

*HIGH PRESSURE LAMINATE - DESCRIPTION AND USE*

SM 'art<sup>®</sup>  
Surface Materials

Designed in Italy

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## ABOUT US

We are a dynamic, constantly evolving company which has made innovation its mission, taking a new approach to production, management and creativity. Pre-empting trends and proposing new decorative solutions, we have quickly earned the trust of operators in the sector.

We are characterised by our constant research into the product: prestigious raw materials, state-of-the-art technologies and an insatiable creative talent are our greatest strengths. We then add meticulous attention to our customer's requirements with tailor-made style. Now you have a complete picture of the offering that we develop, create and distribute all over the world for the fitting, furniture and construction industries.

## HPL

We produce HPL sheets with sophisticated texture and innovative decors. We manufacture HPL laminates with the Synchronopore or Register embossing technology. Our goal is to create HPL laminates with high technical performance which touch for their aesthetic aspect. The laminates coordinated to the melamine panels are identical in colour and surface finish.

We offer HPL laminates in many sizes and thicknesses and in different qualities: Postforming suitable for curved elements, Chrome with black or white or coloured core, Compact with black or white or coloured core.



## HIGH PRESSURE LAMINATE

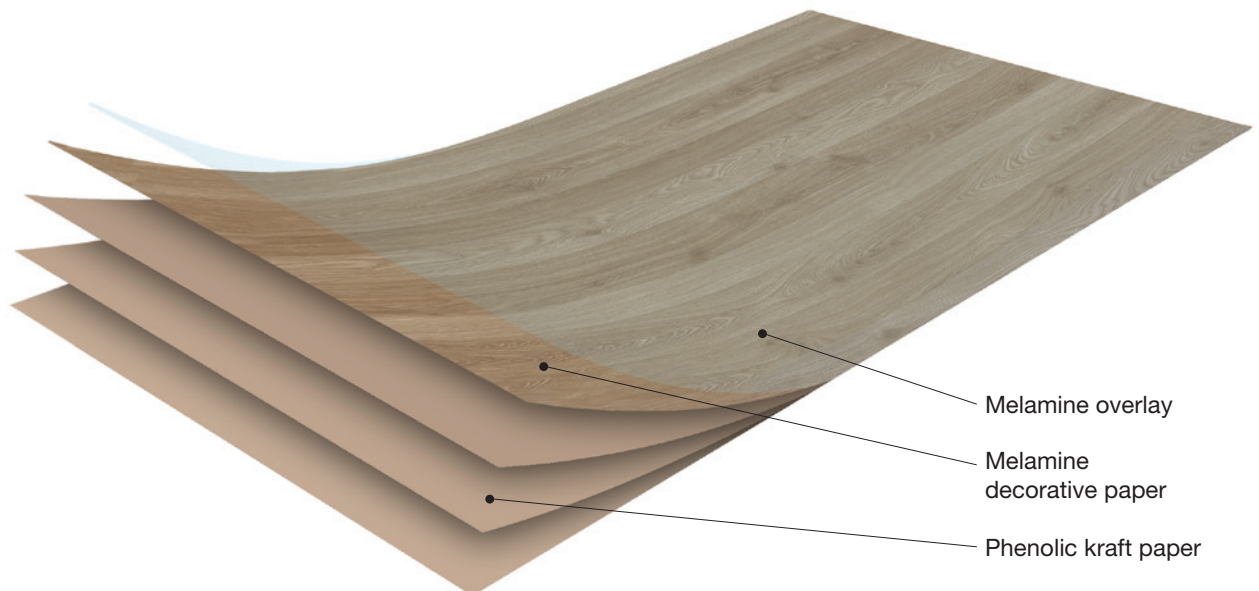
The High Pressure Laminate is a product composed by an overlay paper, a decorative paper and many kraft papers.

- The overlay paper is impregnated with melamine resins. The melamine resins give superficial abrasion resistance features the finished product. Thanks to the overlay paper the laminate can be used horizontally.
- Melamine impregnated decorative papers. The melamine resins give the superficial resistance to the product. We at SM'art use 100% melamine impregnation which enhance the resistance to water of the finished product. On this type of paper can be printed any kind of pattern: woods, stones, textiles etc... there is, almost, no limit to what you can print. The decorative papers give the aesthetic features to the melamine boards.
- The kraft papers are impregnated in phenolic resins and they are composing the thickness of the laminate. The more kraft papers you put the thicker the laminate will be. The kraft paper thanks to the phenolic resins give plasticity and hit resistance to the finished product.

The decorative papers and the kraft papers are impregnated with thermosetting resins. Thanks to the heat and pressure give from a specific press they adhere to the substrate.

The press is also impressing, thanks to specific palates, the tactile textures to the HPL.

Melamine boards are particularly indicated for the furniture production, furniture elements and interior decoration.

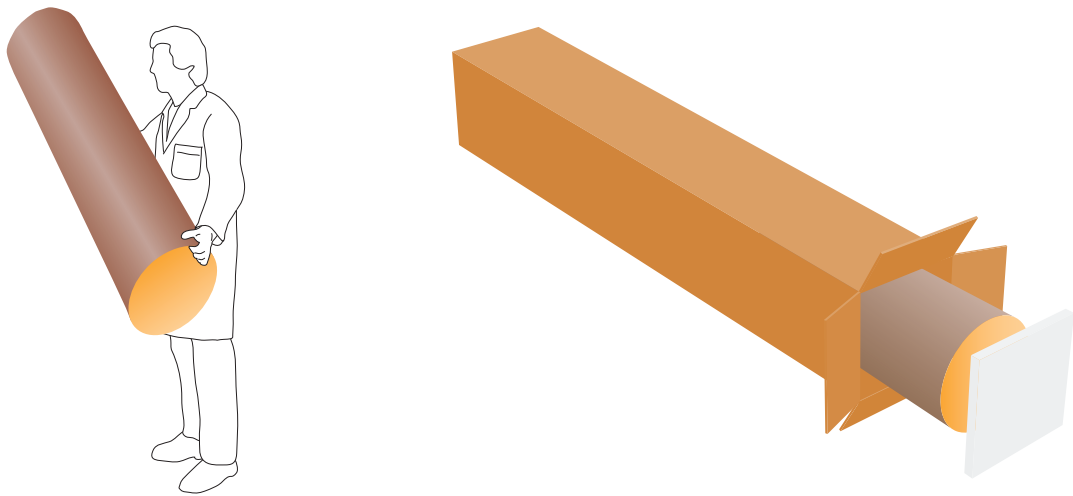


## HANDLING AND TRANSPORT

### Sheets

High pressure laminate are sharp on the edges, for this reason they should always be handled wearing gloves for protection.

When loading and unloading, the sheets should always be lifted, not slid upon one another, to avoid scuffing. Laminate sheets should be handled with care to avoid brakes. For the shipping of few sheets, the most common system is to roll the sheets with the decorative side facing inward, so to get a cylinder of about 500 mm diameter. The tubes should then be tighten with tape or cord and have the sides protected with carton. Even better would be to use carton boxes in which you can slid the laminate tube, protecting the sides with foam rubber or polystyrene.



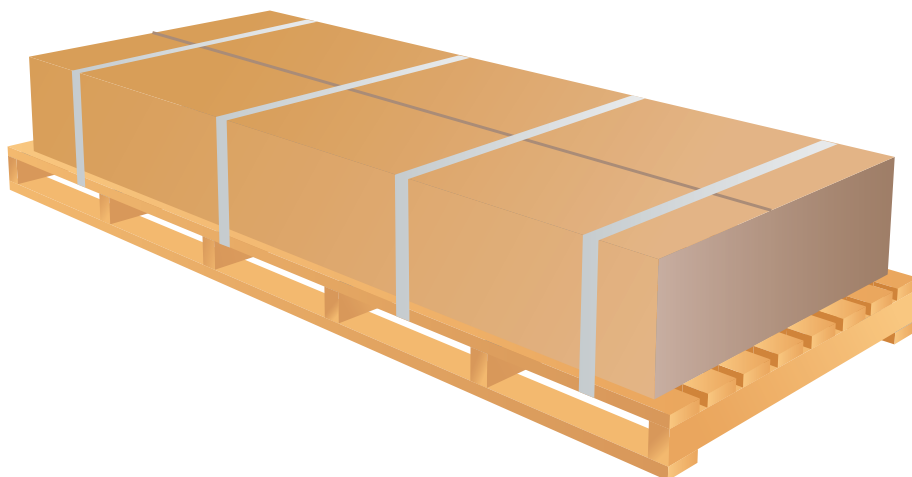
### Pallets

When the number of sheets to carry are considerable it is advisable to pile them on a wooden pallet.

Pallets should always be at least 5 cm longer and wider than the laminate size. Pallets should be very rigid, thus not bowing when lifted.

All the corners should be protected with carton or plastic to prevent damages.

Laminates should be tighten with metallic straps so to be well secure on the pallet. Particular care to sliding sheets should be taken in case of laminate with protective film.

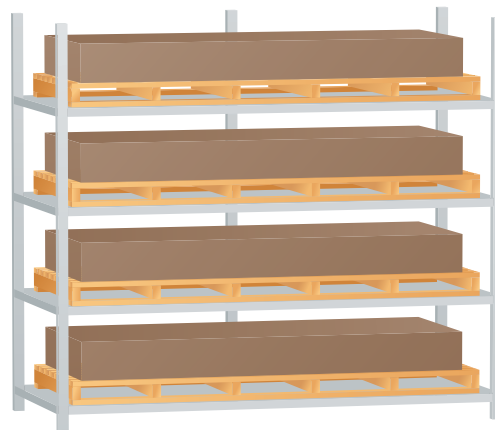
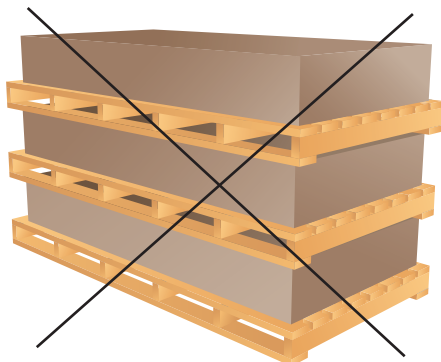


## STORAGE

### Pallets

SM'art laminate must be stored under roof and preferably in the same packing used for transportation.

The pallets should be stored on shelves and not piled upon one another to avoid the top laminates damaging.

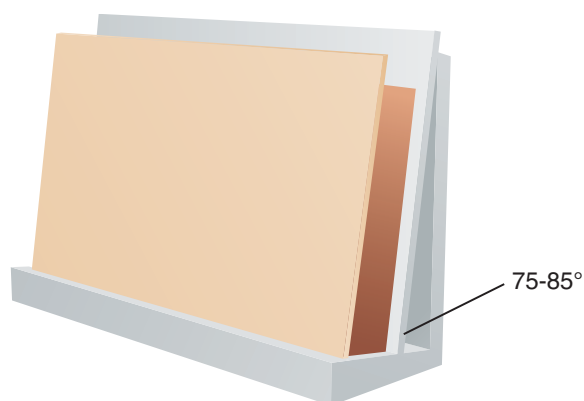


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### Sheets in racks

When you don't want to store the sheets on pallets, but loose sheets of laminate in horizontal racks, you should preferably store them face to face. You should also protect them with a covering board, which has also the aim of keeping them flat. If this is not possible, you should at least turn the top sheet face down to avoid warping.

If there is the need of storing few sheets of different colors, a vertical rack can also be used, in which the laminates are kept on edge. The rack should have a slight inclination so that the sheets lean on one side of the rack. On the other side there should be a board heavy enough to keep all the sheets flat.



SM'art high pressure laminate contracts slightly when kept at low humidity levels, between 5 and 30%, while it expands when kept at high humidity, between 70 and 90%.

Very low temperature do not effect the technical characteristics of the SM'art high pressure laminate.

Instead, very high temperature effect the SM'art postforming grade laminates, whose shelf life is reduced by half when kept at temperature over 30°C.

The best storing conditions are with a temperature between 18 and 24°C, and humidity level between 45 and 55%.



## CONDITIONING

The conditioning has the aim to minimize the different dilatations among the various materials when, once fabricated and installed, will undergo changes of humidity.

For this reason, laminate, substrate, backing laminate and glue should be conditioned for at least 48 hours prior fabrication, having all the components at room temperature not below 18°C, in a dry storage area with humidity between 45 and 55%.

During these 48 hours the various components will have the time to reach equal or very close humidity contents.

Starting from very similar conditions will limit the differences in dimensional stability, and by consequence the risk of warping of the fabricated element.

Wooden substrates should have a humidity close to 10%. Decorative laminate and backing laminate should have the same moisture content..

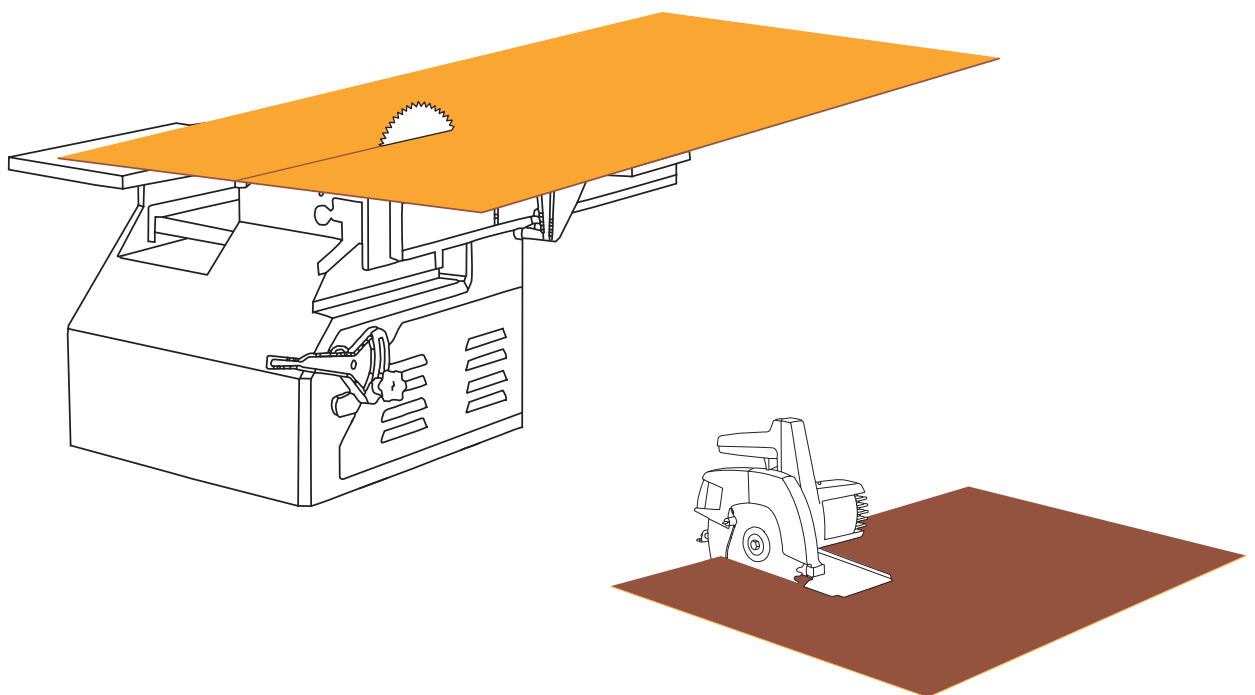
## CUTTING

SM'art high pressure laminate should be cut with circular saws.

If the saw is portable, the laminate will have to be placed with the decorative face side down in contact with a smooth surface which must be clean.

With fixed circular saws the decorative face should be side up and the blade should touch it first. The sheet must be held firmly to prevent fluttering. Blades should be steel or widia. The blades should be between 25 and 45 cm in diameter for straight cuts and between 6 and 12 cm for curved cuts. The peripheral cutting speed should be between 25 and 50 meters/second.

It is advisable to foresee a laminate size cut at least 2 - 3 mm bigger than the substrate size. Thus to be sure that the laminate is covering the whole surface of the board leaving still some margin for the finishing of the edges



## COUNTER VENEERING

Boards faced with SM'art high pressure laminate will nearly always have to have their reverse side bonded with the same laminate or with a backing laminate having the same or similar thickness to guarantee a good planarity.

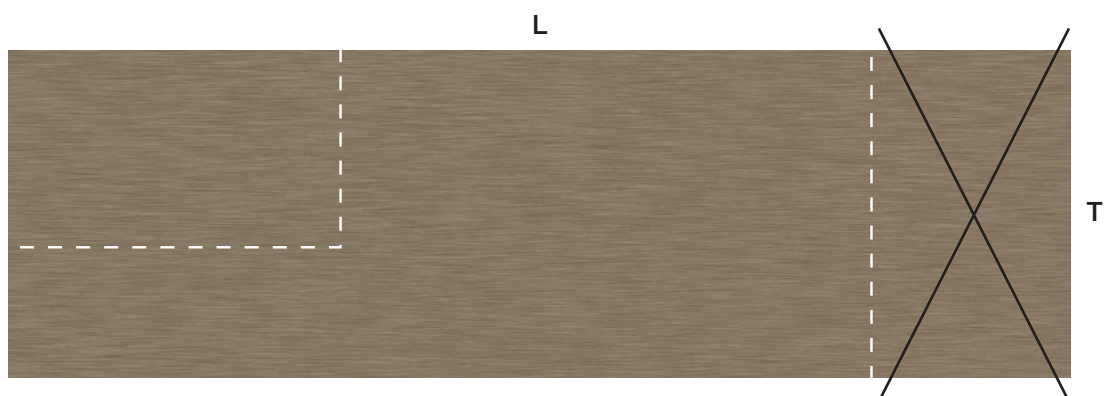
Particular care should be taken in case of boards of big dimension, especially when self standing without a frame.

In these instances it is always better to use the same laminate for the two sides.

Less critical is the situation where the boards have limited dimensions, like cabinet doors. Decorative laminate and backing laminate should always be cut in the same direction of the full sheet, and never at 90°. In other words, the sanding of the two laminates has always to be parallel.



Since the longitudinal dimensional stability is twice as big as the transversal, it is also important that the long side of a piece of laminate is cut from the long side of the full sheet, that is the one parallel to the sanding.



## SUBSTRATES

The substrates which can be used with SM'art high pressure laminate are various and of different origin, but they must all have the common characteristic of having a surface as smooth and homogeneous as possible, and free from irregularities which could show up on the bonded laminate surface. This is particularly true for high gloss surface finishes and/or very thin laminates.

The most common substrates are chipboard, plywood, medium density fiberboard, fiberboard. All these substrates are cellulose based, thus they have dimensional variations similar to the one of HPL. For this reason they are not causing many problems with warping.

For some special applications particular substrates should be used.

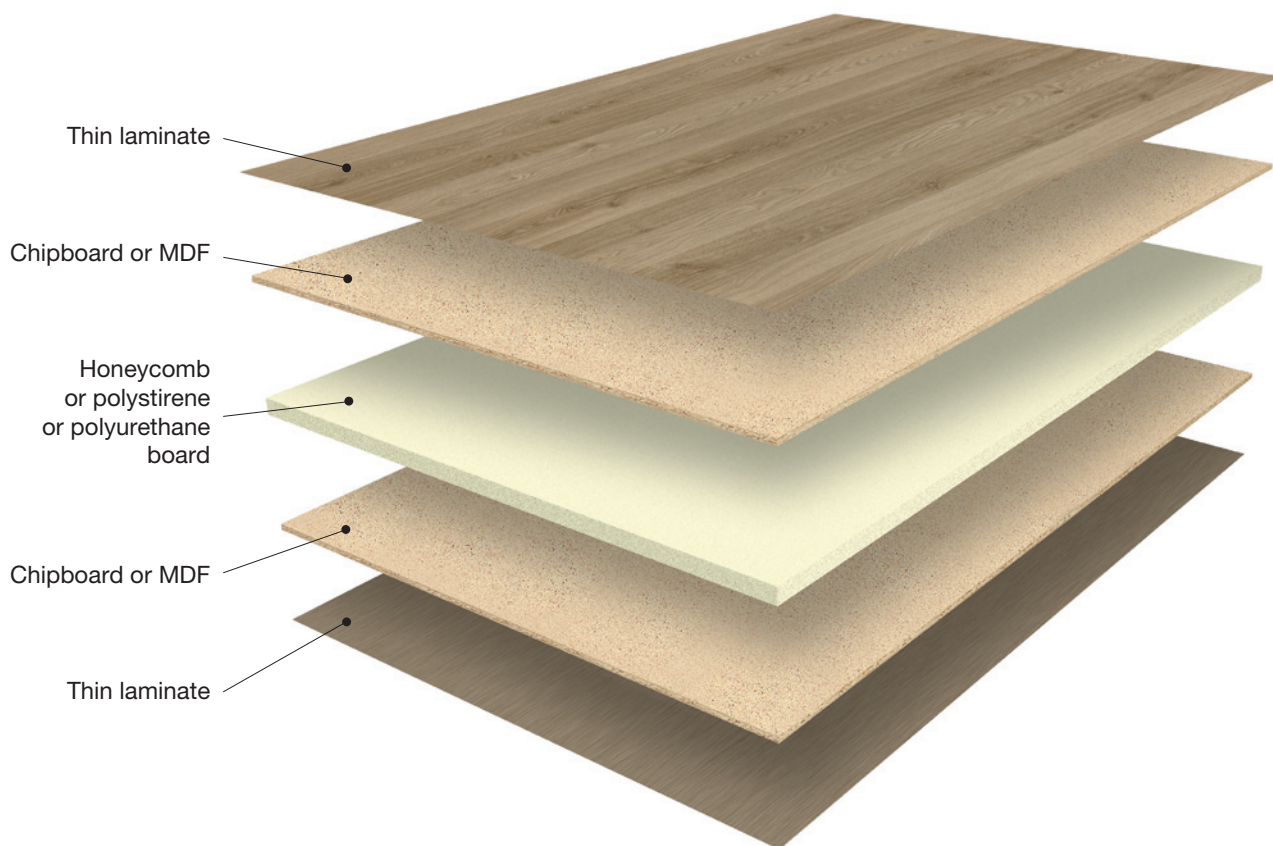
Mineral based cores should be used when a special resistance to fire is required. Particular care should be used concerning warping problems.

Aluminum, iron or steel slabs are also a good substrate, even if their dimensional variations are different from the one of HPL sheets.

Honeycomb cores, in aluminum or kraft paper, polystyrene and polyurethane boards are good substrates whenever a limited weight is important.

The laminate can be bonded directly onto the honeycomb, or the polystyrene or the polyurethane boards, only if the thickness is equal or more than 1,5 mm. In fact thinner laminates would not give a good enough shock resistance, since this kind of substrates are very yielding and do not "help" much the laminate sheet.

To be able to use thinner laminates, between 0,7 and 0,9 mm, a thin chipboard or MDF board should be used between the substrate and the laminate sheet.





## GLUING

Before the gluing it is important to perfectly clean the surface and the back of the laminate sheet, as well as the surface of the substrate, to avoid damages to the laminate surface caused by the pressure. It is recommendable to use blowing guns or soft brushes.

The glue should always be uniformly spread, as well as the pressure. Different types of glue can be applied depending on the board and the press used.

Here below we list certain indications on the most common types of glue and on the methods of application. These are however very generic and can be influenced by a variety of factors. It is always better to consult the glue supplier to obtain precise and personalized parameters..

### **PVA polyvinyl acetate glue**

They can be used in both hot or cold presses, and give good results for the bonding to wood based substrates. They are the best choice for postforming boards.

They are available in single and two part varieties.

The single part glues have a low humidity and high temperature (-20°/+70°C) resistance, which reduces their bond strength. The two parts glues have a much better resistance to humidity and high temperature (-20°/+100°C).

The general parameters to follow using a hot press are the following:

glue quantity: 60 - 70 gr/m<sup>2</sup>

temperature: 60° - 70°C

pressure: 3 - 5 kg/cm<sup>2</sup>

time: 40 - 45"

The general parameters to follow using a cold press are the following:

glue quantity: 80 - 90 gr/m<sup>2</sup>

pressure: 3 - 5 kg/cm<sup>2</sup>

time: 20 - 30'

After the pressing it is recommendable to let react the glue for some hours.

### **Ureic thermosetting glue**

These glues are used in hot presses and give optimum results for all application on wood based substrates, with the exception of postforming boards. They have exceptional performances for both humidity and high temperature (-20°/+120°C) resistance.

The general parameters to follow are the following:

glue quantity: 100 - 120 gr/m<sup>2</sup>

temperature: 100° - 140°C

pressure: 5 - 10 kg/cm<sup>2</sup>

time: 40 - 120"

### **Contact glue**

These glues are used in cold presses and allow the bonding to any wood based substrate. They are applied with spray guns on both the back of the laminate and the face of the substrate. They only need a minimum pressure. Humidity and high temperature (-10°/+50°C) resistance are both very low.

### **Resorcinol glue**

These glues can be used in hot or cold pressing. They are used for the bonding to fire retardant or waterproof substrates because of their extremely high humidity and water resistance and also their temperature resistance (-20°/+140°C).

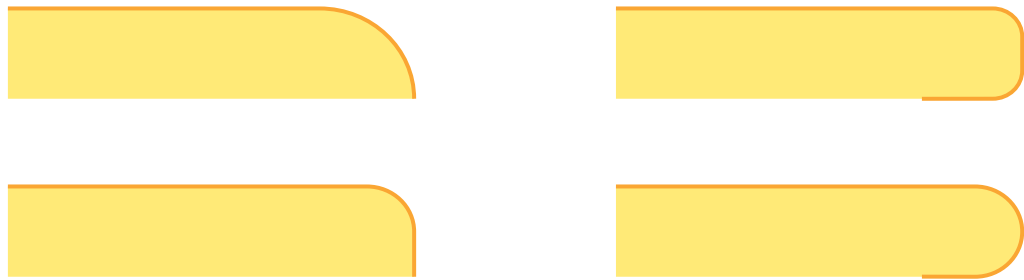
### **Epoxide glue**

These glues are used in hot and cold pressing for the bonding to metal substrates and they have good humidity and high temperature (-20°/+100°C) resistance.

## POSTFORMING

The postforming laminate has the characteristic of being formable under heating. This property allows the achievement of elements which do not show joints or sharp edges. The lack of joints avoids the problem of accumulation of dirt or infiltration of water, and gives a much better aesthetic result. The lack of sharp edges increases the safety of the elements.

A good postforming result depends upon a correct equilibrium between speed, temperature, curving radius and laminate thickness.



SM'art high pressure laminate, to be postformed, should be heated in the area to bend so to reach rapidly a minimum temperature set at 150°C on the laminate surface. It should not however overpass the maximum temperature of 165°C. In fact at the temperature of 180°C or more SM'art high pressure laminate shows blisters. For this reason this temperature should never be approached.

The best method to measure the temperature on the laminate surface is to apply heat sensitive waxes on the area to be formed.

These waxes melt at a set temperature and will give a very accurate sign that the laminate has reached the temperature required and thus can be formed.

The minimum bending radius which can be achieved is generally 10 times the laminate thickness, that is, if a laminate is 0,8 mm thick, the minimum bending radius will be 8 mm. Given a laminate thickness, some colors are more easily postformed and others which need more heating to be bent at the same radius. Generally the latter are the light solid colors and the whites, which, to get to a good hiding power, need to be heavier and to have a high white pigment content. Both these things are worsening the postformability.

The most common substrate is chipboard, which should have a surface as smooth as possible and a chip as homogeneous as possible throughout the thickness. Moreover the interior chips should not be too big, so to avoid cracks in the laminate surface due to protruding chips or due to cavities underneath the laminate surface caused by missing chips. Plywood used as a substrate for postforming can cause more problem than chipboard because of the layers of glue which very often make the surface of the edge not enough homogeneous.

MDF is instead a perfect substrate because of the complete lack of chips and the perfect homogeneity throughout the thickness.

SM'art postforming high pressure laminate has a shelf life of one year starting from the date of production. After this period of time, the postforming process could cause cracks on the laminate surface.

This period can be sensitively reduced, if the laminate is stored at high temperature, over 30°C.

In the following pages are illustrated the different processing used for postforming.

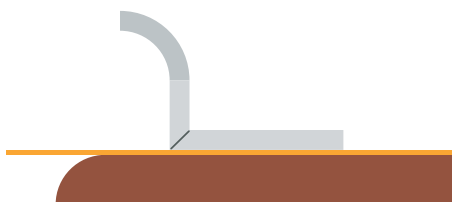
## Static process



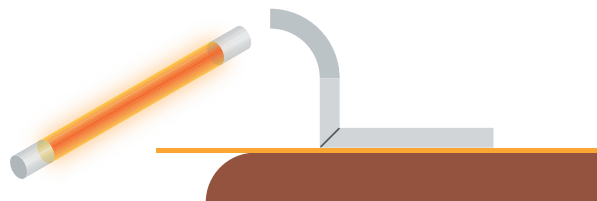
Substrate



Edge rounding



Laminate banding and positioning of the bending mold



Heating



Postforming of the laminate softened by the heat

## Continuous process



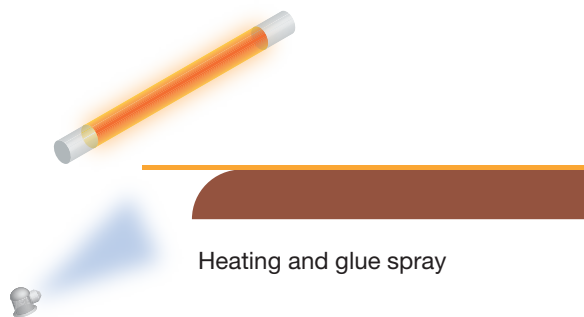
Substrate



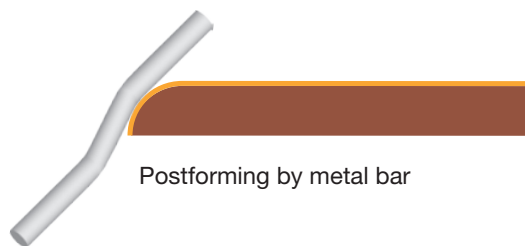
Edge rounding



Laminate bonding



Heating and glue spray



Postforming by metal bar

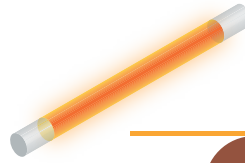


Shaped rollers press the laminate to the edge of the substrate

## Direct postforming process



Laminate bonding to substrate



Heating and glue spray



Machining leaving the overhanging laminate



Postforming by metal bar



Edge rounding leaving the overhanging laminate



Shaped rollers press the laminate to the edge of the substrate

## Splash back process



Substrate



Machining



Laminate bonding



Machining the back of the substrate



Postforming and insertion of Mdf plug



## PLANING

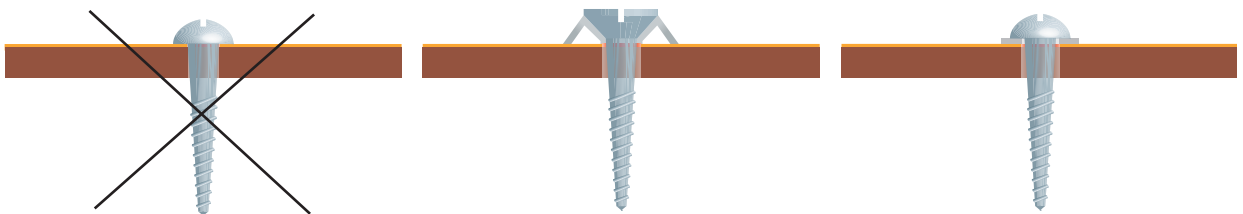
The planing can be carried out with a fine file or a small plane. It is done to bevel the edges of the laminate once bonded. The manual movement has always to be done from the decorative side in the direction of the substrat.

## DRILLING

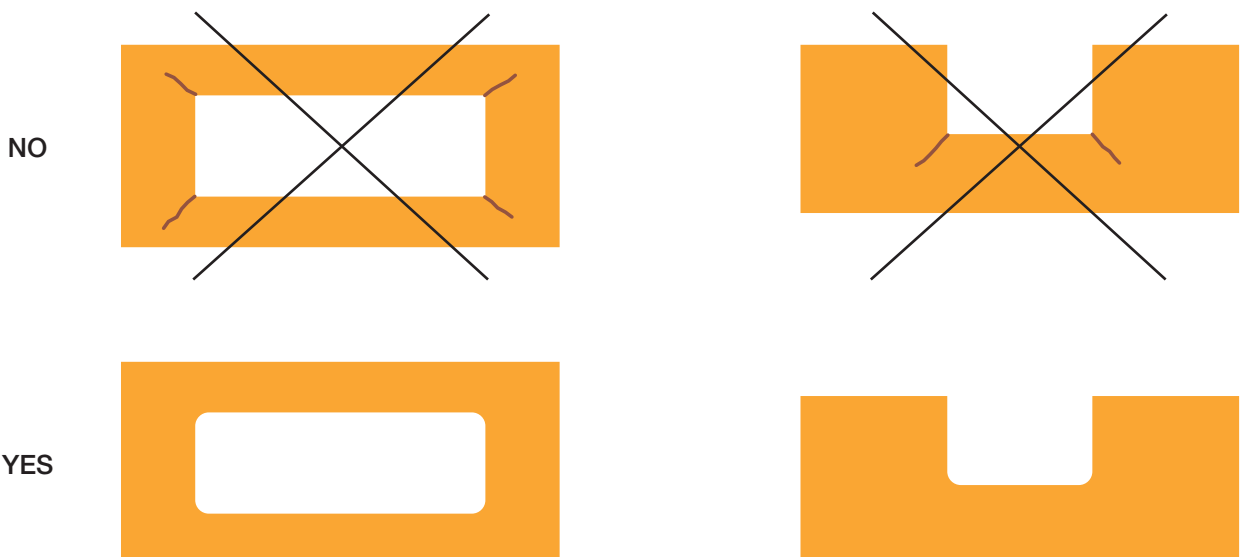
When drilling a laminate particular care should be taken not to over heat the point of the drill, which could damage the surface.

Drill points should be helical with a point angle between 50° and 90°.

The holes diameter should always be at least 0,4 mm larger than the one of the screws, and rubber or plastic washers should be used to avoid direct contact between the screws and the laminate surface, and which should give some allowance to the laminate dimensional variations due to changes of temperature or humidity



The holes and the internal corners should never present sharp corners, which could cause cracking, but should always be rounded with the maximum radius possible.



## CLEANING

SM'art high pressure laminate can be cleaned with a clean, soft and wet cloth. If the stain is particularly difficult hot water or liquid detergent without abrasives could be used.

Ink, glue or varnish stains can be removed with the use of solvents like alcohol or acetone.