



# TECHNICAL MANUAL

COMPACT LAMINATES

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## 1. GENERAL RECOMMENDATIONS

### 1.1 Transport and Handling

To avoid the damage of surfaces and edges, sheets must be handled with extreme care. Always transport the panels on flat and stable pallets and make sure that they do not slide over each other during loading and unloading operations.

To transport large quantities of laminates, use a strong pallet or a wooden case after wrapping them up in polyethylene film, and cover the edges with protections.

Thin laminates (< 1,0 mm) can be transported by rolling them up, with the decorative side facing inwards to form a cylinder of ~600mm in diameter.

Secure the panels with steel straps during transit and use protective corner sections under the straps.

Lift the sheets straight up, do not slide the sheets against each other. Lift them by hand or by means of a vacuum lifting device with proper load capacity.

Pay particular attention to dirt, foreign bodies and sharp edges that can cause damage in case of rubbing against the surfaces.

Thicker panels should be stacked at the bottom, lighter ones towards the top, and care should be taken not to over-load the stack.

### 1.2 Storage and Conditioning

Material that is stored in the wrong position may be deformed, even permanently. Never let the panels stand on the edge.

Sheets must be stacked horizontally.

Panels moderately change dimensions depending on weather and relative humidity, therefore a pre-conditioning of 72 hours on site is suggested. Store them in a closed place where normal climatic conditions are guaranteed (temperature between 18° and 25° C and 45-65% RH), avoiding that the two sides of the panel are in different condition of temperature and humidity.

Use a protective sheet to protect all the panels on the pallet. The pallet should always be covered after any removal of panels, in particular when the product is stored in between operations. The prolonged exposition to a different environment in terms of temperature and relative humidity can cause permanent mechanical deformations.

### 1.3 Maintenance and Cleaning

HPL are hygienic and suitable for direct contact with food. The surface prevents the proliferation of germs and bacteria, and it has antistatic properties not to attract dust.

HPL surfaces does not require any special maintenance, but it is important to take certain precautions:

- Although very durable, the surface of HPL must still never be treated with products containing abrasive substances, abrasive sponges, sandpaper or steel wool;
- For common types of dirt, use a damp cloth or a soft sponge with water or mild detergent to clean up the surface;
- Products with a high acid or very alkaline content should be avoided because they can stain the surface;
- Avoid furniture polishes and wax-based cleaners in general, since they could form a sticky layer on the HPL surface, where the dirt deposits.

<i>Type of dirt</i>	<i>Cleaning recommendation</i>
Coffee, tea, milk, wine, juice, syrup, soap, ink	Cold water
Animal and vegetables fats, dry wine and spirits, sauces, dry blood, eggs	Cold water with soap or household detergent
Vegetable and vinyl-based glues, organic waste	Hot water with soap or household detergent
Vegetable oil, solvent marks, marking and ballpoint pen, wax foundation and greasy make-up	Alcohol, acetone, MEK
Nail polish, lacquer, linseed oil	Acetone
Synthetic oil paint	Trilene nitre-based solvent
Neoprene glues	Trichloroethane
Silicone (traces)	Wooden or plastic scraper (attention not to scratch the surface)
Limescale	Low percentage of citric or acetic acid detergent (10% max)

#### 1.4 Release of Protective film

The protective films are designed to temporary protect the surface against dirt, scratches and tool marks; they are not suitable for corrosion, humidity or chemicals.

According to the structure of the surface finish, the protective film shows a different adhesion, which may be further influenced by the ambience temperature and the storage conditions. Store the material in fresh and dry areas, avoiding the exposition to direct and indirect sunlight or extreme heat.

In case of thick compact laminates, the protective film must always be removed from both sides at the same time.

For post-forming laminates, the applied protective film can withstand the high temperature of the process. However, the customer has to test the post-forming process conditions with a trial before going to a full-scale production.

For further information and warranty conditions, please consult the data sheet of the purchased product.

## 2. PROCESSING

### 2.1 Safety precautions and general processing

Machining panels should only be fabricated by a machining or construction professional with proper equipment, such as personal protection and high visibility clothing. The edges of unbevelled boards are sharp, so suitable anti-slip gloves should be worn. Cutting will create dust, so protective eyewear and a dust mask are required.

Generally, the material has a homogeneous composition that allows the processing of both sides, with a machining comparable to high quality hardwood. The decorative side is made of a melamine impregnated paper that ensures a hard surface.

Working tools must always be in good condition.

### 2.2 Cutting

The cutting pattern must consider the fibre direction, which is along the long side of the panel.

For stationary circular saw, the machining should be done with the decorative side of the panel facing upwards; in case of double side decorative surface, it's advisable to use a scribing blade while cutting and a protective panel for handling over the machine's worktop.

For portable circular saw, the non-decorative side should be upwards.

To ensure a good finish and a long life, it's advised to use saw blade with inset carbide teeth (Widia) or diamond teeth PCD for volume components.

Use a saw blade with alternating tooth chamfered (WZ/FA), or trapezoidal/flat teeth (FZ/TR), with a cutting speed of 50 – 60 m/s. The feed speed depends on panel thickness, 6 – 10 m/min will give good results.

Saw blade projection should be 25 – 35 mm.

Type of sawing	Diameter		Teeth	N° or revolutions	Saw blade thickness		Saw blade height setting	
	mm	inch			mm	inch	mm	inch
Portable	150	6	36	3 000/min	2.5	1/8	15	5/8
	200	8	46	3 000/min	3.0	1/8	20	3/4
	300	12	72	5 000/min	3.4	1/8	30	1 1/4
Stationary	350	14	84	4 000/min	4.0	3/16	35	1 3/8
	400	16	96	3 000/min	4.8	3/16	40	1 5/8

**Please Note:** The parameter reported in the table are just a general indication, and they must be adjusted to the specific sawing set-up and treated panel. When the machining generates chipping of the material, it's necessary to reduce the feeding speed to obtain a cleaner cut.

### 2.3 Drilling

Compact HPL laminates tend to contract at low humidity rates, whereas they tend to expand at high humidity rate; therefore, while piercing the laminate, these dimension changes must be considered to allow adequate space around the screw to avoid the cracks (1 – 2 mm greater than the screw)

The use of carbide-tipped HSS helicoidal drill, with a top angle of 60-80° is recommended; with a speed of 1000 tr/min and piercing speed between 20 and 50 mm/min.

Mill the hole mouth and use plastic or metal washers not to tight the screw too much against the surface of the laminate. Always use a solid surface underneath (hardwood or equivalent material), to avoid fissures or splints on the opposite side.

When making dead holes, always allow at least 1.5mm from the panel thickness. A simple tap for threading will allow an easy piercing of compact laminates. Drilling the panel on the thickness side is not advisable and should be previously tested.

The exit speed of the drill must be carefully selected not to damage the melamine decorative surfaces, and the feed rate should be reduced by 50% shortly before the drill exits the work piece in full diameter.

Minimum and maximum distance between panel edge and hole are shown in chapter 3.

### 2.4 Milling

It's possible to make a large number of edge treatments for both functional and aesthetical purposes. To obtain proper finishing, edges must be milled and rounded with the use of a fine-grained abrasive paper. For better appearance, it is advice to polish edges with a silicon-free furniture product.

Internal openings must always have rounded corners, with the maximum possible radius. Avoid internal sharp corners and chippings along the cutting line, which could lead to cracking of the material.

For internal cut-outs, the inner radius of the corner should be as high as possible, and it depends on the length of the cut on the side directions.

### 2.5 Supports and Gluing

In most applications, compact laminates with a thickness below 2mm should be applied onto a strong, uniform and smooth support. The type of glue and related thickness, as well as the pressure exerted during assembly, will affect the final results in terms of surface finish and stability.

The dimensions of the laminates undergo minimum variations depending on the temperature and relative humidity; these variations may differ from those of the support.

Normally, the coefficient of thermal expansion for laminates is around 0.015 mm/(m\*°C) for both the length and width of the panel, which gives negligible variations. However, if the sheets are assembled at high temperature, these dimensional changes must be monitored.

For thin laminates, it is important to have a good planarity of the support, which can be made of different natures: particle board, MDF (Medium Density Fibre), plywood panels, wood, alveolar materials, expanded materials, metals, etc.

Gluing is in many cases carried out together with a mechanical joint to provide sufficient pressure during drying, and the glue must be spread homogeneously on the surface. Normally, bonding is made at room temperature, avoiding temperatures lower than 15°C and high temperature which will reduce the grab time of the glue.

The choice of the bonding agent depends on the type of substrate and application; for laminates, both thermoplastic and thermosetting adhesives can be employed.

#### PVA Vinyl glue

On wood-based supports, paper-based alveolar supports, plasterboard, etc.

<b>Parameter</b>	<b>Hot Press</b>	<b>Cold-flow Press</b>
Amount of glue g/m <sup>2</sup>	70 – 80	90 – 100
Temperature °C	60 – 70	20
Pressure kg/cm <sup>2</sup>	4 – 5	4 – 5
Pressing Time	40 – 60 sec	20 – 50 min

#### Contact glue (Neoprene)

Thermoplastic glue for cold-pressing; right after it becomes dry to the touch on the surface, the sheets can be pressed one against the other. It's possible to couple the laminate with all kinds of supports, including iron, steel and other metals.

The amount of glue usually employed is 150 – 200 g/m<sup>2</sup>, with a pressure of 10 kg/m<sup>2</sup> for at least 1 min.

#### Thermosetting glues

These types of glue are employed in hot presser (100 – 150°C) with pressure ranging between 5 and 10 kg/cm<sup>2</sup> for 50 – 100 sec of pressure time. The amount of glue usually employed is 90 – 150 g/m<sup>2</sup>.

<b>Support</b>	<b>Urea Formaldehyde</b>	<b>Melamine Formaldehyde</b>	<b>Resorcin Formaldehyde</b>	<b>Polyurethane</b>	<b>Epoxy</b>
Wooden based	X	X	X	X	X
Paper based alveolar	X	X	X	X	X
PVC				X	X
Polystyrene				X	X
Polyurethanes				X	X
Plasterboard	X				
Metal supports			X	X	X



## 2.6 Balancing elements

For composite panels it's advisable to use the same material on both sides of the support, or a balancer with similar physical characteristics, to avoid bending and warpage on the final product when subjected to environmental changes.

The two laminate faces must be cut in the same direction, considering the paper fibres that are parallel to the sanding on the back. A good planarity is influenced by the substrate, the glue, the bonding process and the final installation.

## 2.7 Post-forming (PF)

It is very important to ensure that PF laminates are stored and conditioned correctly before the process. If exposed to a dry ambient (10–20% RH), laminates tend to contract, while they expand in high humidity ambient (70–90% RH). To avoid anomalous variations and possible surface damages, before the PF process, all the components of the final product should be conditioned for at least 24–48h at 18–22°C, in a 50–60% RH ambient.

The temperature of the laminate should be monitored for all the process with temperature indicating crayons or infrared detector. Insufficient heating could lead to breaking or cracking of the laminate, while the highest working temperature is the one at which the post-forming is achieved without blistering and delamination.

The heating temperature and bending speed depend on the panel thickness, the type and radius of the curvature, and the fibres direction of the cellulose. Usually, PF is performed in the lengthwise direction, where the cellulose fibres are parallel to the sanding direction visible on the backside.

Standard PF parameters:  $T = 150-180^{\circ}\text{C}$  (constant T on the laminate); speed 10–18 m/min.

To achieve optimal results in post-forming production, a smooth support with a homogeneous distribution of fibres (such as MDF) is recommended to avoid surface defects on the final product.

Choose a type of glue that is specially devised for PF, such as PVA<sub>C</sub> or neoprene. Never use hot-melt glue.

### 3. INSTALLATION GUIDELINES

#### 3.1 Wall lining

Alvic compact laminates from 6 mm thickness upwards can be used as suspended cladding systems when assembled on a supporting frame.

The panel can be installed with a fully back-ventilated wall lining system with open floor and ceiling connections, or with a semi-sealed wall lining system with closed joints. A correct ventilation must be considered in order to have an equal relative humidity and temperature on both sides of the panel.

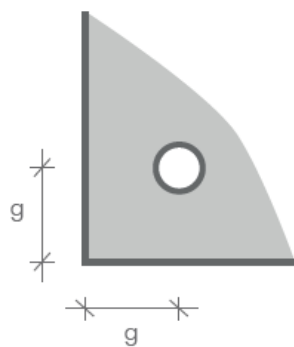
For corner assembly, to avoid stresses and deformations it's important to make joints which allow the movement of the panels by 2,5 mm/m both in vertical and horizontal direction. Two panels can be joined by glued aluminium/plastic corner profile or tongue.

When fixing the panel with visible screw or rivets, the holes must be about 2 mm higher than the diameter of the screw in order for the panel to move freely. For invisible fixing with screw on aluminium rails and brackets, a residual thickness of at least 1,5 mm must be preserved on the visible side.

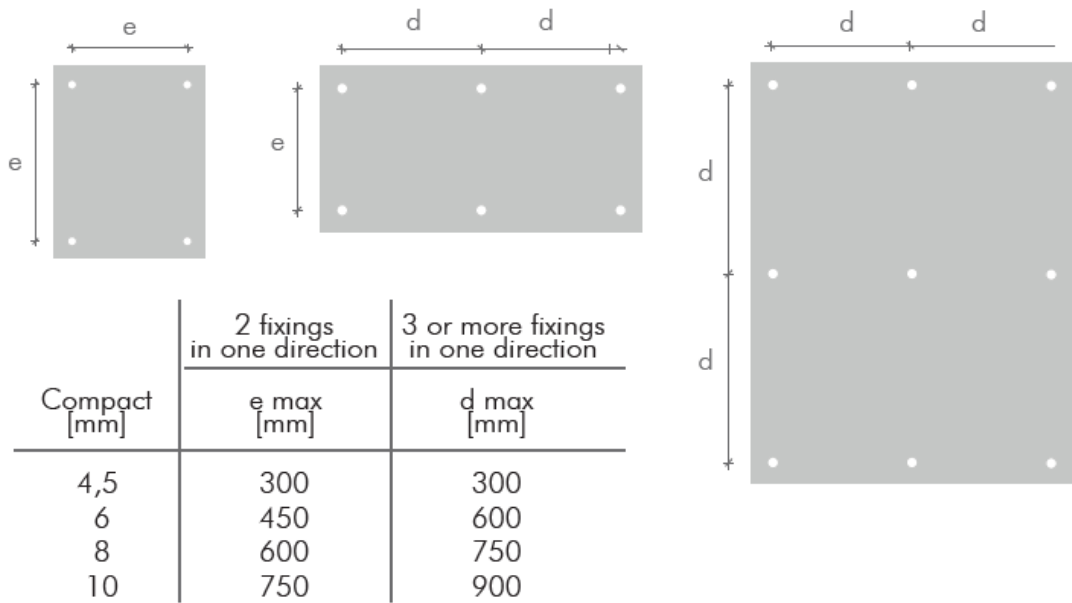
When using specific adhesive strips, apply them only in the full length of the vertical direction. Normally, adhesive systems are employed with a double-sided tape for temporary fastening while the adhesive cures.

For the fitting and assembly of laminates in the creation of partitions, or booths and cabinets for changing rooms, certain rules need to be followed in terms of distances at which rivets, self-tapping screw or door hinges should be placed.

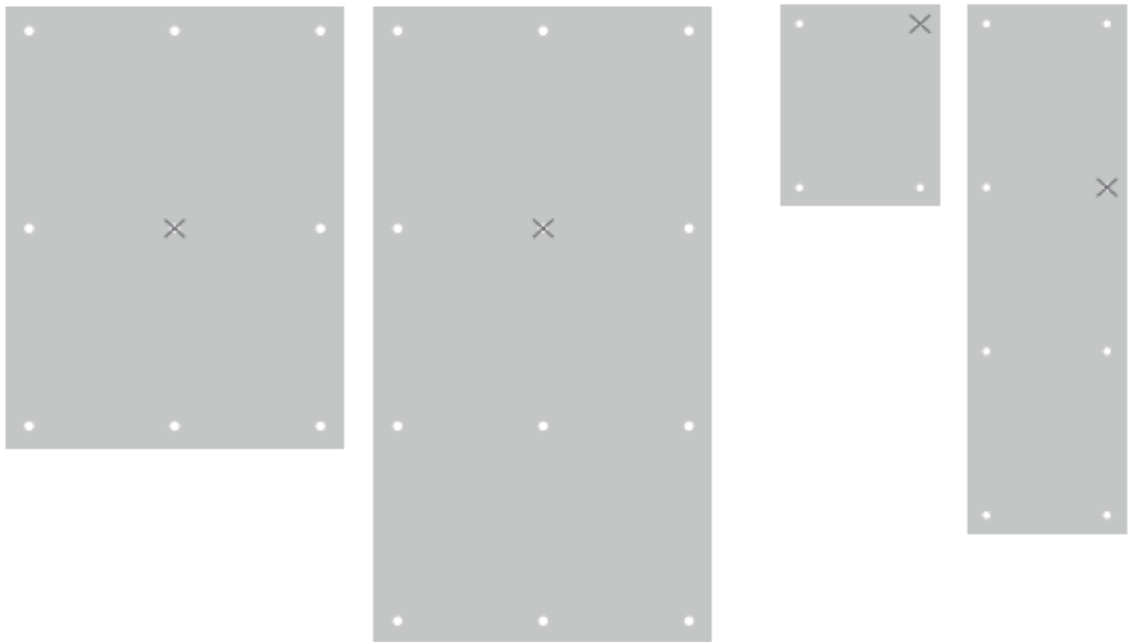
Minimum and maximum distance between panel edge and hole; and maximum distance between fastening points, depending on the thickness, are shown in the picture below:



Compact [mm]	g [mm]	
	min	max
4,5	20	45
6	20	60
8	20	80
10	20	100



Sliding points guarantee that the different stretching between substructure and Puricelli laminates will be compensated. The diameter of the sliding point should be 7,5 mm on a wood substructure, and 8,5 mm on aluminium.



### 3.2 Cubicles and partitions

Alvic compact laminates can be widely applied in various and different fields, such as: creation of doors, partition walls, toilet partitions, changing room cabinets, cabinets for communities, hospital and laboratories.

When cutting the panel for door applications, the height of the final product must be obtained from the length of the panel. Door must be hung with at least 3 hinges.

Temperature and relative humidity should not differ on the two sides of the panel for long periods, and the edges of the panel should not be permanently wet. For these reasons, a correct ventilation and drainage devices must be provided.

Panels can be supported on both vertical sides, on one vertical side, and in particular cases on the top and bottom sides.

### **3.3 Horizontal worktops**

Compact laminates can be used as worktops or tabletops. The suggested thickness depends on the final installation and dimensioning.

A conditioning of 24h is recommended for the panels in the room where they are going to be installed. The selected chamfer size should be set on the waste elements and calibrated with a trial. Chamfered edges should be sanded.

Dead holes maximum depth is 3 mm lower than the panel thickness, and the drill diameter must allow the panel dimensional variations due to temperature and humidity. The steel or aluminium support structure must withstand the bending after the application of a load on the top of the panel.

Tabletops can be joined together with properly dimensioned wooden dowels seal glue. After cleaning both edges, each joint should be sealed along the entire circumference of the tabletop's cross-section. Remove the excess sealant by wiping the tabletop with a cloth across the joint (not along the seal).

In case of a protective film, it should be removed only after assembly.

### **3.4 Sink processing**

Align a proper template on the tabletop, with a minimum distance of 40 mm from the edges and 150 mm from the tabletop joint. The milling phase should be divided in multiple steps, setting the cutter at 1/3 of the total thickness and moving it in the same direction until it goes below the lower edge of the material.

Chamfer and sand the upper edges of the hole, caring not to damage the surface of the laminate. Place the sink in the hole and use rubber seal or strips of elastic sealant to fix it on place. Finally, the sink is attached with latches along the circumference and screwed on with clamps under the tabletop.

Sinks can also be assembly in an undermounted position. After marking and milling the holes, put in the pegs, and spread the sealing resin evenly on the surface. Place the sink in position and tighten the clamps with screws. Remove excess resin with a clean cloth.