



# ***SIGNABOND®***

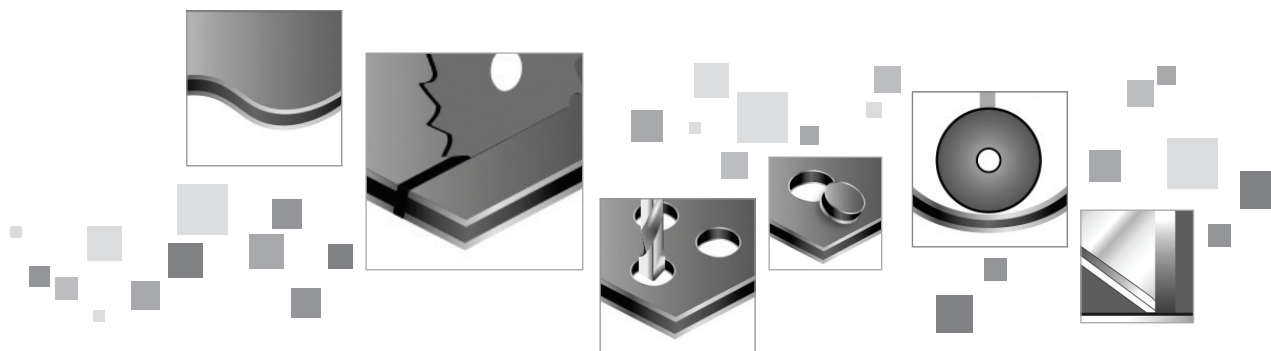
***Aluminum Composite Sign Panels***

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Applicable for Signabond Lite, V.3 and V.5 Products

## Processing & Installation Methods

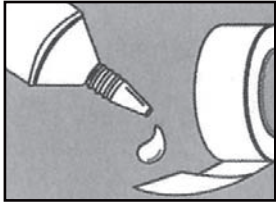


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# Processing Methods



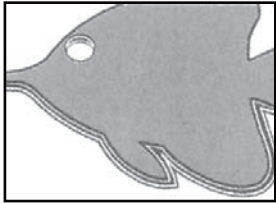
## Bonding

Standard metal adhesive sealing compounds and Double Sided VHB tapes can be used for bonding. Adhesives and sealants will not adhere to polyethylene core, only apply to aluminium skins.



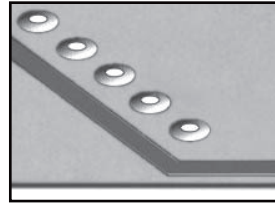
## Folding & Routing

Signabond Panels can be folded and shaped by various routing techniques. Refer to section of Routing & Folding in this leaflet for more detailed information.



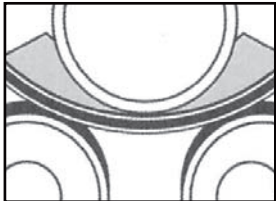
## Contour cutting

Panels can be easily contour cut with CNC machines and jig saws.



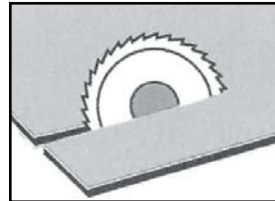
## Riveting

Solid or blind rivets can be used with conventional riveting tools. For exterior applications, allow for thermal expansion. Countersunk rivets are only suitable for interior use.



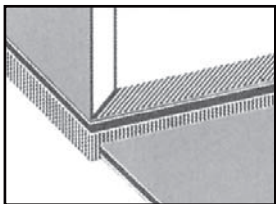
## Roll bending

Signabond Panels can be bent using roller benders, 3 roller-benders are recommend for bending large internal diameters.



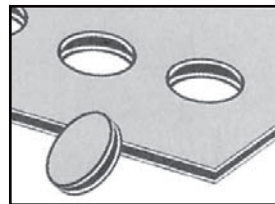
## Cutting

Signabond Panels can be cut and processed with vertical panel saw, circular or jig saw. Thickness of the cutting teeth approx.: 2-4mm. Flat teeth chamfered at 45°. It is recommended that a carbide or hard alloy blade is used. Max cutting speed v: 5000m/min, Max feed: 30m/min



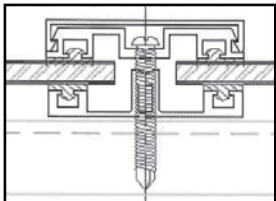
## Shearing

Signabond Panels can be sheared with standard guillotine machines. To prevent surface damage to coated surface, use protective pads between the down holders and panel surface and adjust to minimum down holding pressure. Use carpet protection on feeder table. Shearing will cause slight deflection of the cut edges on the impact side.



## Punching

Conventional sheet punching machines can be used for desired perforation or patterns. Punching will cause slight deflection of the cut edge on the impact side.



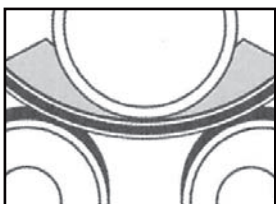
## Clamping, Bolting & Screws

Typical bolt and nuts, stainless steel screws and rivets can be used for securing. Please refer to section on Clamping, Bolting and Screws in this leaflet for more information.



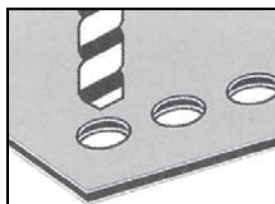
## Welding

The plastic core can be hot air welded using an electric hot air welding equipment. Hot air welding will provide watertight joint, however it is to be noted that this is not suitable for joints where structural strength is required.



## Bending

Bending can be done with standard bending machines, i.e. brake press, roll bending machines & folding machines. The minimum inside radius:  $r = 10 \times T$   
For PE & FR (B1) core Panels.



## Drilling

Twist drills with a center point that are normally used for aluminium and plastics can be used. Drill with high speed, low feed with occasional raising of the drill and blow away any dust and swarf using a compressed air blower.

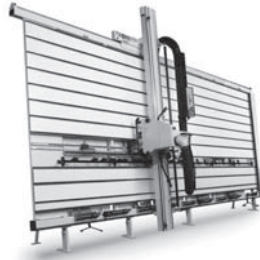
# Routing & Folding

Signabond Panels Sheets can be routed and folded using a flat bed CNC routing machine, a Vertical Panel Sawing Machine or a handheld router "V-Grooving" tool. The Panel Sheets can be bent and formed into cassette trays and be integrated onto exterior facade or curtain wall systems.

A "V" shaped or "Rectangular" shaped groove should be routed on the reverse side of the panel sheet along the proposed folding edge. When routing, the groove should not be made all the way to bottom, a thin layer of core (0.8 mm) must be retained at the base allowing enough room for easy folding. This is to prevent the paint on coated surface and the aluminium from cracking or crazing during the folding process.



Flat Bed CNC Routing Machine

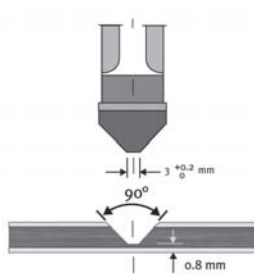


Vertical Panel Sawing Machine

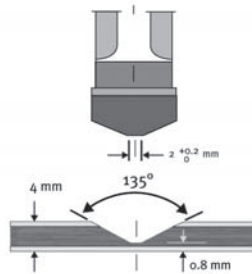


Handheld V-grooving tool

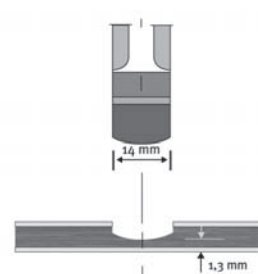
## Disk milling cutter with carbide tips for vertical panel saws



Disk milling cutter for V-grooves, 90°

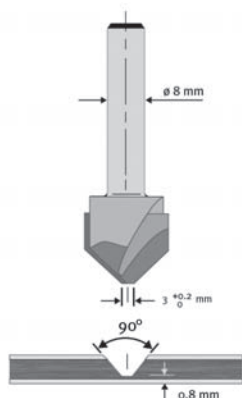


Disk milling cutter for V-grooves, 135°

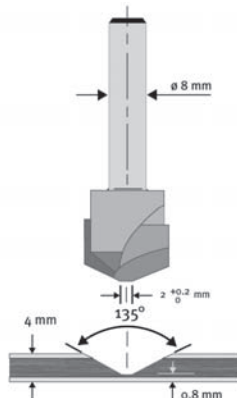


Disk milling cutter for rectangular grooves

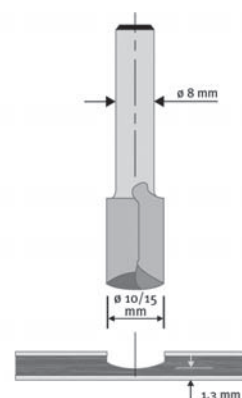
## Form milling cutter with cylindrical shaft for hand routing



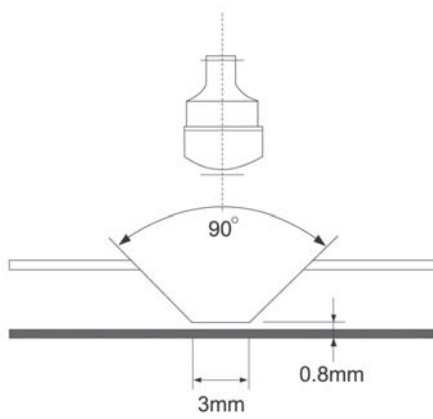
Milling cutter for V-grooves, 90°



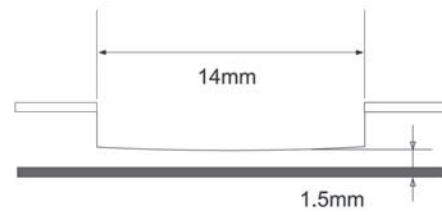
Milling cutter for V-grooves, 135°



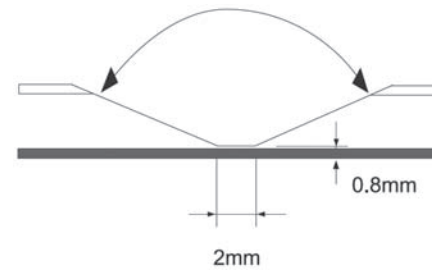
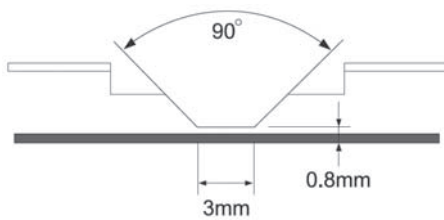
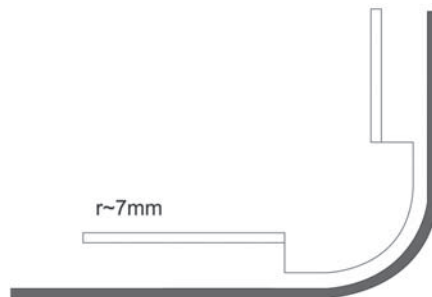
Milling cutter for rectangular grooves



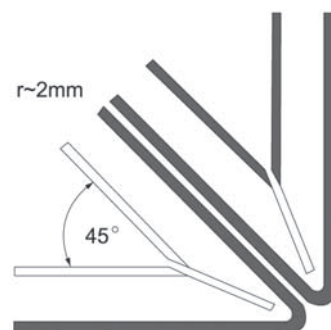
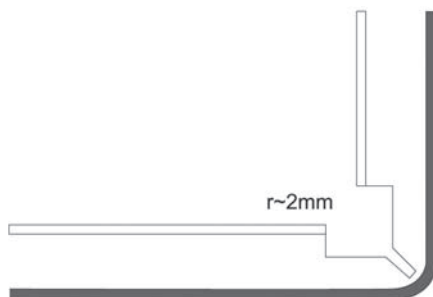
Groove 90° (V-shape) for foldings up to 90°



Routed groove (rectangular form) for folds up to 180° depending on panel thickness



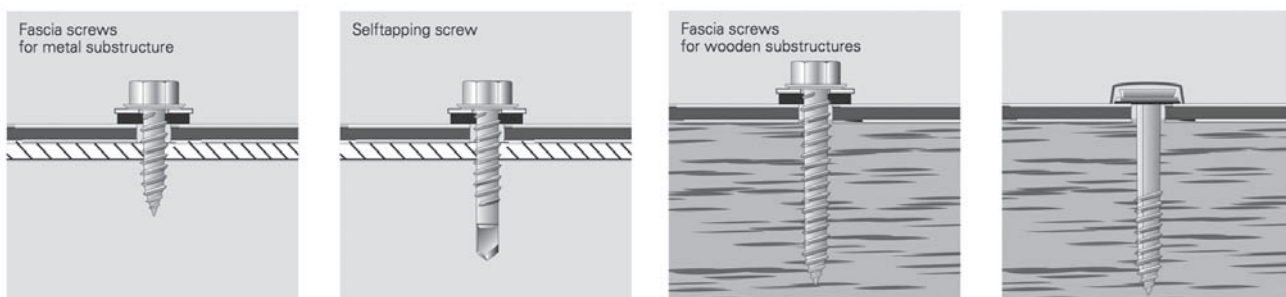
Groove 135° (V-shape) for foldings up to 135°



# Clamping, Bolting and Screws

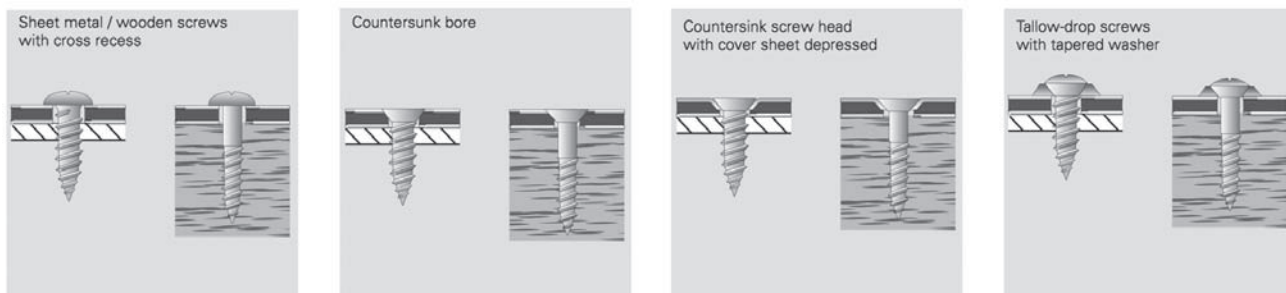
## Screws for Outdoor use

For outdoor use, the panel's thermal expansion should be taken into consideration when using bolted connections. A small gap of 2 to 3mm is suggested to allow for such expansion. To avoid jamming, the hole diameter in the panel must allow for the expansion and it is best to use stainless steel facade screws with sealing washers. The screws must also be suitable for the intended substructure. Use a torque wrench or a power screwdriver to attach the screws in such a way that the washer mounted on the panel seals the borehole without exerting any pressure on the panel. Multi-Step drills or drill sleeves with corresponding diameters can be used centrally drilling holes into the panel and the substructure and for centrally setting the rivet. Please be sure to remove protection film in the screw area prior to screwing.



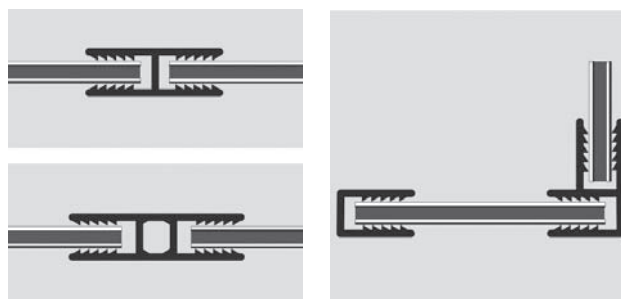
## Screws for Indoor use

Sheet metal and wooden screws with different head shapes are suitable for indoor use. By doing so, they do not normally allow for any panel expansion. If it is indoor application then no gap is required as the panel won't expand too much. Countersunk screws can be embedded using the conventional countersinking method or by depressing the surface of the panel. When depressing the aluminium surface, the hole diameter in the panel must be larger than the screw diameter.



## Clamping

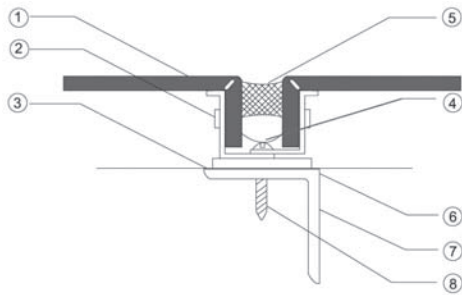
Clamp connections are mainly used for shop fitting and display construction. Aluminium or plastic clamps are suitable. They consist of two parts-with the clamping effect achieved by bolting. Aluminium profiles are particularly suitable as connectors or impact resistant frames. Inevitable tolerances lead to different levels of holding force. However, you can obtain a uniform and solid profile fit by pressing the profile sides together before inserting the panels. Butt joint, corner and end profiles are available at local hardware stores or companies dealing in aluminium profiles for 3mm, 4mm and 6mm thickness.



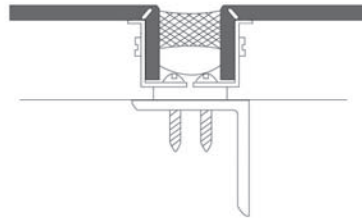
# Installation & Fabrication Methods

## Panel Type and Joint Design A

Angle aluminium and seal joint 1



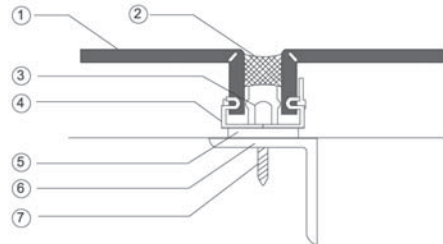
Angle aluminium and seal joint 2



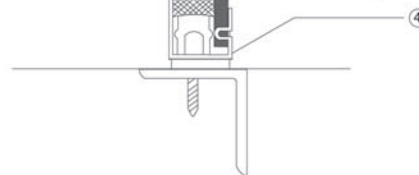
- 1 Signabond panel
- 2 Aluminium rivet
- 3 Angle aluminium
- 4 Backer rod / Gasket
- 5 Sealant
- 6 Angle bar
- 7 'L' angle bar
- 8 Self-drilling screw

## Panel Type and Joint Design B

Accessories and seal joint 1

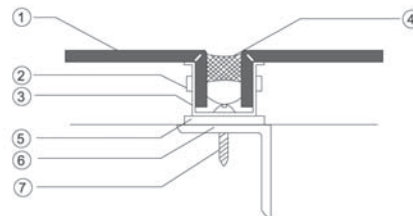
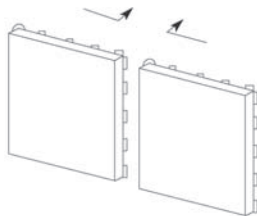


Accessories and seal joint 2



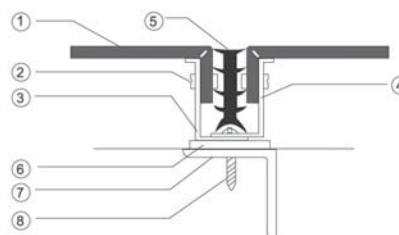
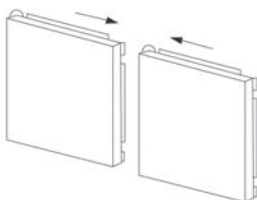
- 1 Signabond panel
- 2 Sealant
- 3 Alum extrusion
- 4 Alum extrusion
- 5 Gasket
- 6 'L' angle bar
- 7 Self-drilling screw

## Panel Type and Joint Design C



- 1 Signabond panel
- 2 Aluminium rivet
- 3 Angle aluminium
- 4 Sealant
- 5 Spacer
- 6 'L' angle bar
- 7 Self-drilling screw

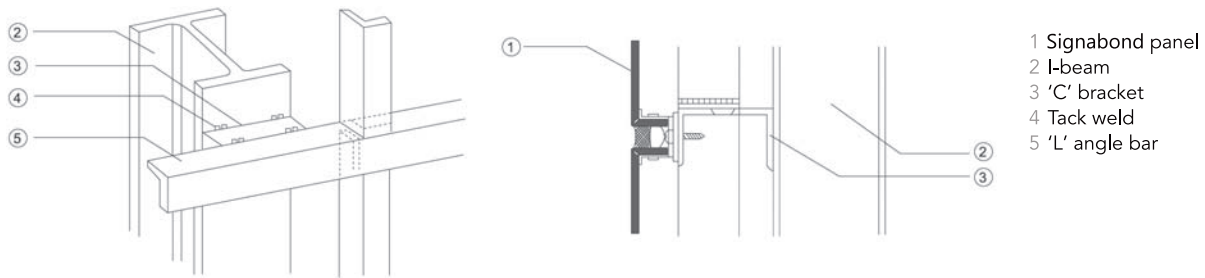
## Panel Type and Joint Design D



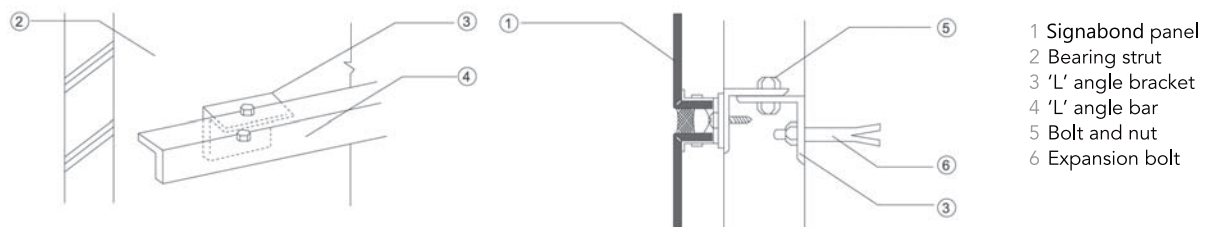
- 1 Signabond panel
- 2 Rivet / Screw
- 3 Alum extrusion
- 4 Alum extrusion
- 5 Backer rod / Gasket
- 6 Separator pad
- 7 'L' angle bar
- 8 Self-drilling screw

*Above mentioned accessories  
used for low buildings*

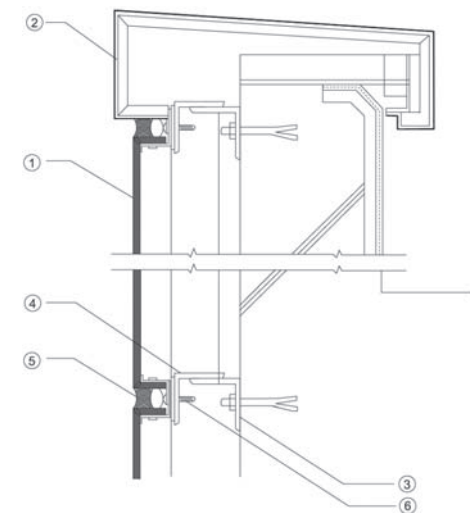
## Keel Structure A



## Keel Structure B

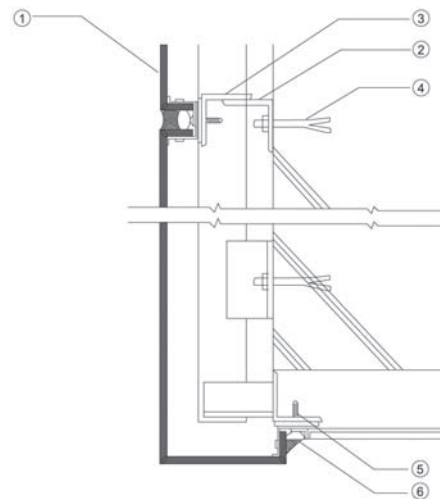


## Parapet Capping



- 1 Signabond panel
- 2 Roof top
- 3 'L' angle bar – bottom
- 4 'L' angle bar – top
- 5 Sealant
- 6 Self-drilling screw

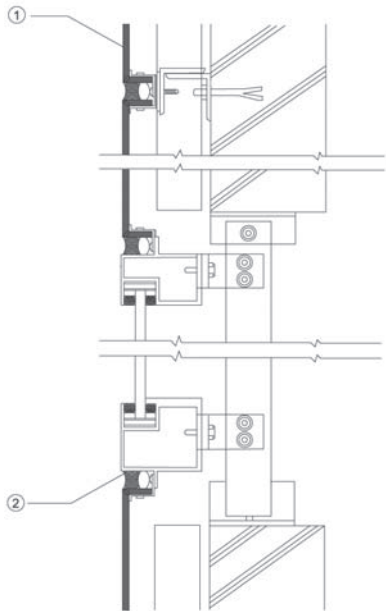
## Eaves



- 1 Signabond panel
- 2 Angle support
- 3 Angle bar
- 4 Expanding bolt
- 5 Self-drilling screw
- 6 Sealant to act as drip-point

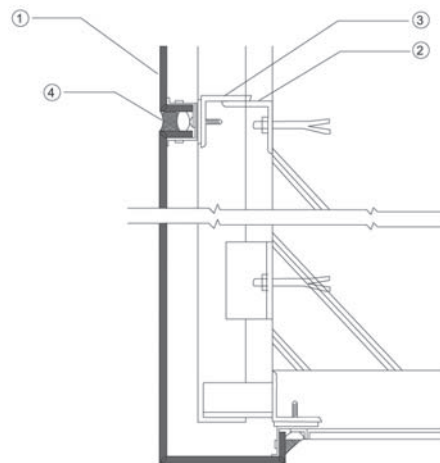


## Window Frame



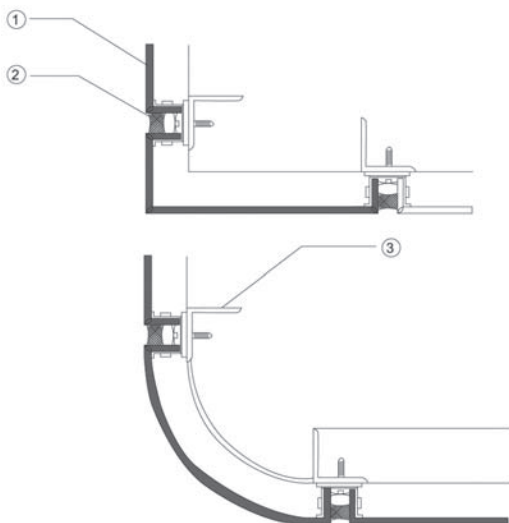
- 1 Signabond panel
- 2 Sealant

## Foundation



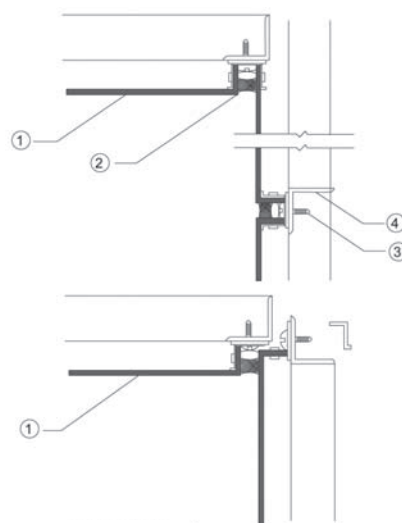
- 1 Signabond panel
- 2 Angle bar
- 3 Angle support
- 4 Sealant

## External Corner



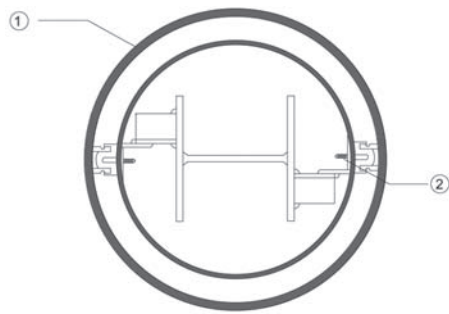
- 1 Signabond panel
- 2 Sealing material
- 3 Angle bar

## Corner Installation



- 1 Signabond panel
- 2 Sealing material
- 3 Screw
- 4 Angle bar

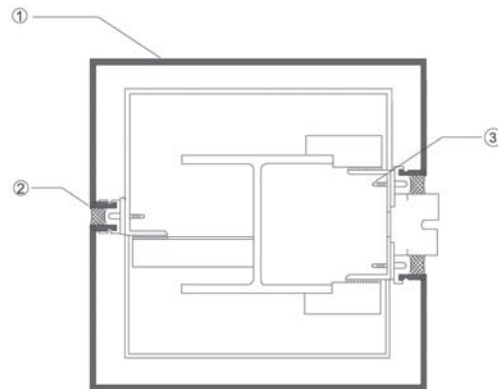
## Column Covering



- 1 Signabond panel
- 2 Screw

*Above mentioned accessories  
are used for low building*

## Strut Covering



- 1 Signabond panel
- 2 Sealing material
- 3 Screw

*Above mentioned accessories  
are used for low building*

## Storage and Handling

Proper care should always be taken when handling and storing pallets which contain Signabond panel Sheets.

We strongly recommend that the following guidelines be strictly adhered to:

- A forklift, which can support lifting weights of at least 2500kg is used to move the pallets around.
- The length of the fork should be at least 1.5 meters in length, so that it can adequately support the weight of a pallet and prevent the pallet from tipping over or being damaged.
- When storing pallets, they should be stored in a clean, dry and covered warehouse or space at all times, so as to prevent the pallets from being exposed to the sun, rain, moisture and other elements.
- When stacking the pallets on top of each other, the maximum height should not exceed 6 meters, so as to avoid warping and bending of the panel sheets.
- Only pallets of identical size should be stacked one on top of the other.
- All pallets must always be placed on horizontal racks or stacked horizontally.
- If panels are removed from the pallets, do not lean the removed panels against any vertical wall or similar support, so as to avoid damage to the surface of the panel sheets.
- When removing a panel sheet from a pallet, it must be carried out with at least 1 worker, at opposite ends and they should only remove 1 panel at a time.
- A single worker must not try to remove or flip the panel sheets out of a pallet by himself, as doing so could cause injury to the worker and damage to the panel sheet.
- When stacking panel sheets on top of each other, nothing should be placed between them, so as to avoid causing any marks, dents or impressions on any of the panel's surfaces.
- It is highly recommended to cover pallets with a plastic sheeting to prevent accumulation of dust and dirt on the Panel Sheets.

## Specifications

Test	Criteria & Tolerance
<b>Mechanical Properties of Aluminium Skin (Cover Sheets)</b>	
Alloy	1100/3105, 3003/5005
Temper	H18/H24, H22/H42
Tensile Strength of Aluminium Skin (Rm)	≥ 130
0.2% Proof Stress (Rp 0.2)	≥ 90
Elongation A50	≥ 5%
Rigidity ( EJ kNcm <sup>2</sup> /m)	4mm = 2400
Modulus of Elasticity (N/mm <sup>2</sup> )	70,000
Linear Thermal Expansion	2.4mm/m at 100°C Temperature
<b>General Specifications of Almaxco Aluminum Composite Panel Sheets</b>	
Pencil Hardness PVDF Coating	HB
Impact Resistance (Ball Drop) 50kg/cm	No split after reverse impact test with cross cutting
Humidity Resistance	3000 hours, No Change or Blister
Salt Spray Resistance	5% Salt for 3000 hours, No Change or Blister
Solvent Resistance	200 times MEK, No Change
Chemical Resistance	5% HCL or 5% NaOH for 24 Hours, No Change
Boiling Water Resistance	100°C (+/-2°C) for 2 hours
Cleaning Agent Resistance	Isopropyl Alcohol, Ethanol Absolute 46.7% No Change
Oil Resistance	No Trail
Abrasive Resistance	50 - 80 KTR, No Crack
Temperature Resistance	- 50°C to +80°C
<b>Coating Specifications &amp; Tolerance</b>	
Minor Surface Coating Flaws	≤ 3/m <sup>2</sup>
Color Variation Tolerance Solid Colors (PVDF, Polyester, FEVE)	Δ ≤ 4 from approved color
Color Variation Tolerance Metallic Colors (PVDF, Polyester, FEVE)	Δ ≤ 4 from approved color
Color Variation Tolerance (Wooden/Granite PVDF Coating)	Δ ≤ 5 from approved color
Gloss Range for PVDF	20% - 45%
Gloss Range for Polyester & FEVE	30% - 90%
Acceptable Gloss Reading Tolerance	+/-10%
T-Bending for Polyester Paint	1T
T-Bending for PVDF, NANO, FEVE	2T
<b>Dimension Tolerances</b>	
Thickness of Aluminium Skin	+/-0.02mm
Thickness of Panel	+/-0.2mm
Length (mm)	+/-3mm
Width (mm)	+/-2mm
Diagonal Difference (mm)	≤3mm

## Signabond ACP Mechanical & Technical Properties Summary

No.	Test Item	Test Method	Result
1	Heat Deflection Temperature	ASTM D648-07	112.84°C/235.12°F
2	Flexural Bending Strength	ASTM D790-07	111.8 Mpa
3	Flexural Elastic Modulus	ASTM D790-07	16130 Mpa
4	Core Shear Ultimate Stress	ASTM C393-06	10.2N/mm <sup>2</sup>
5	Facing Bending Stress	ASTM C393-06	172.9N/mm <sup>2</sup>
6	Shear Strength By Punch	ASTM D732-09	30.2Mpa
7	Penetrating Resistance	ASTM D732-09	9362N
8	180° Peel Strength	ASTM D903-98(2004)	10.6N/mm <sup>2</sup>
9	Tensile Strength	ASTM E 8-09	44.4Mpa
10	Tensile Strength at Yield	ASTM E 8-09	44.4Mpa
11	Elongation at Break	ASTM E 8-09	250%
13	Linear Thermal Expansion Coefficient	ASTM E 831-06	238.3 (µm/m°C)
14	Thermal Resistance (R Value)	ASTM C 518-04	0.06305
15	Coefficient of Thermal Conductivity (U Value)	ASTM C 518-04	4.32

- Above Tests are conducted by SGS and Test Report for the same can be provided on written request.
- Above Tests are for 4mm 0.50/0.50 Panel Sheets.

## Signabond ACP Summary of International Fire Tests (4mm)

North American Standard	
ASTM E119-07	2 Hour Fire rating
ASTM E84 for B1 FR core	Class A Class 1
European Standard	
EN 13501-1: 2007 (Class B) for B1 FR core	B-s1-d0 - European Union Fire Standard
EN 13501-1: 2007+A1: 2009 (Class A2) for A2 FR core	A2-s1-d0 - European Union Fire Standard
British Standard (All Commonwealth Countries)	
BS 476 Part 4 tested to Core Only for A2 FR core	Non Combustible FR Core
BS 476 Part 6 tested to Core Only for A2 FR core	Class 0
BS 476 Part 7 tested to Core Only for A2 FR core	Class 1
BS 476 Part 6 tested to panel for B1 FR core	Class 0
BS 476 Part 7 tested to panel for B1 FR core	Class 1
Australia/New Zealand Standard	
AS/NZS 1530.1 (Only for A2 FR Core)	Non- Combustible FR Core
AS/NZS 1530.3	Simultaneous Determination of Ignitability, Flame Propagation, Heat & Smoke: All Nil
AS/NZS 3837: 1998	Classification of Fire Performance Pursuant to BCA C1.10a
Test Heat Flux = 50k/m <sup>2</sup> Time (Sec)	(Building Code of Australia Classification - Group 3) Eligible for installation as Wall and Ceiling Lining for Class 2-9 Buildings

# Cleaning and Maintenance of Signabond Panel Sheets

For all Signabond panels to retain their color, gloss and aesthetic appeal, an approved and bonafide cleaning company must carry out regular cleaning and maintenance of the installed panels.

Signabond panels are smooth and thus do not retain much dirt and soil on their surfaces, however if the panels are not regularly cleaned and maintained, dirt and soil could build up on the panels' surfaces. The durability and Warranty of the panels could be affected, if the panels are not regularly cleaned and maintained, due to a build up of dirt and soil, this could cause coating surface issues to arise. This will also negatively impact the aesthetic look, color and gloss of the panels.

The amount of dirt and soil, that can build up on a panel surface depends on the environmental conditions in the location of the project. Hence, cleaning and maintenance frequencies will depend on the local environmental conditions.

The panels must be cleaned in accordance to the stated details below at least once a year, or more if the environmental conditions so require.

When the panels on a project are due for their first cleaning and maintenance process, the cleaning company must first carry out tests for compatibility between their proposed cleaning agent and the panels. It is recommended that the testing is carried out on a spare panel or on an inconspicuous area of the project panels.

Once a cleaning agent is found to be compatible with the panels, then this cleaning agent must always be used. If at any time the cleaning company wishes to change their cleaning agent, they must go through the same testing process as stated above.

When cleaning the panels, it must be ensured that the surface temperature of the panels is always below 40°C at all times, so as to avoid any unforeseen issues with the Panels surfaces. As far as possible try to carry out the cleaning process in the shade and at moderate temperatures. Do not carry out any the cleaning process when it is raining, snowing or in similar conditions.

A forceful water rinse from top down is recommended, as an initial step of the cleaning process, followed by a low water volume with a moderate pressure for the remainder of the cleaning process.

The cleaning must be done with a uniform pressure and with a horizontal motion first, followed by a vertical motion from top to bottom of the Panel's coated surfaces.

It is essential that either a non abrasive grit free pad, soft grit free squeegee or soft lint-free cloth is used to clean or wipe the surface of the Panels, so as to prevent abrasions and scratches on the Panel's coated surfaces.

To remove soil and dirt off the surface of the Panels, it is recommended that prior to the carrying out the proposed cleaning process, a small area is tested first to determine the degree of cleaning actually necessary to accomplish the task.

A mild cleaning agent such as IPA solution (Isopropyl Alcohol) with a neutral PH of 5-10% can be used for the removal of light and dirt soil.

For stubborn stains, such as those caused by sealant and caulking compounds, a mild solvent such as IPA (Isopropyl Alcohol), n-Hexane or Ethanol 46.7% can be used.

It is recommended to start the cleaning from the top of the building, as opposed to the bottom of the building, so as to avoid any rundown and streaking of the water and cleaning agents on the panels that have already been cleaned.

After the soil and dirt has been removed, the Panels must immediately be rinsed with clean water and wiped with a soft non-abrasive cloth.

## WARNING:

Do not use any strong organic solvents or cleaning agents under any circumstances, such as MEK (Methyl Ethyl Ketone), MIBK (Methyl Iso Butyl Ketone), Triclene, Paint Thinner, household detergents, cleaning agents, strong alkali or strong acid based cleaning agents containing sodium carbonate, caustic soda, potassium hydroxide or similar, or any such strong abrasive and lacquer dissolving agents. All cleaning agents must have a neutral PH of 5-10% only.

The use of abrasive cloths, pads will damage the surface coating of the Panels coated surfaces.

While using any cleaning agents, caution should be taken at all times. It should be noted that many cleaning agents may be inflammable and dangerous, hence it is important to avoid any contact with fire or the use of lighters or the permitting of smoking around any cleaning agents. It should also be ensured that cleaning site is always adequately ventilated to prevent any explosions and inhalation, as vapors from such cleaning agents can build up in the cleaning site.

All cleaning materials must be disposed of properly. The company shall bare no liability whatsoever for non-compliance with the warnings stated above and for the non-compliance with the local work safety laws and regulations in the respective countries by any parties whatsoever.

**Disclaimer**

All information, photos, illustrations, diagrams and recommendations with regards to the processing, installation and fabrication methods provided in the Company's catalogue and or other marketing materials are for general information only.

The Company disclaims all liabilities whatsoever, including for injuries to persons and property, loss of Panels Sheets, loss of profits, loss of goodwill or any tangible or intangible loss, however arising including circumstances where the customer or any third parties have not obtained the relevant advice and recommendations from a Certified Construction Professional, Qualified Architect or Qualified Engineer, Qualified Fabricator or Installer regarding the correct applications and installation methods of the Panel Sheets or Panels.

The Company cannot be held liable under any circumstances whatsoever, for failure by the customer or any third parties to comply with any applicable building codes, regulations, laws or testing requirements, as required by the relevant governmental agencies in their respective countries. It is wholly the customer's responsibility to ensure that Panel Sheets ordered comply with such local regulatory requirements and are fit for their intended purpose.

**Important**

Safety must be practiced at all times while handling, fabricating and installing, Signabond panel sheets. All fabrication and installation work must be done using protection gloves, goggles and protective headgear during installation on site.

The protection film must be left on the coated side until all the processing works are completed to avoid scratches and damages to coated surface.

**Errors & Omissions**

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