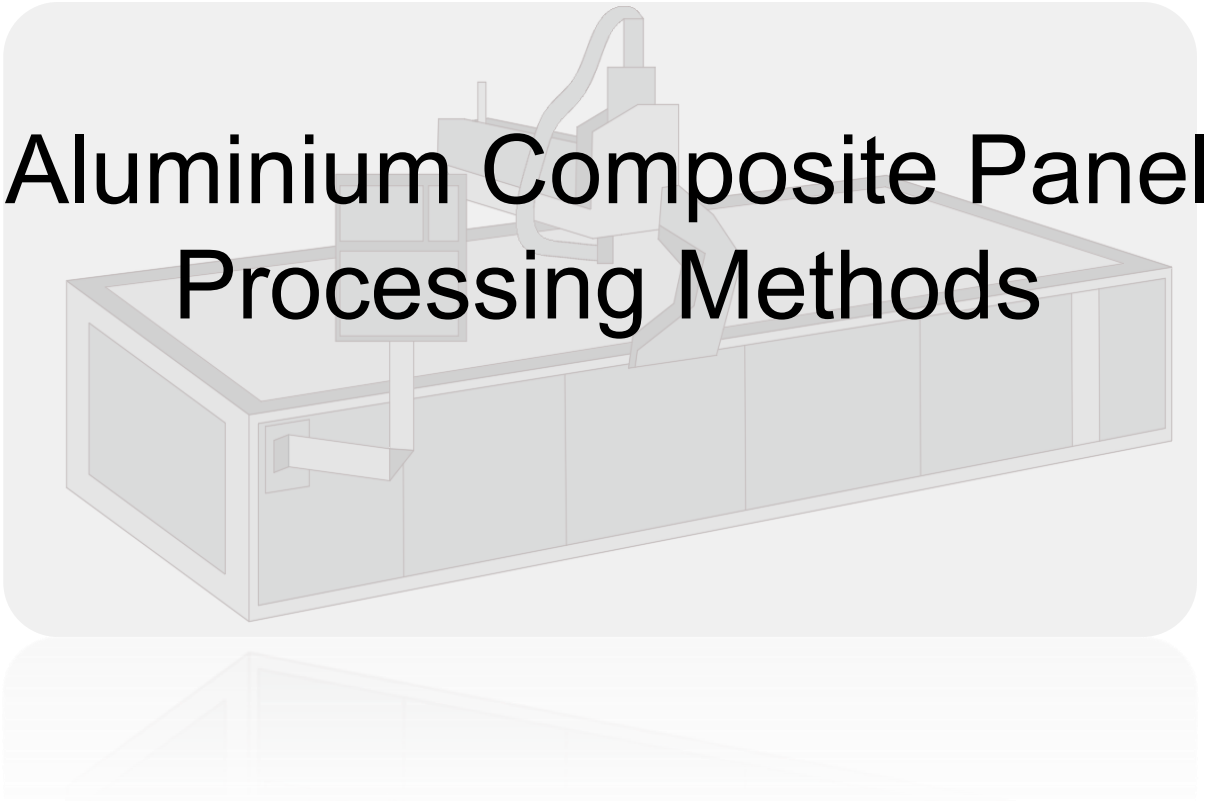
ALBOND
A2s1d0

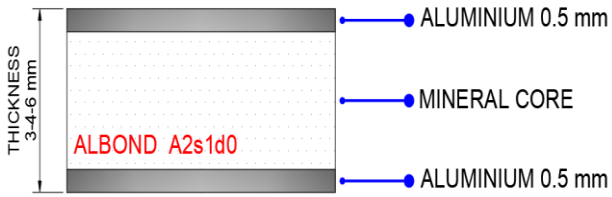
Aluminium Composite Panel Processing Methods



ÇORLU - 2024

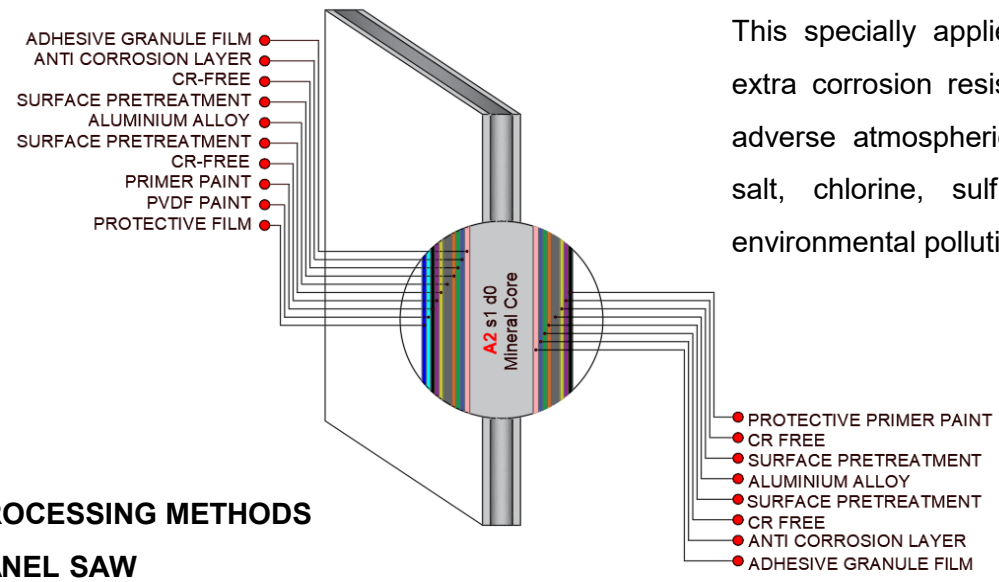
ALBOND A2 COMPOSITE PANEL

Albond A2 composite panel has a core which has minimum 92% inorganic raw material content and high fire resistance class. It has an excellent smoothness as it is produced by continuous production method. Although the higher density of core material, A2 panels are still lighter when compared to solid aluminum. Thanks to its high mineral filler, it is in the highest safety class against fire according to the European Norm (EN) (A2s1d0).



Albond A2 is a composite panel made of 0.5mm thick 5XXX and 3XXX series alloys, containing a special dark gray colored high mineral core, produced in 3, 4 and 6 mm thicknesses.

Albond applies special chemical treatment to mill finish aluminum before A2 composite panel production. After surface cleaning pre-treatment, aluminum is subjected to chrome-free surface treatment. After chrome-free treatment, a special layer is applied.

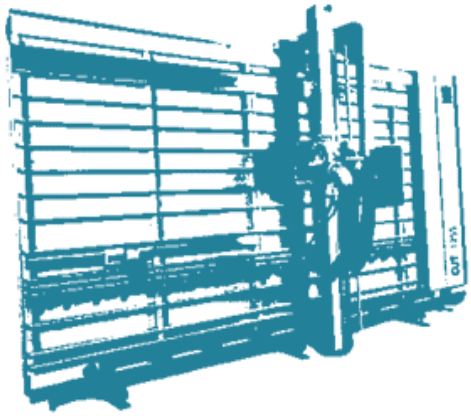


This specially applied layer provides extra corrosion resistance against all adverse atmospheric conditions (sea salt, chlorine, sulfur environments, environmental pollution, etc.).

PROCESSING METHODS

PANEL SAW

Albond A2 Composite panels can be easily cut on vertical panel saw benches and circular saws. The saw material must be tungsten carbide tipped and polycrystalline diamond tips are also preferable. According to capability of the saw, Ø250, Ø255, Ø300 and Ø305 mm diameter, 60, 72, 80 and 100 teeth saw blades can be used. In this type of machines, it is recommended to have a speed of 2000-4000 rpm and a feed rate of 10-30 m/min.

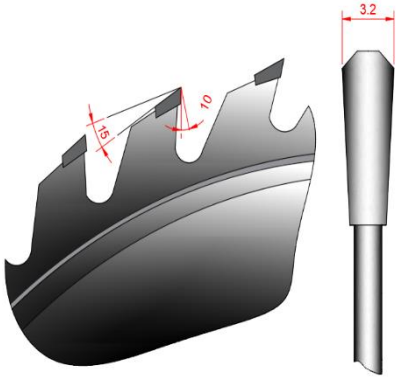


For a Good Panel Saw;

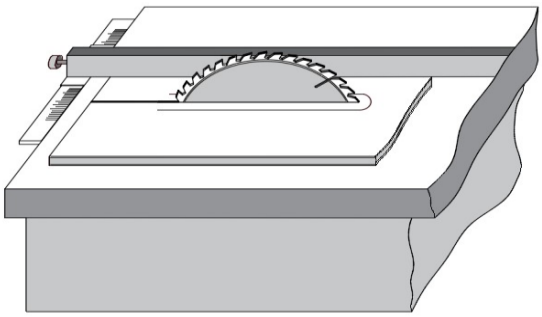
- Cutting Geometry and Angle,
- Circular Saw Diameter Selection,
- Selection of Number of Teeth,
- Cutting Material,
- Saw Speed

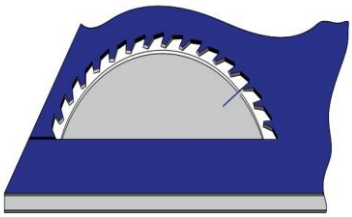
should be selected properly.

In Solid Aluminum, circular saws with a negative 5° cutting angle are preferred to ensure proper plunge and cut, while in Albond PE/FR/A2 Composite panels, the cutting angle of the circular saw should be positive approximately 10°.



- When cutting, make sure that the front surface which has protective film is at the bottom. If there is a double-sided, double foiled top surface, there is a possibility that the foil will burr from the saw, wrap the saw and create scratches on the panel. Additional care should be taken.
- Cutting with dull blades may increase the amount of burrs on the edges and it might deteriorate the edge surfaces. Check the blades continuously.
- Remove burrs after cutting. Burrs may cause dents and scratches on poorly cleaned panels.





Due to the high mineral content in the core of Albond A2 panels, the life time of the blade might be shorter than other blades which cut Albond PE and FR panels. Check the blades frequently.

CRITERIA SELECTION APPROPRIATE

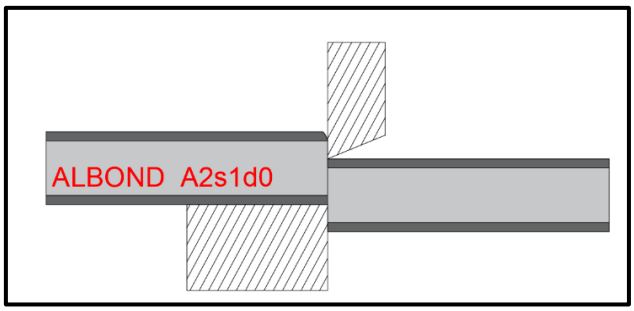
- ❑ Clean Cut
- ❑ Very Few Burrs at Corners
- ❑ Long Life of the Saw
- ❑ Normal Heat Generation
- ❑ Normal Friction Generation
- ❑ Vibration Free Cutting

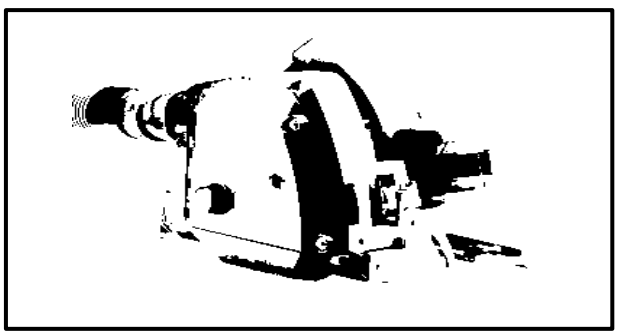
SELECTION OF CRITERIA NOT APPROPRIATE

- ❑ Rough Cut
- ❑ Many burrs at the corners
- ❑ Rapid Dulling of the Saw
- ❑ High Heat Generation
- ❑ High Friction Generation
- ❑ Vibratory Cutting

CUTTING WITH GUILLOTINE SHEAR

Albond A2 can be cut with guillotine shear machines. However, in the guillotine cutting process, there is a slight inclination at the cut point. This angle is approximately between 1º and 1.5º.



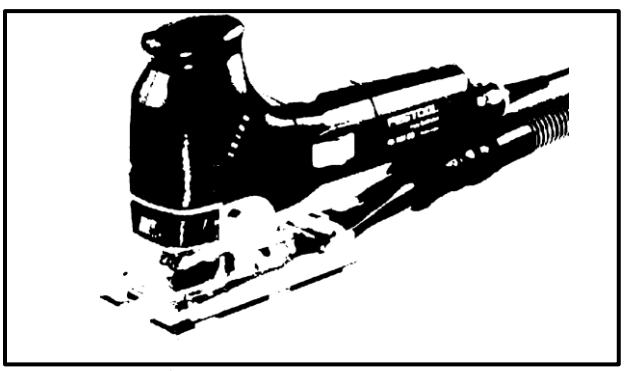


HAND SAW CUTTING

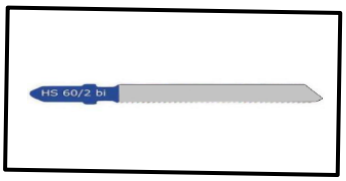
Albond A2 can also be cut with hand-held sawing machines. In the 200 mm - 355 mm diameter range, it is possible to cut with a suitable hand saw. It can be high speed steel or carbide tipped. Maximum speed should not exceed 5500 rpm.

CUTTING WITH JIG SAW

Albond A2 can be cut with hand-held jig saw machines. While high carbon steel tips can be used for Albond PE and FR products, Albond A2 can be easily cut with a 60 mm long bimetal material jig saw with a teeth pitch of 1.00 -1.50 mm.



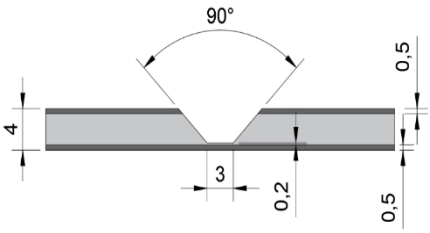
	ALBOND PE/FR	ALBOND A2
Jig Saw Length	74 mm	60 mm
Tooth Spacing	2.7 mm	1.2 mm
Cutting Thickness	2.5-6.0 mm	2.5-6.0 mm
Material	High carbon Steel(HCS)	Bimetal

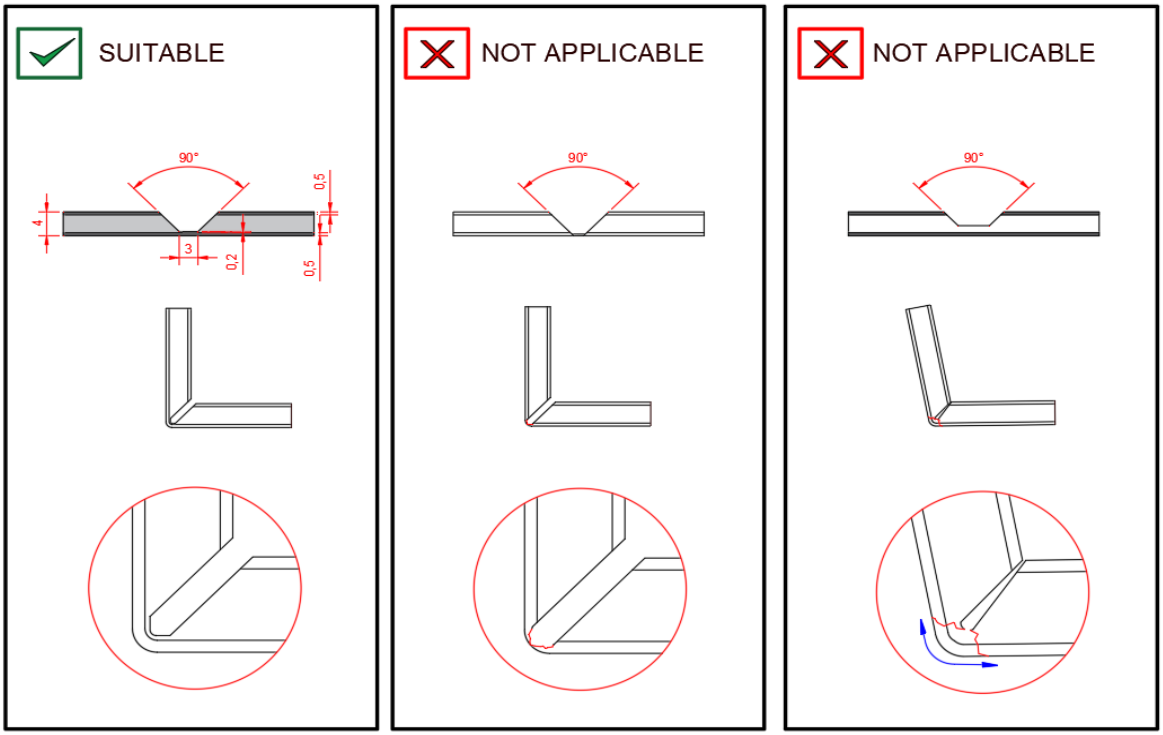


GROOVING

Albond A2 can be grooved with vertical routers and CNC machines. Generally "V" shaped grooving are made for circular saws. In the grooving process of Albond PE and FR products a core of around 0.3 mm is left on aluminum, while it is suitable to leave a core of around 0.2 mm on Albond A2 panels.

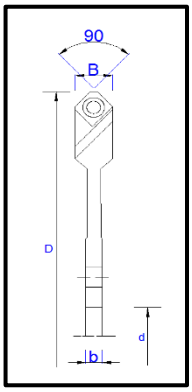
In the grooving process, if the core is completely removed, a scratch may form on the aluminum and the painted aluminum may break at that point with the notch impact effect. If too much core is left in the grooving point process, a healthy 90° fold may not be made and in case of excessive force, it may crack the core together with the aluminum.





Tungsten carbide tipped cutters are suitable for this operation. For a good grooving, the feed rate is 5 m/min and the rotational speed is 20.000-24.000 rpm. It is recommended to use Tungsten Carbide or Synthetic Diamond (Polycrystalline Diamond) tips at horizontal and vertical saw machine.

Saw Diameter	ø 244 - 250 mm
Number of Teeth	8
Cutter Tip Width	16.5 mm
Shaft Diameter	30 mm
Saw Width	6.5 mm
Material	Tungsten Carbide / Polycrystalline Diamond (PCD)



GROOVING WITH HAND-HELD MILLING CUTTER

Albond A2 composite panels can be grooved and used with hand-held milling machines in the installation site area. Grooving can be performed on a special sliding bearings apparatus.

Drive Speed	1800-5500 rpm
Depth operating range	0-9 mm
Cutter Tip dia (max)	118 mm.

CUTTING AND GROOVING WITH CNC MACHINE

Albond A2 can be cut and grooved with CNC routers. While high speed steel (HSS) and carbide material cutter tips can be used in Albond PE and FR products, Polycrystallized Diamond Tip / Synthetic Diamond Tip (PCD) or Aluminum Titanium Nitride coated (AlTi) tip should be preferred in Albond A2 products. In A2 products, suitable cuts can be made with a 5mm diameter bit. For Albond A2 panels for cutting and grooving; Although it depends on CNC machine capability, it is recommended to have a spindle speed of 18.000-24.000 rpm and a feed speed of 10-20 m/min.

Cylindrical spindle grooving on CNC vertical / hand-held milling cutters

Material : Carbide
Ø Shaft = 8 mm
Ø d1 = 20 mm
L2 = 10 mm
L1 = 60 mm

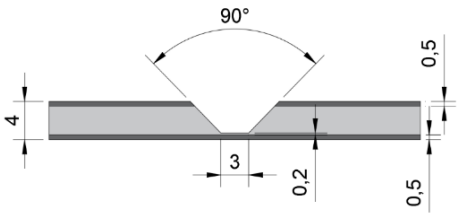
Material : Carbide
Ø Shaft = 8 mm
Ø d1 = 20 mm
L2 = 4.1 mm
L1 = 60 mm

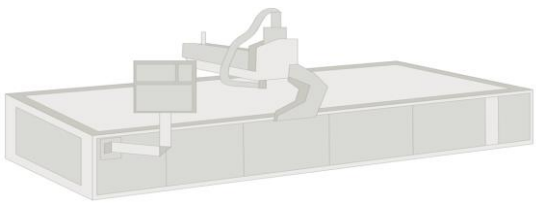
Material: High Speed Steel
Ø Shaft = 8 mm
Ø d1 = 10 mm
L2 = 20 mm
L1 = 50 mm

CNC Cutting and Grouting Machining Steps

- Make sure the table surface is clean, remove any burrs, dust, dirt, etc.
- Make sure that the ambient temperature is not low during CNC grooving processing. (Do not process below 10°C temperature)
- Carefully place the A2 composite panel on the CNC router with the front surface facing downwards.
- Determine the reference point by marking the A2 composite panel on the CNC router
- Adjust the milling depth.
- Make a trial to verify the appropriate milling depth (approximately 0.2 mm core should remain at the joint point of the aluminum).
- The optimum thickness of the remaining core for a V-shaped joint in A2 composite panels is 0.2 mm.
- If the amount of core left at the joint point is high, the panel will not close at 90 angles. In case of force, there will be cracking or breakage in the core and aluminum.
- If the amount of core left at the joint point is not left at all or left very little, during the folding of the panel, the aluminum will break with the notch impact effect.
- Although A2 composite panels depend on CNC capability, it is recommended that the spindle speed should be 18.000-24.000 rpm and the feed rate should be 10-20 m/min. High spindle speed and low feed rate can be taken as reference for ideal joint opening.

- Have periodic maintenance of your machines and tools done by authorized personnel.
- For good machining; constantly check the oscillations of your machine, your machine. Have the oscillations of the material holders checked at certain intervals. Oscillations of more than 0.001 mm will cause you not to process a good job. The cutter bits you use will have a much shorter life.
- Never use coolant for Albond PE/FR and A2 products.
- Use air cooling system for Albond PE/FR and A2 products.
- Wear personal protective equipment during all cutting and grooving operations.





ALBOND PE/FR	MAX.CUTTING SPEED M/MIN	MAX.FEED RATE M/MIN
HSS(HIGH SPEED STEEL)	3000-5000	25
CARBIDE TIP	5000-8000	30

ALBOND PE/FRCARBIDE TIP END MILL			
Ød	L	LG	Øs
6	20	60	6

ALBOND A2	MAX.CUTTING /GROUTING SPEED M/MIN	MAX.FEED RATE M/MIN
PCD or AlTi	18.000-24.000	10-20

PCD :POLYCRYSTALIZED DIAMOND TIP / SYNTHETIC DIAMOND TIP
AlTi :ALUMINUM TITANIUM NITRIDE COATING

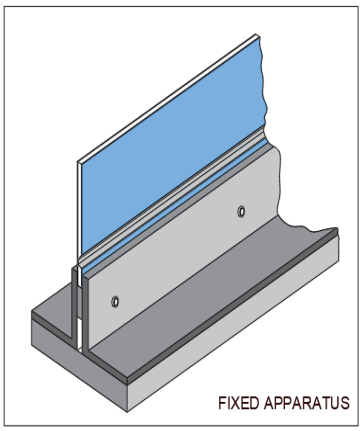
ALBOND A2 CNC CUTTING TIP				
DIAMETER	CUTTING LENGTH	SHAFT DIAMETER	TOTAL LENGTH	NUMBER OF TEEHT
Ø5	10	Ø5	55	1
Ø5	10	Ø6	55	1
Ø6	10	Ø6	55	1

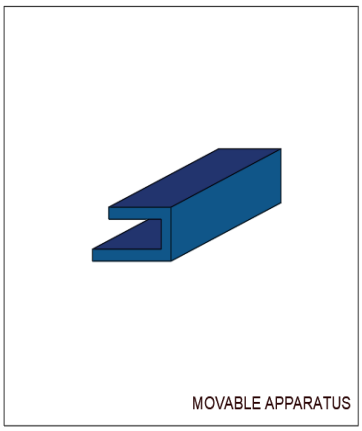
ALBOND A2 CNC GROUTING TIP				
Ø12(ONE DIRECTION)	4,73	Ø12	70	4
Ø12(DOUBLE DIRECTION)	4,73	Ø12	80	4

ALBOND A2 FOLDING PROCESS

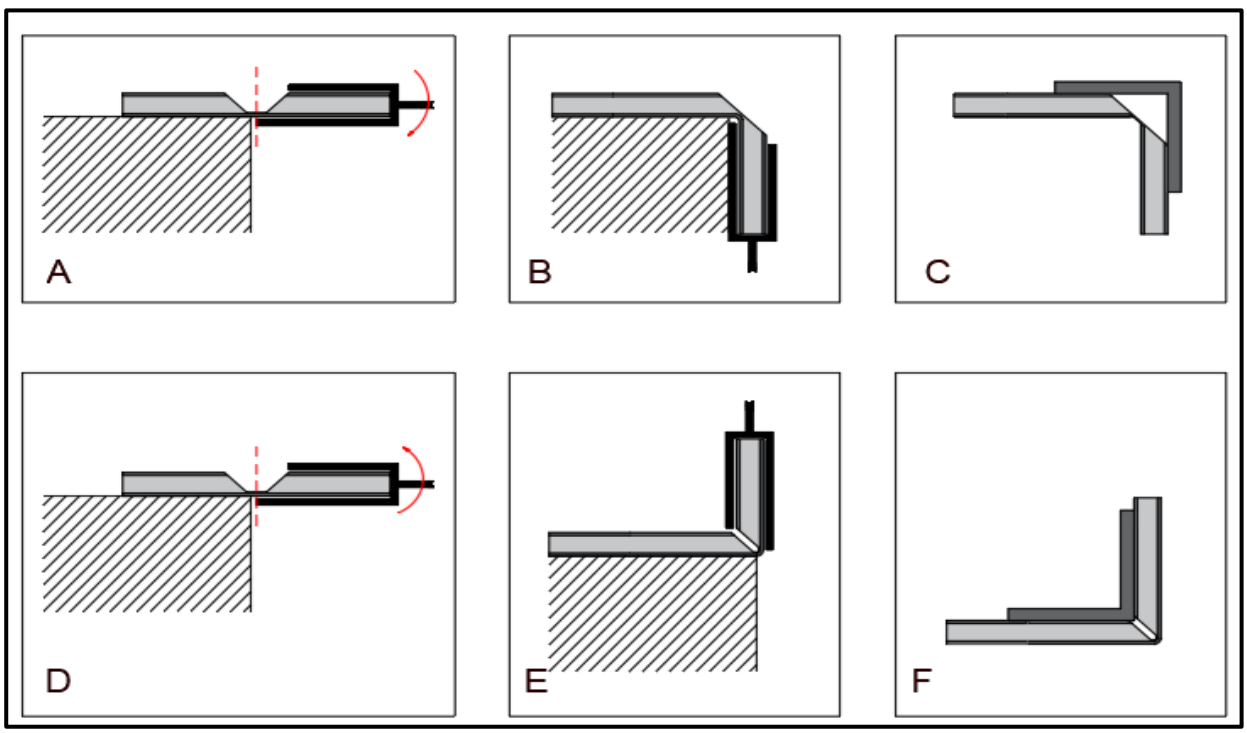
Albond A2 composite panels require a more precise folding process than PE and FR products due to the high content of mineral core in the core. For folding, a fixed apparatus fixed on a plain table or a moving apparatus is used to fold the A2 composite panel on a plain table.

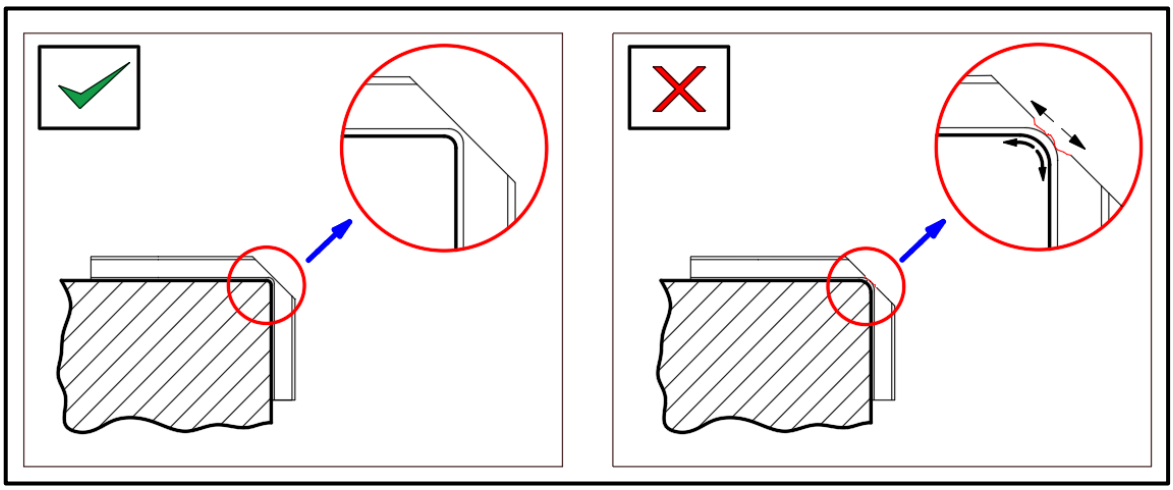
In Albond A2 products, grooving and folding operations should not be performed below 10° C ambient temperature to prevent paint and core cracking. Likewise, Albond PE and FR products should not be bent below 10° ambient temperature to prevent paint cracking.





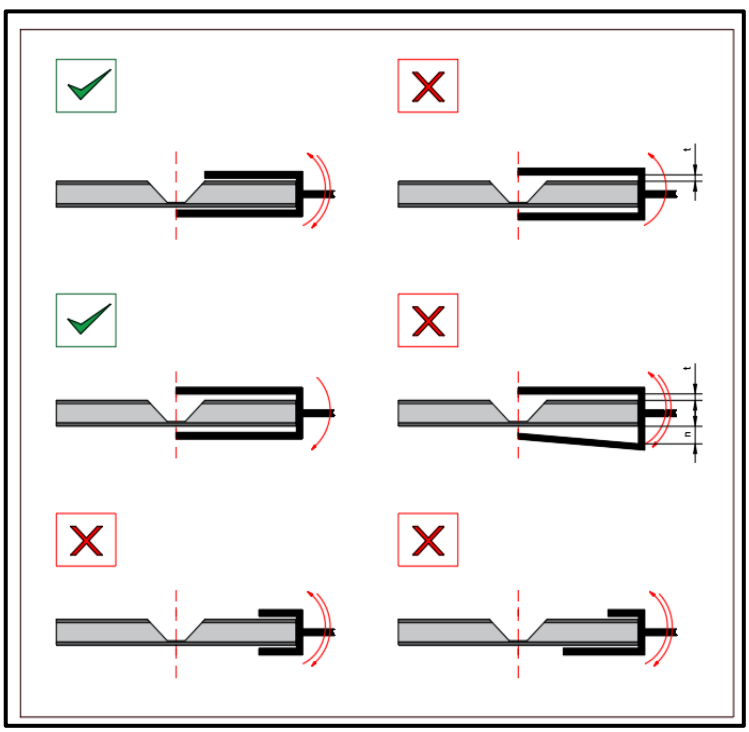
Albond A2 composite panels For inner surface folding and outer surface folding, the folding process should be performed as shown in the figures below. If necessary, «L» shaped aluminum profiles should be used for reinforcement.(Figures C and F)





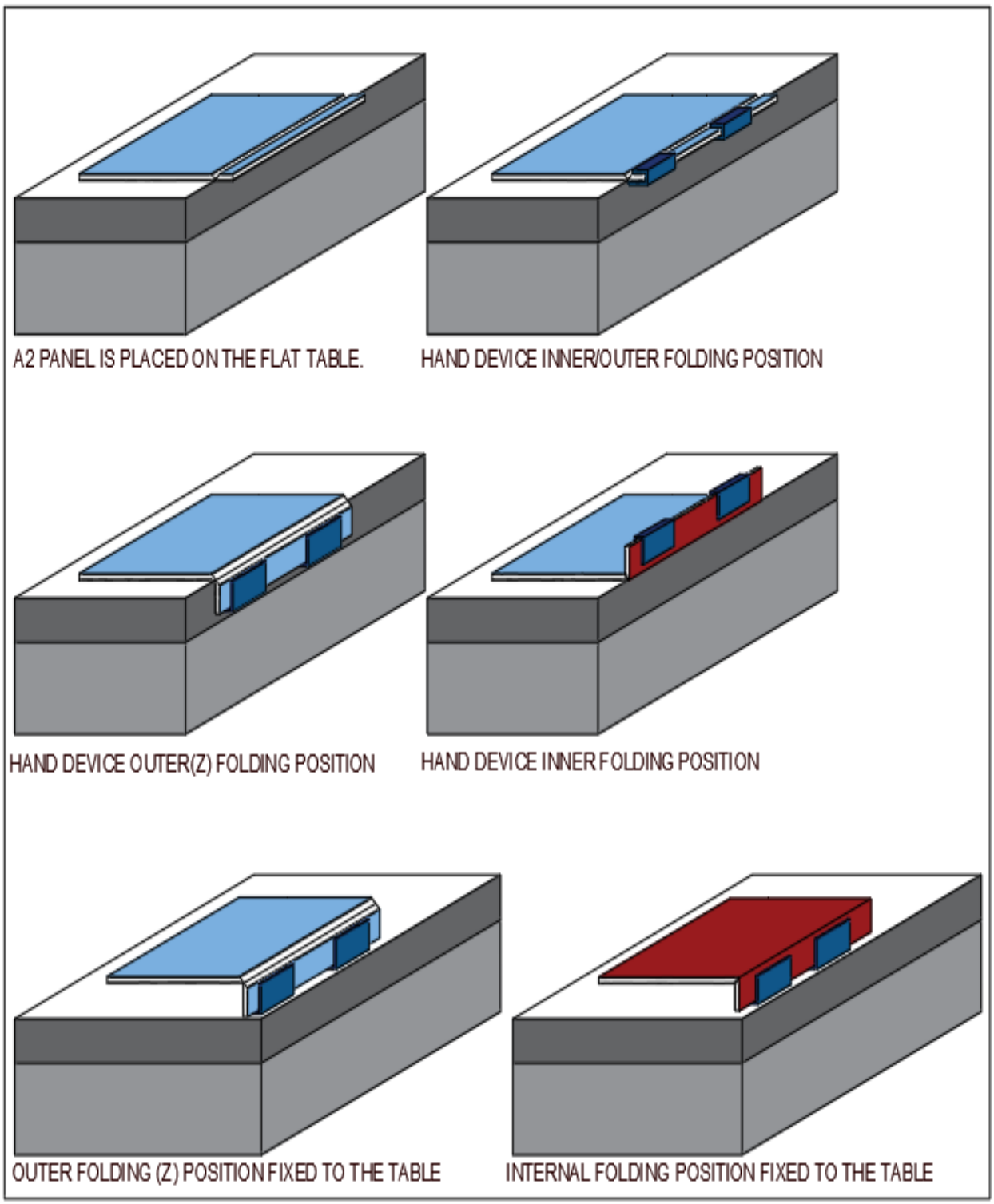
The inner folding (Z process) of Albond A2 composite panels, the radius of the support table should not be bigger than the Radius of the panel fold. If it is bigger, the core material which is left approximately 0.2 mm after the joint will try to elongate due to the large radius here and will cause cracking and fracture at this point.

The proper use and improper use of the hand apparatus to be used in inner folding and outer folding are shown in the following figures. At proper inner folding, the edges of the folding apparatus should not be equal. A2 composite panels should be placed on a plain table, the bottom point should be positioned close to the center of the joint point.



The edge gaps of the apparatus to be used should not be more than 2-3 mm. One-point or two-point inclined (hollow) apparatus will allow the load to form at different points and healthy folding will not be possible. Likewise, short apparatus will allow the load to occur outside the joint point and healthy folding will not be possible.

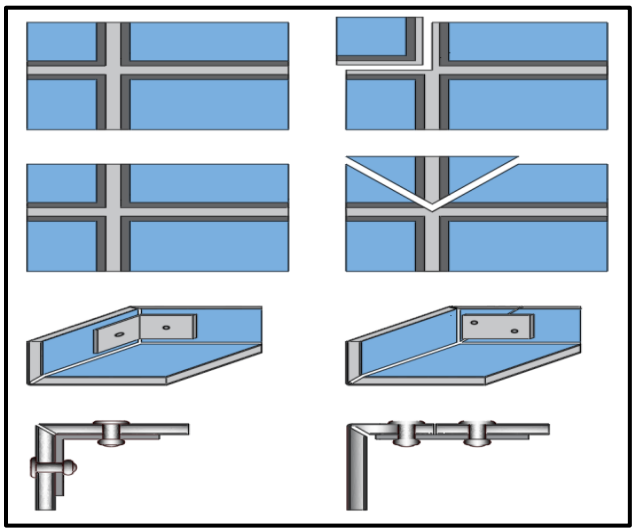
Two types of apparatus, fixed and movable, can be used for folding Albond A2 composite panels. In the use of both apparatus, the A2 composite panel should be placed on a plain table and the folding process should be carried out on this table.



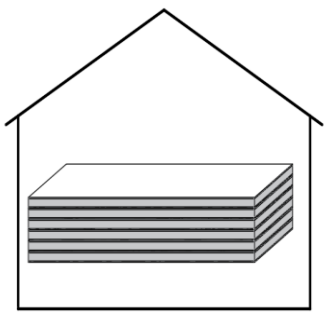
Two (2) methods can be used to make Albond A2 composite panels in tray form. A 90° two-point cut and a 45° cut. The cut shape and the connection shape are shown in the next figure.

After cutting at two 90° points, it is connected to the inside with an "L" shaped aluminum angle.

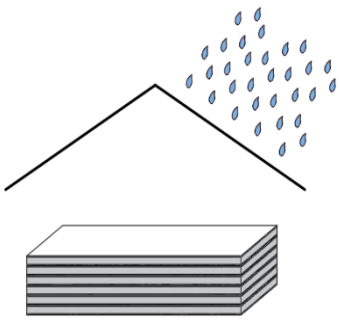
After the 45° cut, it is folded and joined with a flat rectangular aluminum piece.

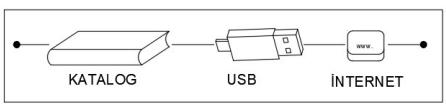


A2 COMPOSITE PANEL TRANSPORTATION, STORAGE, PROTECTION



- ❖ Pallets should be used carefully during transportation and unloading.
- ❖ Panels should be carried by 2 people and taken off the pallet by 2 people.
- ❖ Panels should not be removed by rubbing or pulling.The penetration of hard particles such as dust, burrs, sawdust, etc. between the panels will cause dents in the panels.Panels must be checked carefully.
- ❖ Panels should not be placed on the ground before and after processing. Stones, soil, dust, etc. It will cause scratches and indentations on the panels. It should be left on the table or on a clean flat surface.
- ❖ Panels should be stored in a dry and closed environment.
- ❖ Precautions should be taken to protect pallets against all kinds of rain and water.Situations where condensation may occur should be avoided (for example, moving cold panels to warmer rooms).
- ❖ PVC tape should never be used on the protective tape.After processing, the panels should not be exposed to direct sunlight during the assembly phase.
- ❖ After installation, the protective film should be removed as soon as possible.





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