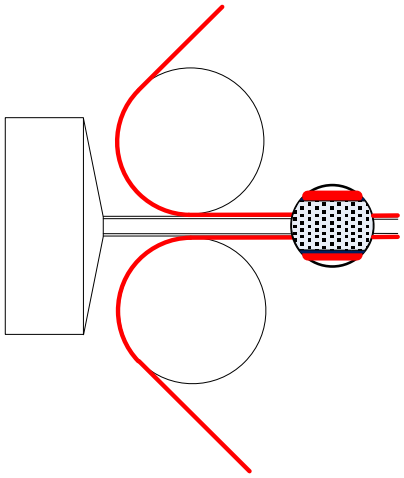
Aluminium Composite Panel

ALBOND TECHNICAL GUIDE



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Albond® Aluminium Composite Panels

Albond® Aluminum Composite Panel is a Composite construction material which formed; polyethylene or mineral core with low-density bonded between two coated aluminum panels using high technology. (Figure 1)

Despite that Albond® Composite Panel is formed light aluminum; it provides metallic strength with superior smoothness, absorption of vibration, extreme endurance and comfort maintenance.

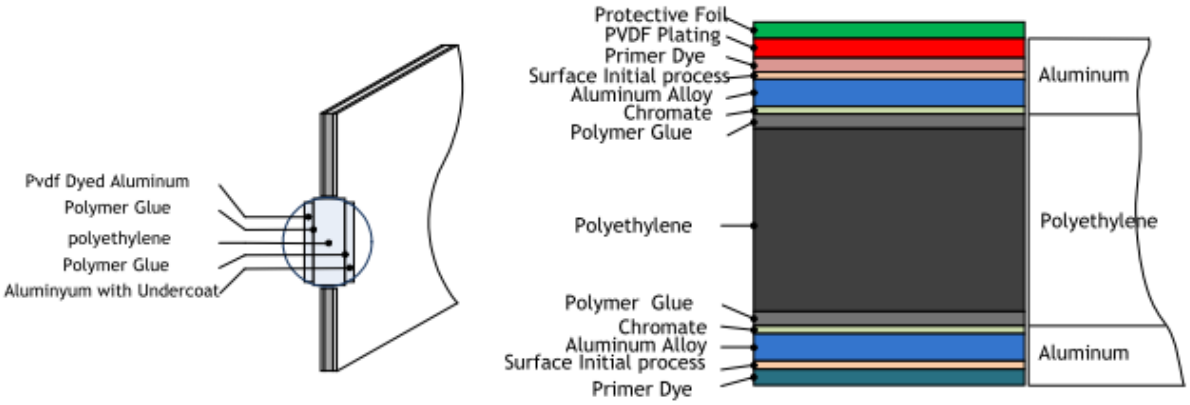


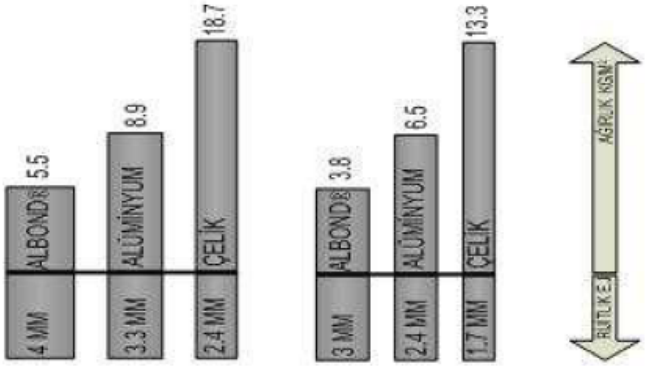
Figure 1.Albond Composite Panel Detail

Aluminium Substrate	**:** EN AW 3XXX Series/ H42-H46
Aluminium Composite Panel Top Surface	**:** PVDF (Kynar 500 or HYLAR 5000 70/30) : HDP (High Durable Polyester) : POLYESTER : ANODISED
Aluminium Composite Panel Bottom Surface	**:** Protective Coating
Plastic Core Material	**:** Low-destiny Polyethylene (LDPE) : Mineral Core (According to fire resistance class)

Why Albond® Composite Panel?

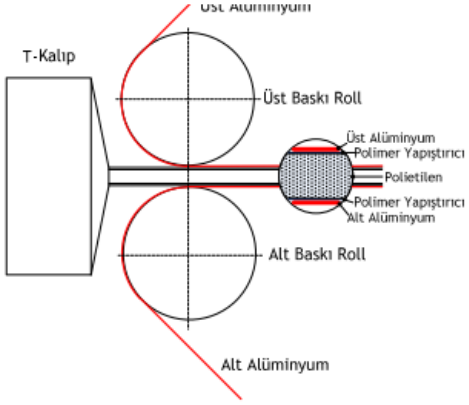
- Albond® provides originality and flexibility on design
- Albond® provides lighter and thinner design but stronger than other surface materials.
- Albond® has superior smoothness.
- Albond® provides many color varieties and flexible design
- Albond® provides easiness of transportation
- Albond® provides easiness of maintenance and cleanliness
- Albond® covers corrupted surface faults.
- Albond® is stainless and incorruptible
- Albond® does not load weight buildings so safety for earthquake.
- Albond® is friendly to environment and nature.
- Albond®'s row materials can be recycled.
- Albond® provides quick assembling.
- Albond® provides economical advantages in long-term.

Comparison Table of Materials' Thickness and Weight which have same rigidity



Production Techniques of Albond® Aluminum Composite Panel

Melted polyethylene filling material is stick with glue and spread homogeneous inside the block. Composite material is formed initially by coalescing of top and bottom aluminum, polyethylene and glue under definite pressure and temperature. Thicknesses of Albond® Composite Panel is set in this process. The thickness value is set which continues constantly during all production process. (Figure 2)

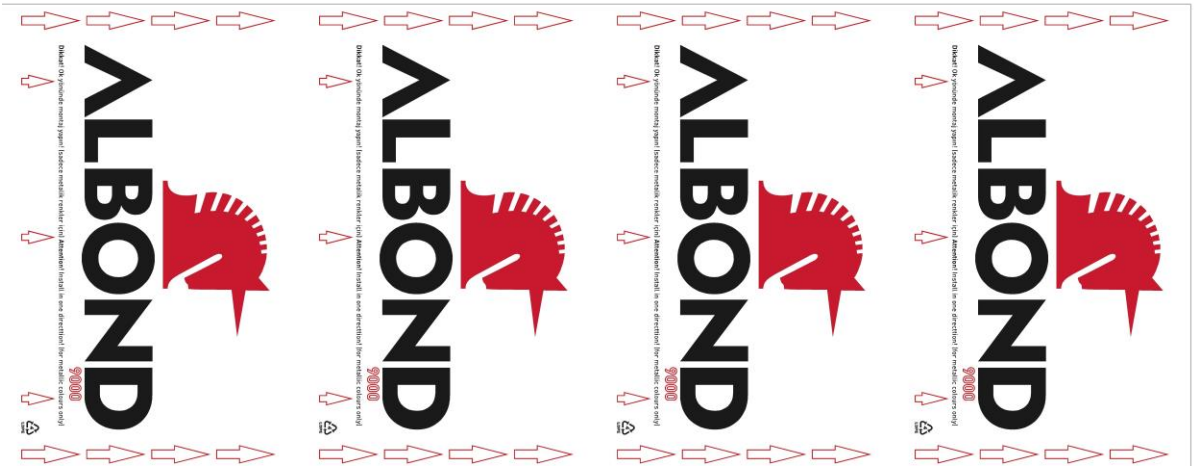


After that Albond® Composite Panel is processed in heating and cooling operations.

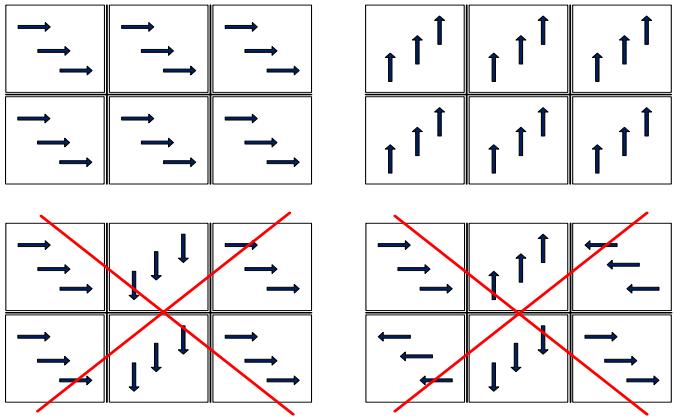
After shearing and reshaping of edges, Albond® Composite Panel is processed at enduring, aluminum foil and stowing operations and finishing production process untouched with full-automatic PLC control.

***Figure 2**.Albond Composite Panel Production Techniques*

Protective Film



Aluminum foil of Albond® Composite Panel causes transportation without damage. It provides high UV resistance, easy and spotless disassembling and standardized to ROHS. Albond® Composite Panel must be disassembled with 180 º angles. sökülmelidir.



EN AW 3005 Aluminium Mechnaical Properties

Yield Strength (Rm) Mpa	: 140-195	(EN 10002)
Tensile Strength (Rp0.2) Mpa	: ≥95	(EN 10002)
Elongation (A50) %	: ≥5	(EN 10002)
Elasticity Module (MPa)	: 70.000	
Thickness Tolerance (mm)	: ± 0.02	(EN 485-4)
Width Tolerance (mm)	: +2/0	(EN 485-4)
Flatness (Edge Wave)	: d≤6 maks. d/f ≤ 1 %	(EN 485-4)
Flatness (Buckle)	: d≤6 maks. d/f ≤ 1 %	(EN 485-4)

EN AW 3005 Aluminum Chemical Composition

Fe %	Cr %	Ti %	Zn %	Mg %	Mn %	Si %	Cu %
0,45	0,01	0,02	0,03	0,45	1,13	0,21	0,11

Albond® Aluminium Composite Panel Mechanical Properties

Yield Strength	(kg/mm²)	: 4.1
Tensile Strength	(kg/mm²)	: 4.8
Elongation	(l0=5,65 A0¹²- %)	: 15
Delamination Resistance(N/mm)		: 12.5
Bending Resistance (MPa)		: 122
Bending Elasticity Module (MPa)		: 10834

Albond® Aluminium Composite Panel Production Tolerances

Panel Thickness (mm)	: ± 0.2
Width (mm)	: +2 / 0
Length (mm)	: +4 / 0
Diagonal Differences (mm)	: max.3

Albond® Aluminium Composite Panel Dimensions

Standart Dimension (mm)	: 4 X 1250 X 3200
Thickness (mm)	: 2-6 (FR Panel max 5 mm)
Width (mm)	: 1000 / 1250 / 1500
Length (mm)	: Up to 6000 mm

ALBOND PANELS PVDF COATING PROPERTIES

Paint Quality	PVDF quality paint. RAL or other colour standards can be supplied.		
Pretreatment	Alkali degreasing and chronium - free conversion coating.		
Coating	**Type Of Paint Coating**	**Thickness (Microns)**	
Primer	Polyester	5 ± 2	(ECCAT1-EN 13523-1)
Base Coat	PVDF	20 ± 2	(ECCAT1-EN 13523-1)
Clear Coat (Optional)	PVDF or FEVE (Lumiflon)	12 ± 2	(ECCAT1-EN 13523-1)
Total		32 - 42	(ECCAT1-EN 13523-1)
Backcoat (Optional)	Epoxy-Polyester	5 ± 2	(ECCAT1-EN 13523-1)
	Grey/Transparent		

PRODUCT PERFORMANCE			
Test Property	**Specs**	**Test Results**	**Test Methods**
Color Differences (Solid Colors)	ΔE ≤ 1	ΔE ≤ 1	ECCA-T3
Specular Gloss (60°)	Requirement	Under Tolerances in EN1396	ECCA- T2
T Bend	Requirement	0 – 1T	ECCA- T7
Impact	7,5 Joule	Pass	ECCA- T5
Cross-cut	≤GT1	Pass	IS0 2409
Pencil Hardness	F - HB	Pass	ECCA- T4
MEK Resistance	100 DBR	Pass	ECCA - T11
5% HCL Acid & 5% NaOH Alkali Test	24HRS	Pass	ASTM D2248-01a(2007)
QUV-A Resistance	3000 Hours	Pass	ECCA-T10
Humidity Resistance	3000 Hours	Pass	ASTM D2247
Abrasion Resistance	< 40 mg	Pass	ISO 11998
Salt Spray Test	3000 Hours	Pass	ECCA-T8

ALBOND PANELS HDP COATING PROPERTIES

Paint Quality	High Durable Polyester quality paint. RAL or other colour standards can be supplied.		
Pretreatment	Alkali degreasing and chronium - free conversion coating.		
Coating	**Type Of Paint Coating**	**Thickness (Microns)**	
Primer	PE	5 ± 2	(ECCAT1-EN 13523-1)
Base Coat	HDPE	20 ± 2	(ECCAT1-EN 13523-1)
Total		21 - 29	(ECCAT1-EN 13523-1)
Backcoat (Optional)	Epoxy-Polyester	5 ± 2	(ECCAT1-EN 13523-1)
	Grey/Transparent		

PRODUCT PERFORMANCE

Test Property	**Specs**	**Test Results**	**Test Methods**
Color Matching (Solid Colors)	ΔE < 1.0	AE < 1.0	ECCA-T3
Gloss At 60°	Requirement	Under Tolerances	ECCA- T2
		in EN1396	
T Bend	Requirement	0 - 1,5T	ECCA- T7
Impact	7,5 Joule	Pass	ECCA- T5
Cross-cut	100%	Pass	IS0 2409
Pencil Hardness	F - HB	Pass	ECCA- T4
MEK Resistance	100 DBR	Pass	ECCA - T11
5% HCL Acid & 5% NaOH Alkali Test	24HRS	Pass	ASTM D2248-01a(2007)
QUV-A Resistance	2000 Hours	Pass	ECCA-T10
Humidity Resistance	1500 Hours	Pass	ASTM D2247
Abrasion Resistance	< 40 mg	Pass	ISO 11998
Salt Spray Test	1500 Hours	Pass	ECCA-T8

ALBOND PANELS POLYESTER COATING PROPERTIES

Paint Quality	Polyester quality paint. RAL or other colour standards can be supplied.		
Pretreatment	Alkali degreasing and chronium - free conversion coating.		
Coating	**Type Of Paint Coating**	**Thickness (Microns)**	
Primer	Polyester	5 ± 2	(ECCAT1-EN 13523-1)
Base Coat	Polyester	20 ± 2	(ECCAT1-EN 13523-1)
Total		21 - 29	(ECCAT1-EN 13523-1)
Backcoat (Optional)	Epoxy-Polyester	5 ± 2	(ECCAT1-EN 13523-1)
	Grey/Transparent		

PRODUCT PERFORMANCE

Test Property	**Specs**	**Test Results**	**Test Methods**
Color Matching (Solid Colors)	ΔE ≤ 1.0	AE ≤ 1.0	ECCA-T3
Gloss At 60°	Requirement	Under Tolerances	ECCA- T2
		in EN1396	
T Bend	Requirement	0 - 2T	ECCA- T7
Impact	7,5 Joule	Pass	ECCA- T5
Cross-cut	100%	Pass	IS0 2409
Pencil Hardness	F - HB	Pass	ECCA- T4
MEK Resistance	100 DBR	Pass	ECCA - T11
5% HCL Acid & 5% NaOH Alkali Test	24HRS	Pass	ASTM D2248-01a(2007
QUV-A Resistance	500 Hours	Pass	ECCA-T10
Humidity Resistance	1000 Hours	Pass	ASTM D2247
Abrasion Resistance	< 40 mg	Pass	ISO 11998
Salt Spray Test	1000 Hours	Pass	ECCA-T8

***EN 1396 GLOSS TOLERANCES**

GLOSS UNIT RANGE	Tolerances on Nominal Gloss	Max. Variation Within One Supply	Gloss Type
≤5	±2	±1	Matt
6 - 12	±3	±2	Low Gloss
13 - 20	±4	±2	
21 - 30	±5	±3	Semi-Gloss
31 - 40	±6	±3	
41 - 60	±7	±5	
61 - 79	±8	±7	Gloss
≥80	Min. 80 gloss		Full Gloss

Albond Panels Warranty Provision

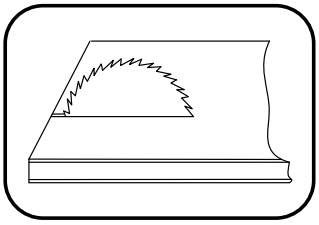
Please contact with us for warranty terms.

PANELS	WARRANTY PERIOD	GLOSSRETENTION (EN 13523-2)	COLOR DIFFERENCES (EN 13523-3)	CHALKING (FILM INTEGRTY)
ALBOND 9000	20-25 YIL	> %60	ΔE < 5-7	5%
ALBOND 7000	15-20 YIL	> %50	ΔE < 6-7	8%
ALBOND 5000	5-10 YIL	> %50	ΔE < 7-10	10%

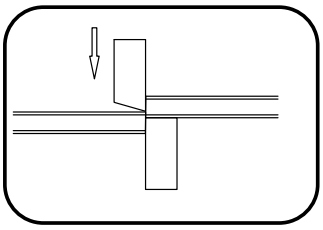
P.S: Warranty periods and coler differences values can be differ according to project location and color of product.

ALBOND ALUMINIUM COMPOSITE PANEL PROCESSING

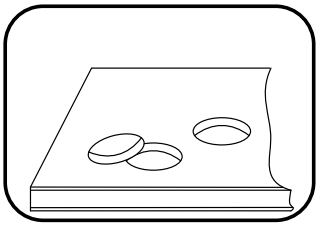
Processing Methods



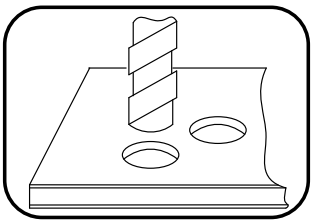
Saw Cutting



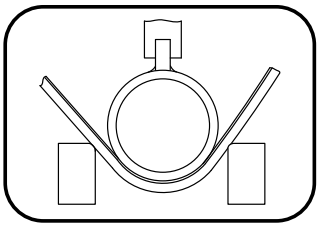
Shearing



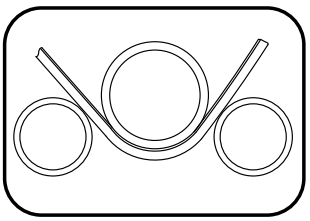
Punching



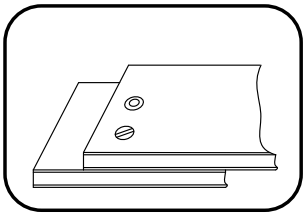
Drilling



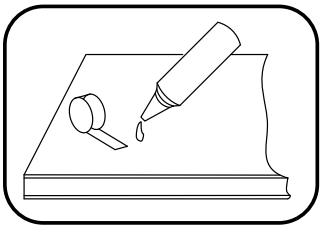
Bending



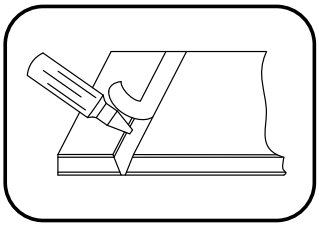
Curving



Fastening



Gluing



Welding

Process Techniques of Albond® Composite Panel

Shearing

Albond® Composite Panel can be sheared easily with carbide tip saw. Also with guillotine shears can be used with approximately 1° - 1, 5° angle. (Figure 6)

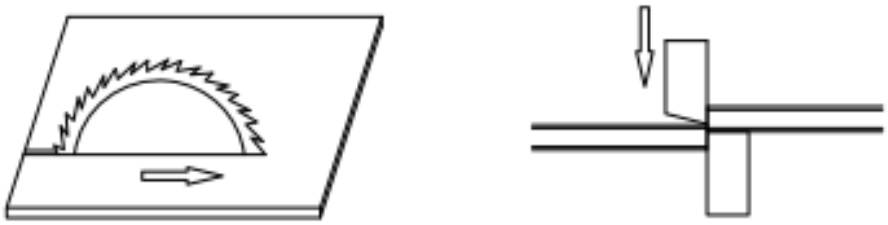


Figure 6.Shearing with a saw and guillotine shears.

Seaming

First the tip should be chosen according to folding type of seam spaces. Polyethylene filling material should be left like 0.3 mm thickness at seam point. 0.5 mm and thicker polyethylene cannot be folded easily. On the other hand 0.1 mm and thinner polyethylene causes fracturing of aluminum, and no polyethylene at seam point causes to aluminum breaks at first stroke. (Figure 7)

Seaming Angles

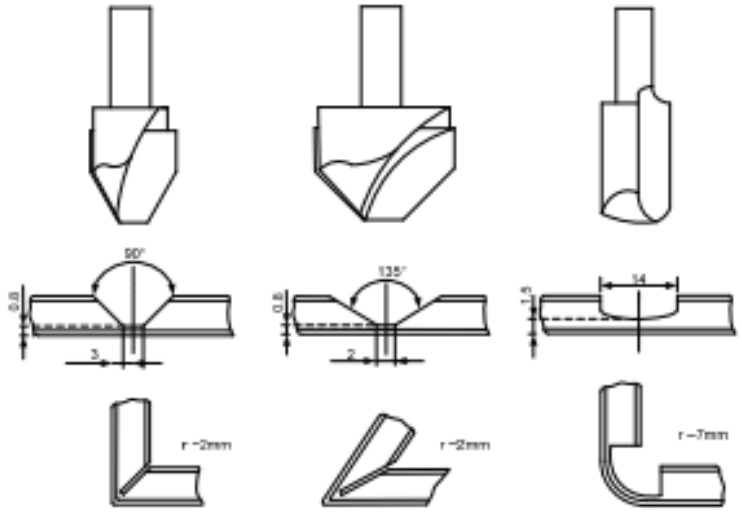


Figure 7. Seaming angles and folding figures.

Bending Process with Pressure

Albond® Composite Panels can be bended shaped by single roll pressure machine. Mould width, roll radius, stroke force and stroke distance are determined the bending angle. Front side must be smooth and with a defined radius.
The two ends of shaping mould are not cornered must be rounded.
Besides soft plug material can be placed to prevent crushing. The ideal mould width is calculated using the formula below. Bending radius is 40-55 mm with press and 200-300 mm with three roller machine. (Figure 8)

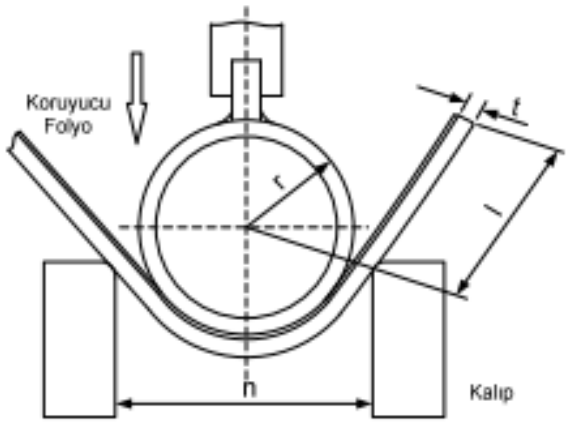


Figure 8.Pres Bending Process with Pressure

l min = d x 5
r min = t x 15
t: Albond Panel Thickness
Ideal Mould Width (n) = (2xt) + (Roll Radius) + (Foil Thickness) +15 mm

Taking out Edges and Folding

Initially, starts with canalizing shaped V 25 mm inside from panel sides. Panel corners are taken off and should be bended to the dyed side and formed 25 mm deep cassette then panel corners must be support clenching/sticking aluminum plugs. (Figure 9)

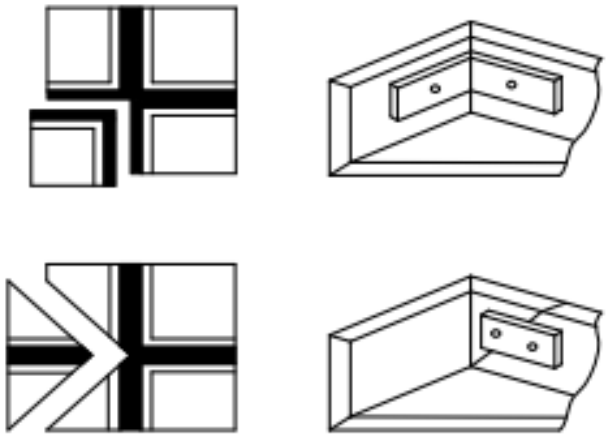


Figure 9.Taking corners off

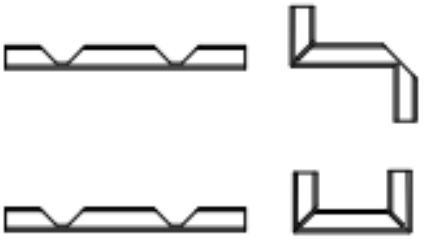


Figure 10. Folding figure

After seaming Albond® Composite Panel can be folded and shaped on smooth and straight desk. Recommended temperature is between 20°C and 35°C. Folding process must be done under 10°C or lower temperature otherwise cracking is possible on dye. (Figure 10)

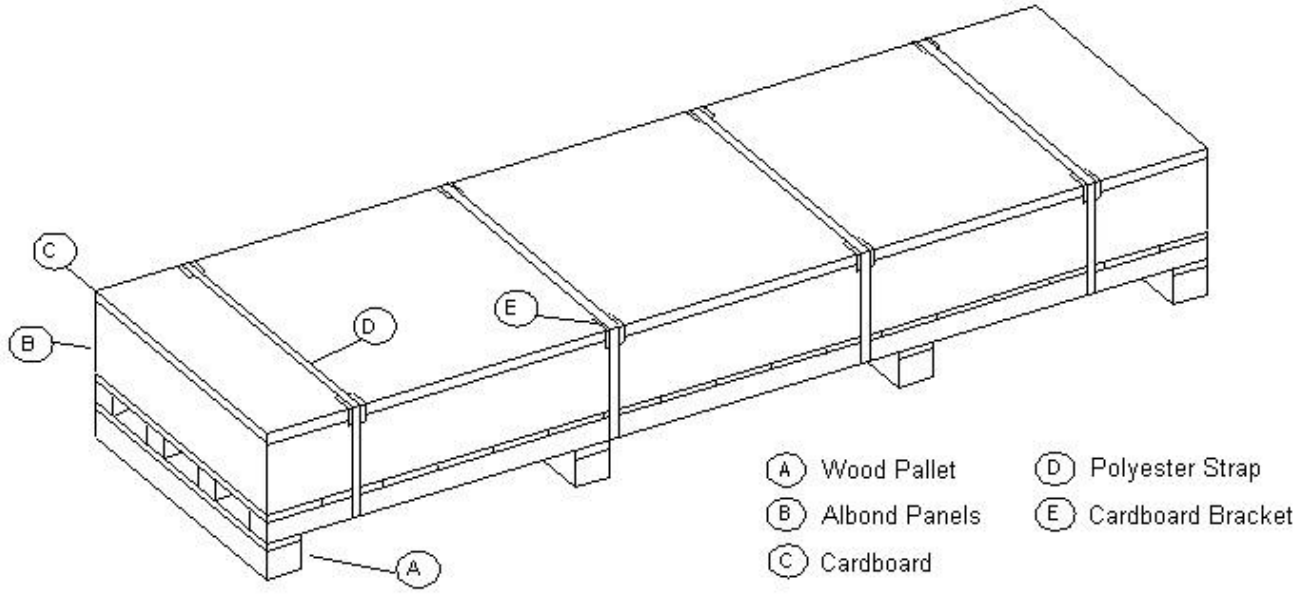
ALBOND PANELS STORAGE & PACKING GUIDE

1. Albond panels must be stored on a clean and dry basement. Please beware storing on standing water.

2. Recommend stacking is horizantal. Vertical stacking is not recommended

3. Albond panels must be stored maximum 6 months.

4. Max. 6 pallets must have been stored over and over.Kompozit paneller üst üste 6 paletten fazla olmamalıdır



ALBOND PANELS MAINTENANCE & CLEANING GUIDE

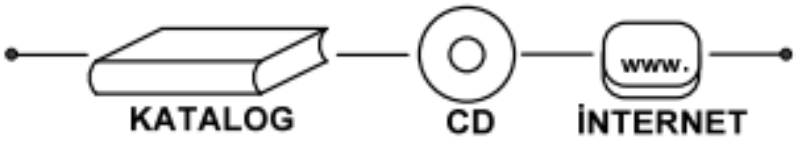
The products which have been produced by coil coating technology need to have a special cleaning and maintenance program. In most cases, annual or suggested frequency according to enviromental conditions would be required to keep the lacquered coated surface long-term quality.

The Required Cleaning Rules Are At the below ;

- Firstly wash the surface with clean water
- Clean the surface with water and mild detergent, followed by a clean water rinse. Use sponge, leather or wiper is necessary to avoid water stains.
- Cleaning agents must have pH between 5-8 values.
- If the soil is still adhering after dry, then 5-10% IPA (Isopropyl Alcohol) solution will be necessary.
- it should be used with soft sponges and/or soft rags. The washing should be done with uniform pressure.
- After washing, the surface should be thoroughly rinsed with clean water, and the rinsed surface is air-dried or wiped with squeegee or lint-free cloth

Do not do these;

- Do not clean sun-heated surfaces (above 40 °C) to avoid rapid drying which may lead to stain formation
- Do not use strong alkali (such as potassium hydroxide, sodium hydroxide/caustic soda) and strong acid and/or abrasive cleaners. If these solvents and cleaners were used, the paint might be swelled or removed.
- Do not use strong organic solvents, such as MEK (Methyl Ethyl Ketone), MIBK (Methyl Iso-butyl Ketone), Triclene and paint thinner.
- Do not mix different cleaners. If cleaners needed to be mixed, please follow the manufacturer's instructions.
- Do not use abrasive pads such as wools or sandpapers for cleaning.
- Do not use sea water for cleaning.



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