and CNC machining centres. To avoid pressure marks on the surface, please use plastic or wood vice jaws when chucking the work-pieces. Preferably use vacuum tables with MDF boards as sacrificial boards.

Carbide tipped cutters suitable for aluminium and plastics are also suitable for ALUBOND USA. Perfect cuts are produced, e.g. under the following conditions: feed 3-5 m/min., speed 18-24,000 rpm.

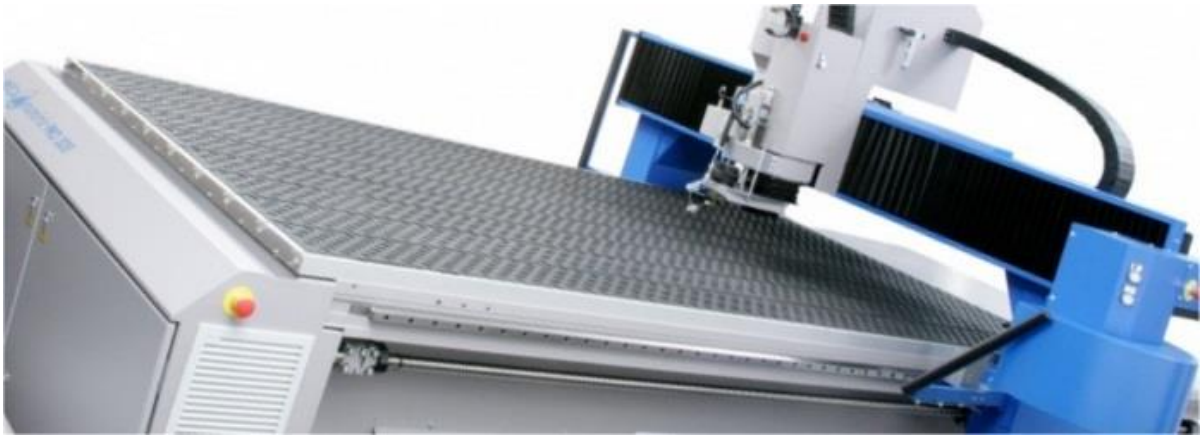
PUNCHING/SHEARING

Punching

ALUBOND USA panels of any thickness can be punched using conventional sheet metal punching machines. For clean cut sharp tools and dies with minimal cutting clearance (0.1mm). This cutting process will cause a slight deflection of the cover sheet.

Multi- station machines

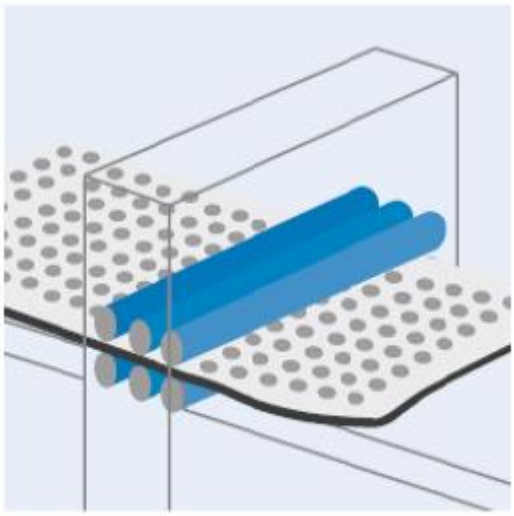
Series punching of, for example, tray panel scan be realized efficiently using multi-station machines.



Shearing

ALUBOND USA FR A2 can be sheared with a conventional guillotine. A shearing angle of ≤ 1,5° and minimum clearance (paper test) are the prerequisites for the best possible quality of the cut.

To prevent damage to the cover sheet, it is appropriate to provide the down-holders of the guillotine with protective rubber pads.



Leveler

SHAPING

ALUBOND can be formed by conventional metal and plastic fabrication methods. Certain specific points should be noted relating to the multilayer structure combining materials of different characteristics:

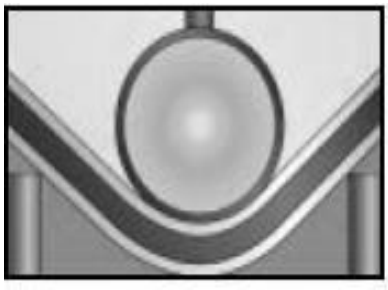
Brake Press Bending

With folding machine or bending Press, min. inner radius for ALUBOND U.S.A STD and ALUBOND U.S.A FR-B is r = 50 x t , as for ALUBOND U.S.A FR-A2 inner radius would be min. r = 125 x t (t = panel thickness) return travel greater than with solid sheet.

At the time of bending application, top painted surface may found with hazing affect. The application acceptance between installer and client.

The spring-back effect experienced when folding Sheet metal is larger with ALUBOND. For production series a prototype should be made. The surface should be protected from damage by affixing plastic film or inserting polyethylene of 1 – 2 mm thickness plastic film strips during processing.

ALUBOND U.S.A, like sheet metal, is easily formed with a brake press. The air-bending process is used when forming with a brake press. The ALUBOND panel rests on the edges of the die (rails, channels) and is bent by the punch (tube or shaft). The bending angle is determined by the width of the die and the stroke of the punch. The die edges should be rounded and smooth. Ideal die width:
2 x t + 2 x protective foil thickness + punch diameter + 15mm
The minimum side length of the bent part should be 5 times the ALUBOND® thickness



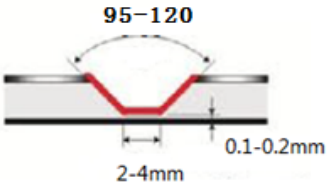
Roll bending

ALUBOND can be bent with sheet metal roll bending machines – mainly with three and four-roll machines. Again, ALUBOND U.S.A FR-A2 inner radius should be min. r = 125 x t (t = panel thickness) Please make sure that the feeder does not exert too much pressure. Bending rolls which are also used for bending other metals must be thoroughly cleaned from swarf before processing ALUBOND. We recommend ground rolls to avoid damaging the cover s

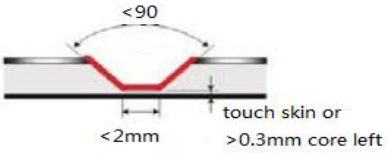
Routing and folding technique for individual shaping and design

Method

ALUBOND USA FR A2 composite panels can be shaped by means of a simple processing technique. This procedure, the routing and folding technique, enables a variety of shapes and sizes to be manufactured. V-shaped or rectangular grooves are routed on the rear of the panels with disk or end milling cutters, whereby the aluminum cover sheet at the front and part of the k core are retained. The small thickness of the remaining material then allows folding by hand. A folding machine is not required. The groove shape determines the radius of the bend. The grooves can be produced with both a panel saw with routing device for ALUBOND USA FR A2, on a CNC machining centre, with a panel routing machine or a hand routing machine. The routing and folding technique can be used for composite panels of all standard surfaces.



Right: open angle bigger, Min core left



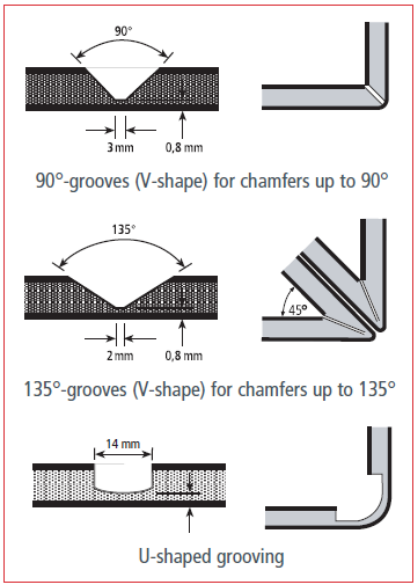
wrong: open angle small, many core left

Advantages

The convincing advantages of the routing and folding technique are:

- Minimum investment
- Simple operating technique
- Folding need not be done in the workshop, it can be done on site; this mean slow transport costs.
- Low-cost manufacturing of pre - shaped decorative elements, advertising boards, large sign boards.
- Versatile formability
- Good economy
- Shapes are not restricted by machine dimensions.
- It has tension - free folding, therefore `no buckling is there in the corner area and thus even elements.

Important: *With ALUBOND USA with Anodized serious surface, the formation of micro-cracks leads to brightening in the edges.*



Routing and folding technique

MACHINES FOR ROUTING AND FOLDING TECHNIQUE

Vertical panels saw with routing device for routing ALUBOND USA® (Special accessory)

Striebig Vertical panel saw
Standard II for composite panels

Manufacturers / suppliers:
Reich Spezialmaschinen GmbH
Plochinger Straße 65
D-72622 Nürtingen
Phone +4970 22702–0
www.holzher.de
Striebig AG Maschinenbau
Großmatte 26a
CH-6014 Littau
Phone +4141 29 53 53
www.striebig.ch

Other panel saws with a special routing device canals which are supplied or retro fitted by the manufacturer. If necessary, the frame has to be adjusted / raised.

For queries relating to:

- New machines with accessory parts for routing ALUBOND USA®
- Possible retro fitting of existing machines (stating machine type /No. and year of construction)
- Accessories such as cutter disks, tracing rollers, etc. Please contact the manufacturer of the panel saws.
- Tracing rollers: Makes uretous etracing rollers with dust proof bearings.
- Speed 2,400 rpm (=½ speed with panels saw of Striebig and Holz-Her)
- Feed max. 20 m/min. Pay attention to a constant feed.
- Routing of rectangular groove not possible.

Please Note: For inquiries and orders, please add “for processing ALUBOND USA FR A2 composite panels”. General information regarding the routing and folding technique

Processing temperature: During folding, the ambient and material temperature should not be below 16°C

CNC machining centers

Series production of ALUBOND USA FRA2 components can be carried out very economically on CNC machining centers. Depending on the equipment of the machines, various processing steps can be performed: sawing, milling (routing and folding), contour cutting, drilling.

MACHINES FOR ROUTING AND FOLDING TECHNIQUE

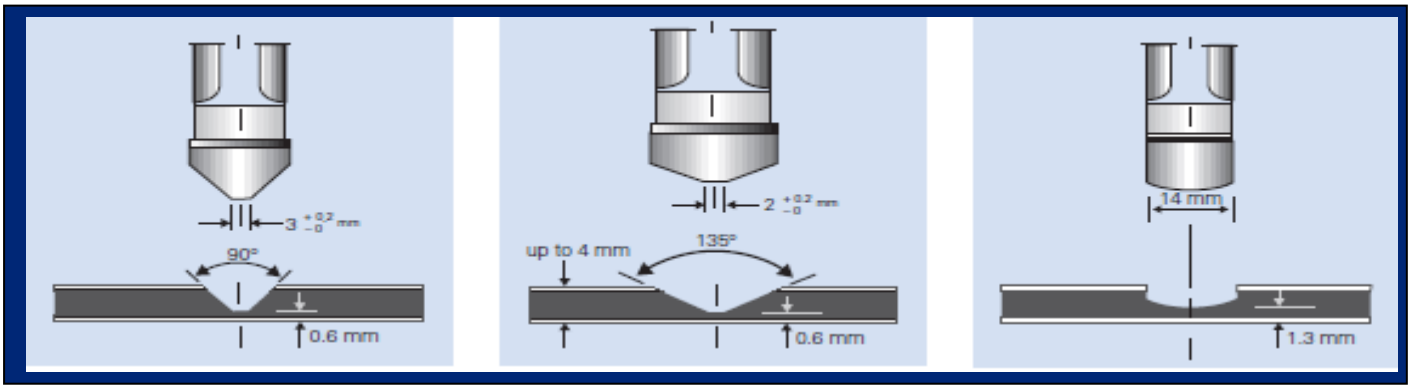
Fes tool panel routing machinePF1200 E- Plus ALUBOND USA®

Supplied with:

- Tracing roller for 4 mm
- Cutter disk for V- grooves 90°
- Adjustment template
- Transport box

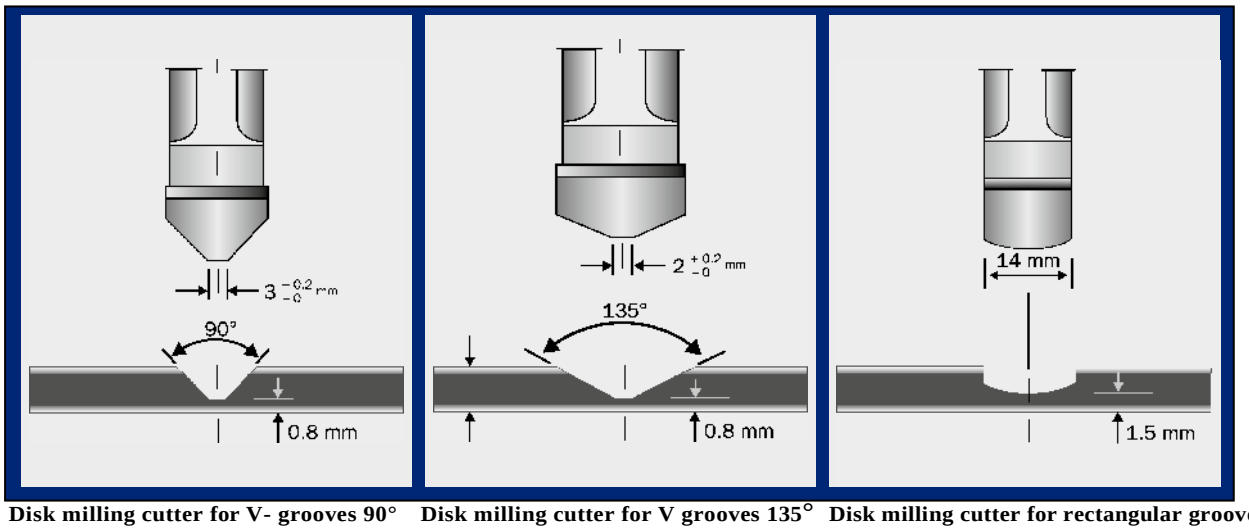
Hand routing machines

Commercially available hand routing machines with minimum rating of 800 W are suitable.



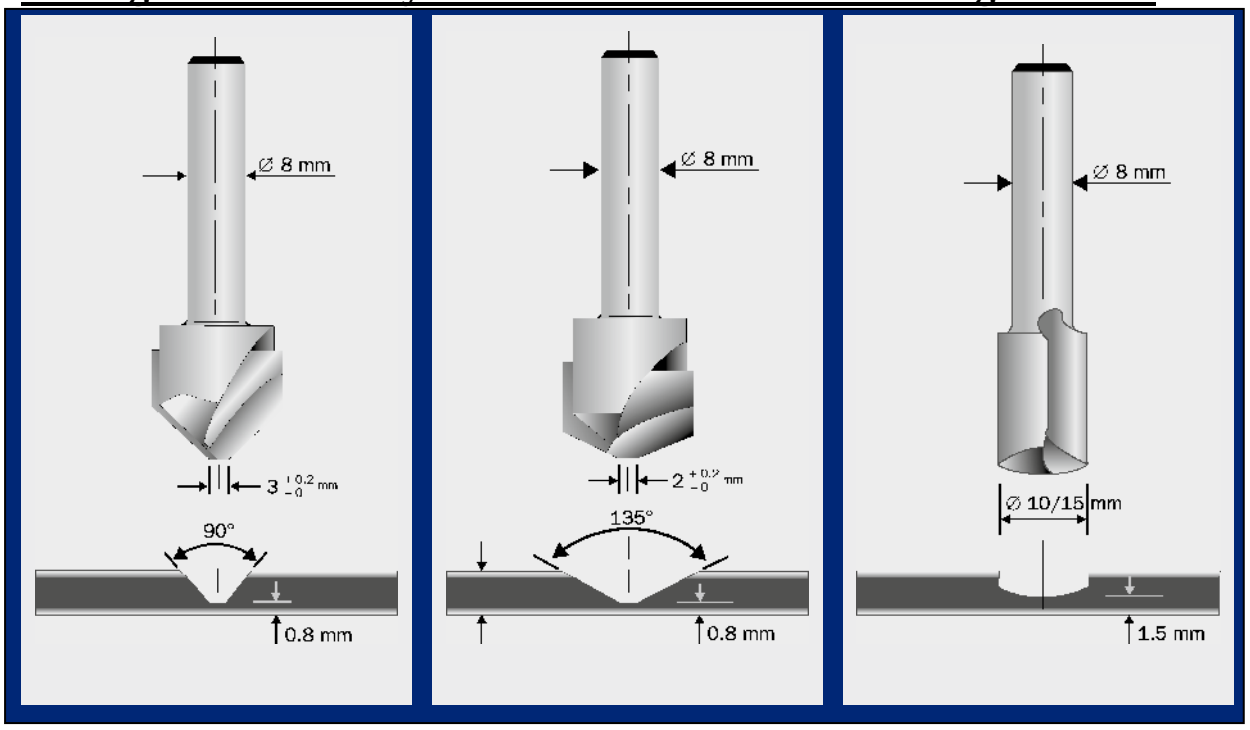
Disk milling cutter for V-grooves 90 ° rectangular	Disk milling cutter for V-grooves 135 °	Disk milling cutter for Grooves
The diameters of tracing rollers and cutter disks are adjusted so as to leave a residual core thickness of 0.3 mm (V-groove) or 1mm (rectangular groove). The dimensions given in the drawings show the cover panel thickness of 0.3 mm plus the corresponding residual core thickness.	Please address all enquiries relating to • New machines with accessory parts for milling of ALUBOND USA ® • Possible retrofitting of existing machines (stating machine type/No. and year of construction) • Accessories such as cutter disks, tracing rollers, etc. directly to the manufacturer of the panel saws.	**Important:** Please state the following in your enquiry or order “for processing ALUBOND® composite panels”.

Carbide tipped disk milling cutters for vertical panel saws



Disk milling cutter for V- grooves 90° **Disk milling cutter for V grooves 135°** **Disk milling cutter for rectangular grooves**

Milling cutters with cylindrical shank for hand routing machine



Milling cutter for V-grooves 90° Carbide tipped cutter No. 491444 (Festool) Carbide tipped cutter no. FV 09.01.090(GIS) Carbide tipped Cutter	Milling cutter for V-grooves 135° Carbide tipped cutter No. 491443(Festool) Carbide tipped cutter no. FV 09.01.135 (GIS)Carbide tipped cutter	Milling cutter for rectangular grooves HSS cutter Ø10mm (KWO) HSS cutter Ø15mm

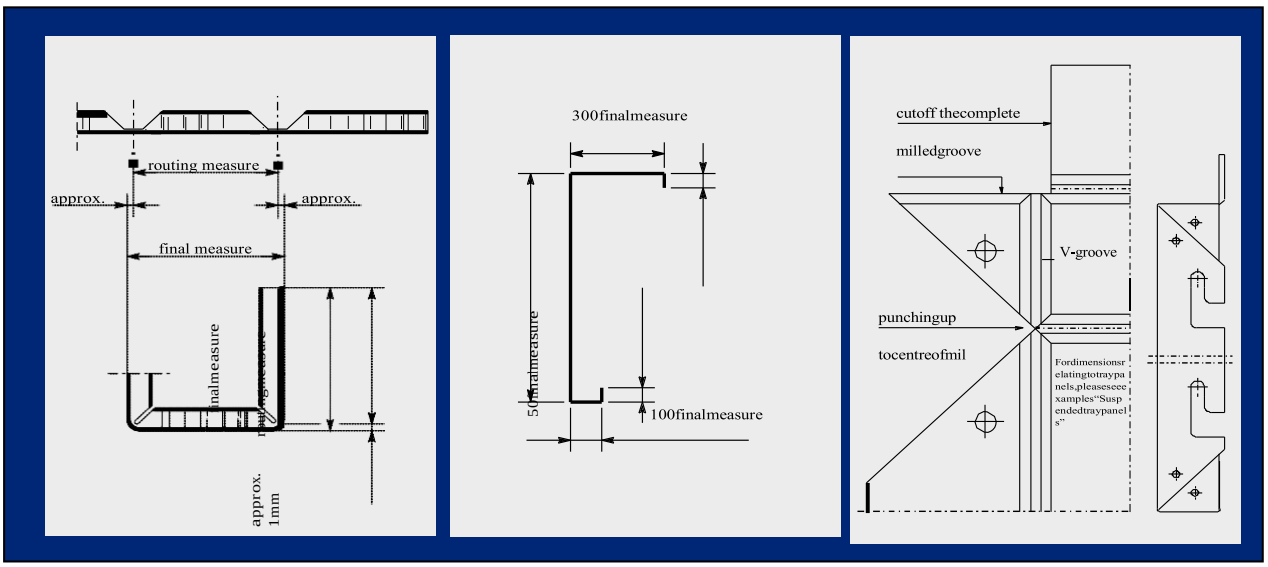
FABRICATION OF TRAY PANELS

Determination of the measures of periphery and routing measures The measures of periphery and the routing measures are determined on the basis of the drawing measures (final measures). In this case, approx. 1 mm per edge is deducted from thefinalmeasure.Thetotaloftheroutingmeasuresresultsinthecuttingmeasure.Inanycase,thefinalmeasuresshouldbecheckedusingateststrippriortoseriesproduction.Thenthelimitstopsofthepanelsawcanbeadjustedtoobtainelementsofidenticalsizes.

Determination of the cutting measure

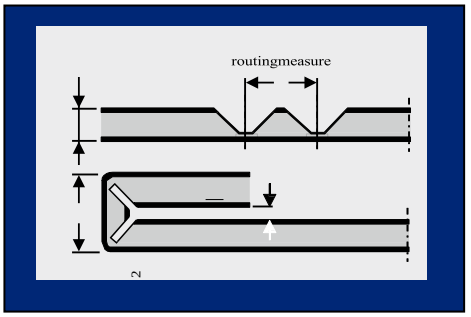
Example ALUBOND USA roof edge:

Total of routing measures = cutting measure = 1292mm



Determination of the routing measure

Adjustment of punch depth



Adjustment of the punching depth when punching corners

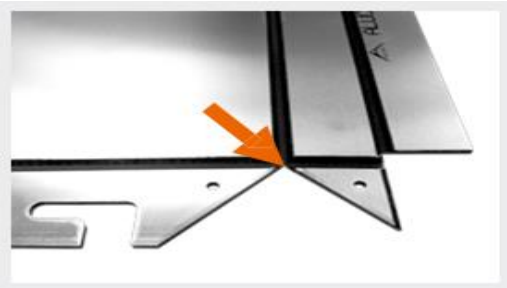
In order to obtain perfectly closed tray corners, them a chine settings indicated in the sketch must be observed.

For clean cuts use sharp tools and dies with minimal cutting clearance (~0.1mm).

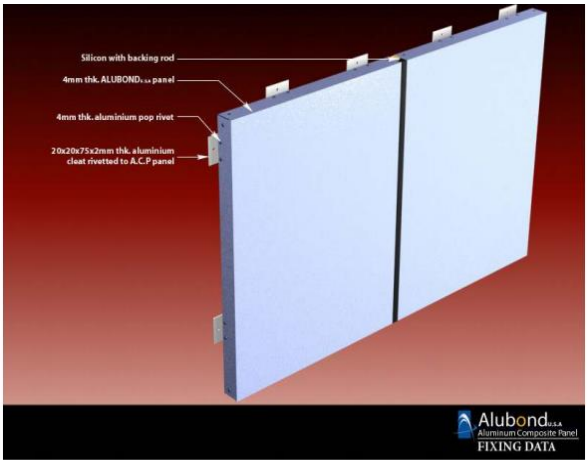
Bending aids

For easy folding of ALUBOND USA®, particularly in the case of narrow folds processed according to the routing and folding technique, were commend bending aids that can be produced of ALUBOND USA butt joint sections and panel strips.

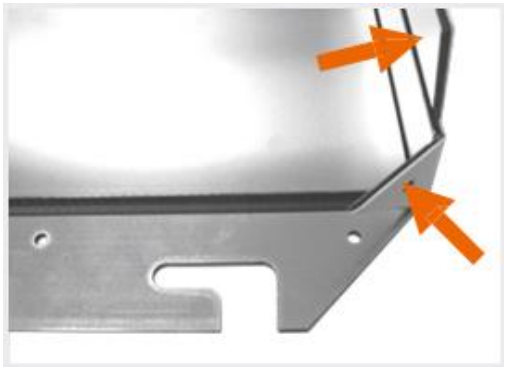
Folding sequence for fabricating tray panels



(1)Cut V-grooves according to the above instructions



(2) Fold the narrow side more tn 90°



(4)Folding the upper edges

Owing to the pre-stressing when folding more than 90°, the two edges of the V-grooves fit tight.

(3)Fold back to a little more than 90° and slightly fold the triangle

JOINTING/FIXING TECHNIQUE

Riveting

General

ALUBOND FR A2 could be drilled by normal drill bit which services for Al or metal.

Material of drill：high speed steel（HSS）

Technical date of drill: weapon corner:100-140

Speed：100-300rpm

Feed speed：0.02-0.5mm/one rotation

During the drilling, need move debris, especially the debris of core quickly. This requires a high rotational speed, low feed speed and raising the drill bit occasionally to blow away the debris by compress air.

Important: The protective film should principally be removed in the area of the rivet or screw head prior to riveting or screwing.

For outdoor use please note:

• For outdoor use aluminum blind rivets with a 5 mm shaft diameter and an attachment head diameter of 11 or 14 mm are used.

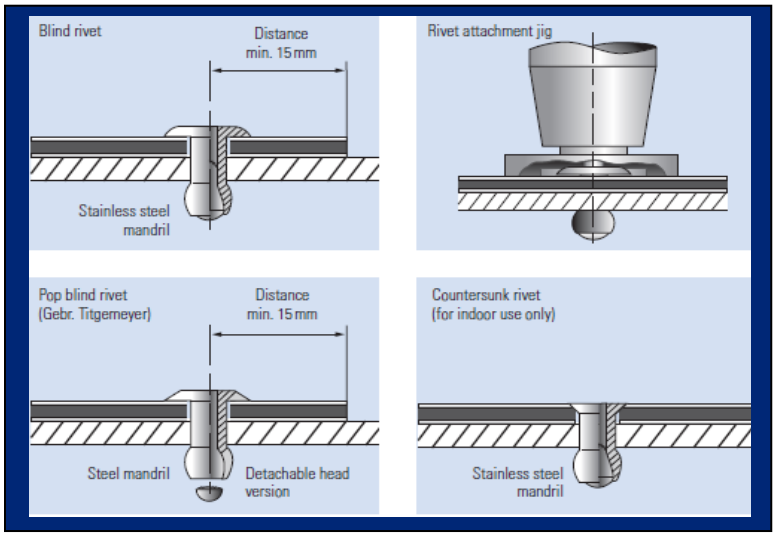
• Please take the thermal expansion of the panel into account (2.4 mm/m/100°C). To avoid jamming, the hole in the panel must be large enough to allow for expansion.

• With the shaft of the rivet fitting closely to the edge of the hole, the attachment head must cover over 1 mm of the area surrounding the hole.

• Multi-step drills or sleeves having corresponding diameters are used for centrically drilling holes into the panel and the substructure and for centrically fitting the rivet.

• Rivet attachment jigs are used for fitting blind rivets without jamming allowing for a tolerance of 0.3 mm. Make sure to use rivet attachment jigs and rivets from the same manufacturer, as the height of the attachment head according to DIN 7337 may vary.

• The clamping thickness results from the thickness of the material to be riveted plus an additional value of 2 mm to ensure that the



closing head is perfectly formed.

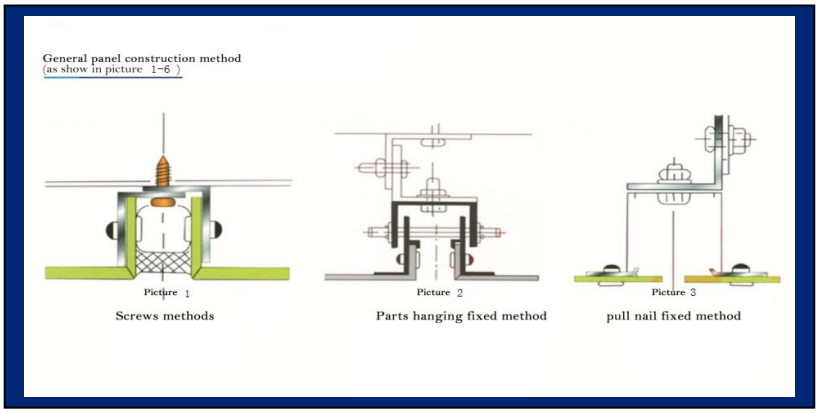
Important please note:

- Since during riveting many factors may have an influence on the exact tolerance of the rivets of 0.3 mm (e.g. rivet head tolerance), we recommend that you make a test on a panel. Please always remove the protective foil in the riveting area prior to riveting.
- If the flat sheets of ALUBOND U.S.A FR-A2 are mounted by rivets, screws or gluing method, It is necessary to protect the edges by folding or protecting them as per recommendations given on page 6 of this document for the warranty to be valid.

Threaded fasteners

Threaded fasteners for outdoor use

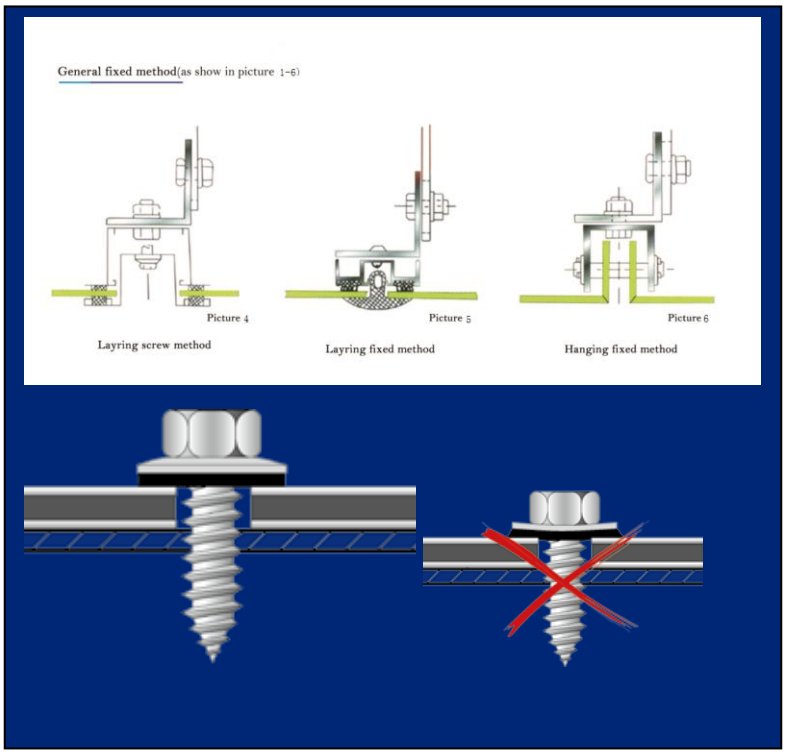
Please take the thermal expansion of the panel into account when using threaded fasteners outdoors. To avoid jamming, the whole diameter in the panel must allow for the expansion. Fastening without jamming is possible with fascia screws made of stainless steel with sealing washer. (Please refer to figure 1.) .The screws must be suitable for the corresponding substructure (please note the information given by the manufacturer). The screws should be tightened with a torque wrench or screwdriver so that the sealing washer is placed on the panel for sealing the bore hole without exerting pressure onto the panel. Multi-step drills or sleeves having corresponding diameters are used for centrically drilling holes into the panel and the substructure and for centrically fitting the rivet.



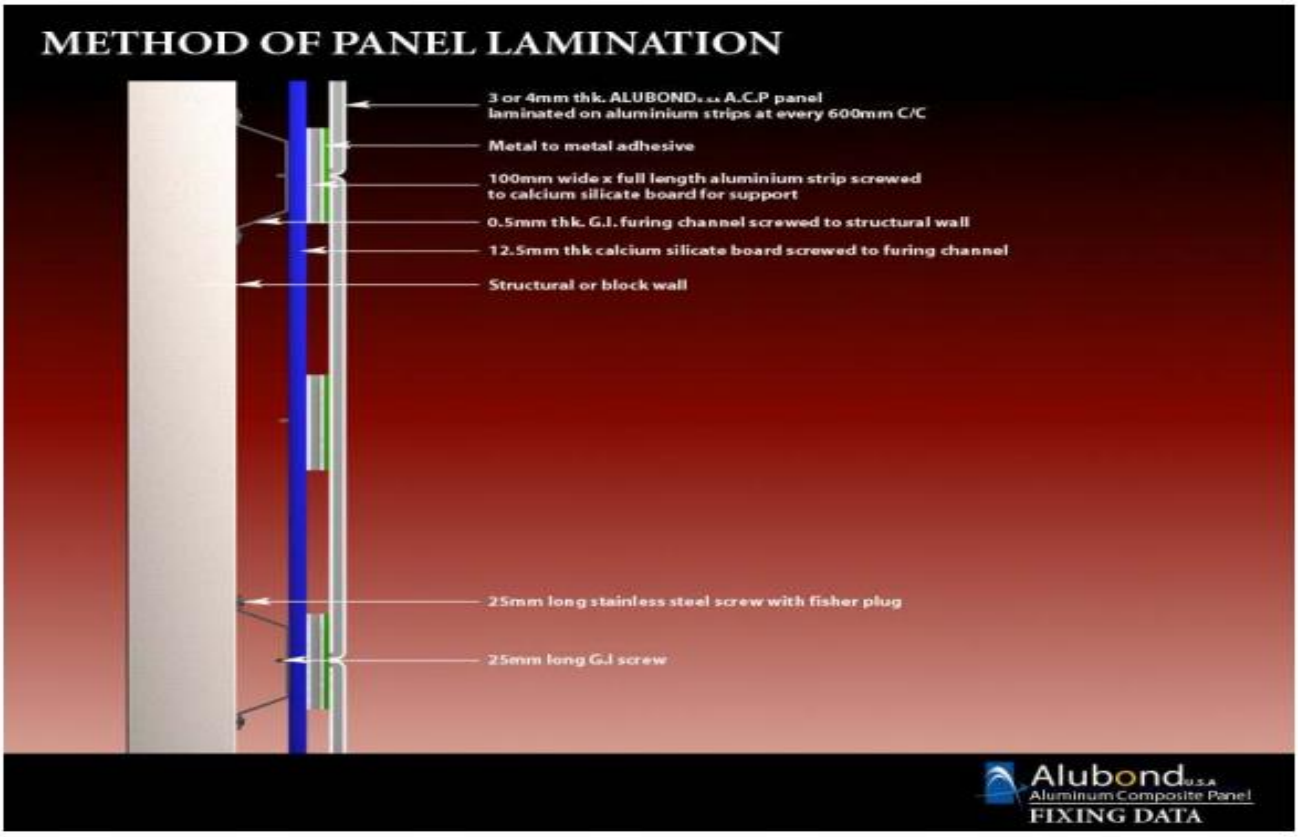
Important:
Make sure to remove protective foil before screwing.

Threaded fasteners for indoor use

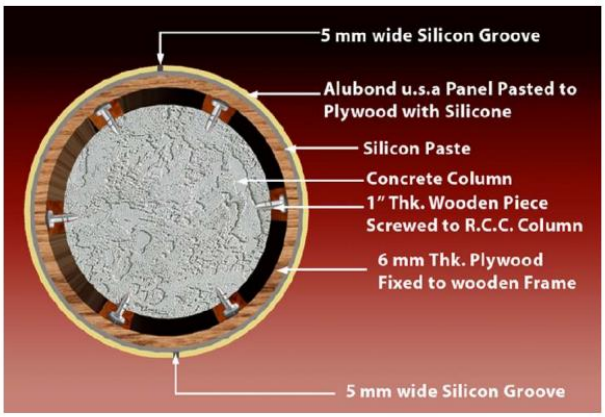
Screws for sheet metal and wood with different head-shapes are suitable for indoor use (Please refer to figure. 2). They do not normally allow for any panel expansion. Countersunk screws can be inserted by the usual countersinking method or by depressing the aluminum surface into the panel. When depressing the aluminum surface, the whole diameter in the panel must be larger than the screw diameter.



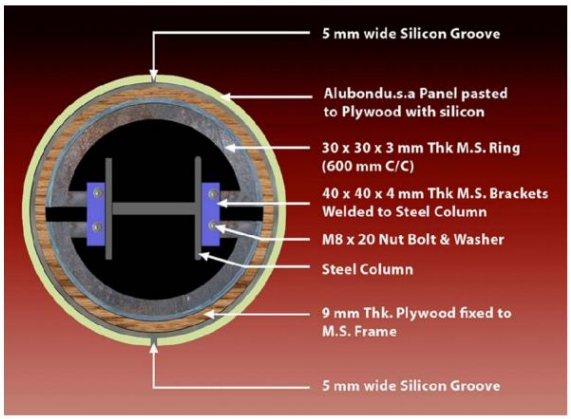
Panel Lamination



CONCRETE COLUMN LAMINATION



STEEL COLUMN LAMINATION



Cleaning and maintenance

Alubond U.S.A Cleaning Methods

Routine cleaning of the ACM surface is recommended. It may be washed with water and mild detergent, followed by a clean water rinse. The frequency with which cleaning is to carried out and the choice of suitable cleaning agent depends largely on the position of the building being cleaned and degree of contamination.

Do not clean sun-heated surfaces (above 400C) to avoid rapid drying which may lead to stain formation.

The cleaning operation must be followed by a through rinse with clean water to ensure the removal of all remnants of the cleansing agent. A final wipe down by means of a sponge, leather or wiper is necessary to avoid water stains.

The Alubond U.S.A. ACM is resistant to industrial atmospheres and is self-cleansing in most environments. As with all claddings, improvements in durability is achieved by an annual wash down with warm water so to avoid the build up of deposits. Often periodic maintenance is not carried out, and whilst this is not detrimental does not improve the product appreance. The Alubond U.S.A. ACM is more self-cleansing than many of the alternatives.

Scope

This manual is applied to the cleaning and maintenance procedures for the external cladding of the of the Alubond u.s.a. ACM panels on which Stove Lacquered based Fluorocarbon (PVDF), Polyester, and Acrylic paint are coated.

Purpose

The purpose of this chapter is to assist project people such as architects, contractors, building owners, et al., who are concerned with and / or engaged in the cleaning and maintenance of the external cladding of the Alubond u.s.a. ACM panels, especially in establishing safe and sound cleaning procedures.

General Notes

Not only Stove Lacquered based fluorocarbon coating but also precolor, polyester acrylic resin or normal organic coatings onto aluminum will not show an appreciable amount of dirt collection; however the dirt and soil depends largely on the local atmospheric conditions where the building exists.

In heavily industrialized area, coastal areas and the areas where construction works are being carried out, it might be necessary to increase the cleaning frequency, not only for the sake of appearance but also for the purpose of removing the dirt and soil likely to be detrimental to the coating surface.

Very often, rainfall is effective to remove dirt and to keep the external cladding clean. In areas of low rainfall, this effect may not be expected and accordingly the cleaning frequency might be increased. Even in the same building, portions which are in direct sight at lower levels might be cleaned more frequently, and less obvious portions might be cleaned less frequently, or in some instances, hardly at all. And in these areas, detrimental components might be deposited on the coated surface. These factors would determine the cleaning schedule.

In planning the actual cleaning schedule of the external cladding, the schedule might be adjusted with other cleaning operations for glass and painted aluminum components.

Clean Frequency

Cleaning will be required more often in the following areas in general:

- Areas of low rainfall
- Heavily industrialized areas
- The areas where construction works are being carried out
- Foggy costal regions with frequent cycles of condensation and dry

In foggy and coastal regions, frequent cycles of condensation and dry take place, and salty components and dirt tends to deposit. Especially, sheltered areas such as overhangs may be soiled easily because of lack of washing by rain.

Alubond U.S.A Cleaning Methods

Machine Cleaning

Once automatic wall cleaning machine is considered to be used, a pre-test should be done in the early stage of equipment design to confirm that there is no detrimental effect on the coating as well as to clarify the cleaning effect and frequency.

Cleaning Procedures

After project completion, construction soils including concrete or mortar, etc., should be removed as quickly as possible. In most cases, the following suggested frequency would be required to keep the coated surface clean as good as it can remain.

Building Situated	Wash Frequency
Rural area	0.5 times/Year
Urban area	0.5 1 times/Year
Low rainfall and /or coastal area	1 times/Year
Heavily industrialized area	1 2 times/Year

Prior To Cleaning

Removal of light surface soil in order to remove light soil, it is recommended to do some tests to determine the degree of cleaning actually necessary to accomplish the task. Prior to any cleaner application, a forceful water rinse from the top to down is recommended as an initial step to tests. The lower water volume with moderate pressure is much better than the considerable water volume with little pressure. When cleaner is applied, physical rubbing with soft sponges or soft rags fully dipped into the liquid solution is also helpful.

Soil Removal

The simplest procedure would be water rinse with moderate pressure to remove the soil. If this does not remove the soil, then a concurrent water spray with sponge should be tested. If the soil is still adhering after dry, then a mild detergent or 5 10% IPA (Isopropyl Alcohol) solution will be necessary.

Clean Detergents / Solutions

When a mild detergent or 5 10% IPA solution is used for removing soil, it should be used with soft sponges and / or soft rags. The washing should be done with uniform pressure, and normally the operation is done with a horizontal motion first and then with a vertical motion. After washing, the surface should be thoroughly rinsed with clean water, and the rinsed surface is air-dried or wiped with chamois, squeegee or lint-free cloth.

Operation Sequence

Dripping of cleaner to the lower portions of the building should be minimized. When some rundown is unavoidable, the areas should be rinsed as soon as possible, to eliminate streaking. Generally, the clean and rinse operations moves from top to bottom of the building.

Avoid drips and splashes during cleaning. Remove dripping as quickly as possible.

Note:

In case of one story or low elevation buildings, it is recommended to CLEAN FROM BOTTOM UP and RINSE FROM TOP DOWN.

Alubond U.S.A Aluminum Composite Panel

Coating Protection

Always aware that it is very difficult to remove sealant and machine oils after hardened.

During construction, the protective film should be remained as long as possible, to protect the coated surface from stains caused by sealant and machine oils. If adhered, these stains should be removed as early as possible before hardening, with suitable detergents.

Remarks

a. Do not use strong organic solvents, such as MEK (Methyl Ethyl Ketone), MIBK (Methyl Iso-butyl Ketone), Triclene and paint thinner.

b. Do not mix different cleaners. If cleaners needed to be mixed, please follow the manufacturer's instructions. Generally the cleaner containing abrasives cannot be used. Do not mix cleaners. Avoid excessive rubbing, as it may later the surface gloss.

c. Avoid extreme temperature to clean the coated surface. Heat may accelerate chemical reactions and may evaporate the water from solution. Extremely low temperature may give the poor cleaning effects. On the contrary, cleaning under higher temperature may result in streaking or straining. Ideally, cleaning should be done on the shaded side of the building under moderate temperature.

Alubond

U.S.A.

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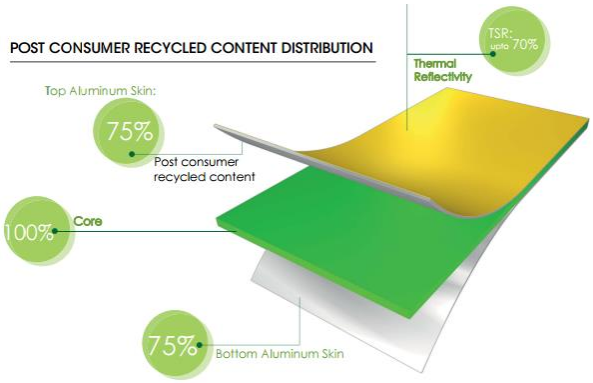
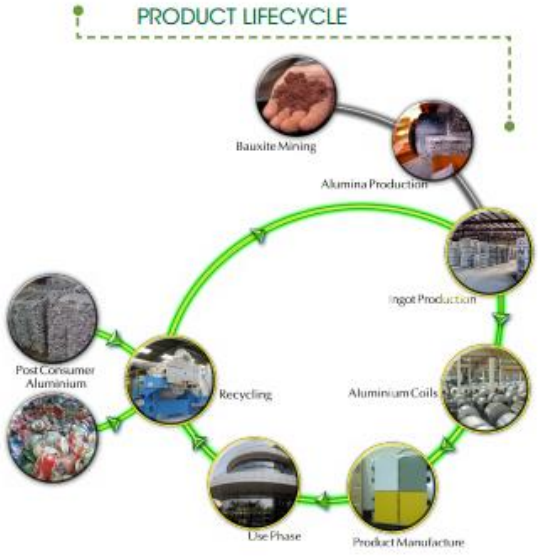
Recycling of the ALUBOND USA

- The standard **ALUBOND USA** FR A2 weight contain about 50% of Al and 50% of core. Al could recycle while the core could crash then recycle into **ALUBOND USA** FRA2 manufacturing.
- Under normal environment, the forecast of the **ALUBOND USA** life time is 50-100years. When the building service time finish, it will create tones of valuable recycling **ALUBOND USA** .
- The main technical point in recycling of **ALUBOND USA** is how to separate the Al skin and the FR core at low cost. There are generally two method to make the separation. Option one is to cut the **ALUBOND USA** become small piece then use normal way to separate it. Option two for the bigger size **ALUBOND USA** is to heat the **ALUBOND USA** then use roller to separate it.

The above way also be used to handle the scrap of ACP which created during manufacturing.





ALUBOND FR A2