

Manual of technical information

LAMICOLOR[®]

HIGH PRESSURE DECORATIVE LAMINATES

.01

Lamicolor products

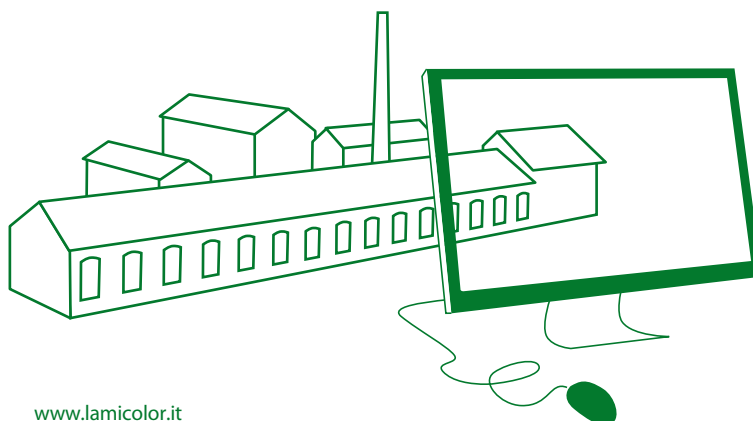
I The whole range of Lamicolor products is represented by high pressure decorative laminates HPL, layered panels made from cellulosic material impregnated with phenolic resins and joined together through the simultaneous application of heat ($T \geq 125^{\circ}\text{C}$) and pressure ($P \geq 5\text{MPa}$).

The finished product is a non-porous material with density $\geq 1,35\text{g/cm}^3$, which Lamicolor presents in a large range of colors, finishes and different sizes, for a vast range of applications, in the following product typologies:

› Lamco ^{HPL}	versions: Standard, Postforming, Ignifugo
› Lamco ^{HPL} Compact	versions: Standard, Ignifugo
› Lamco ^{HPL} Compact RE Exterior grade	versions: Standard, Ignifugo
› Lamco ^{HPL} Floor	versions: Standard, Ignifugo

Lamco ^{HPL} laminates are hygienic, easy to clean, with a high degree of resistance to surface wear and tear, impacts, scratches and acts of vandalism.

For any information: www.lamicolor.it



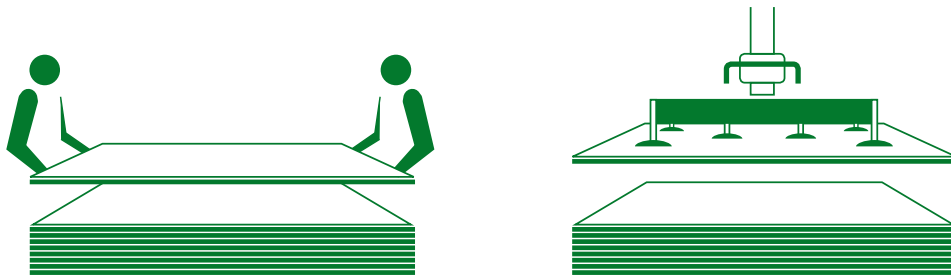
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Transport

- 2.1** Always transport the panels with proper means, such as forklift trucks, trucks, vans, ships etc., so as to ensure their stability and integrity.
- 2.2** The sheets should be transported horizontally on flat, stable and whole pallets at least of equal size (or bigger) than the panels, taking care in securing laminates so as to prevent them from sliding.
- 2.3** Always cover the laminates with waterproof material during transport.

Handling

- 2.4** Make sure that the panels do not slide over each other during loading and unloading operations. Lift the single panels by hand or by means of a vacuum lifting device with proper load capacity. (see A-B)
- 2.5** No foreign substances of any kind must interpose between the panels in order to avoid scratches and/or indentations on the laminates surface.



(A)

(B)

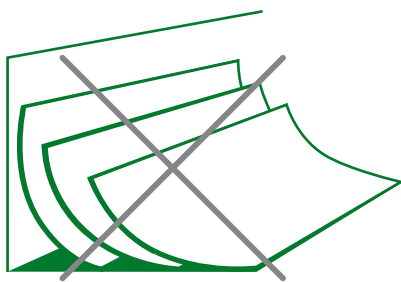
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Storage

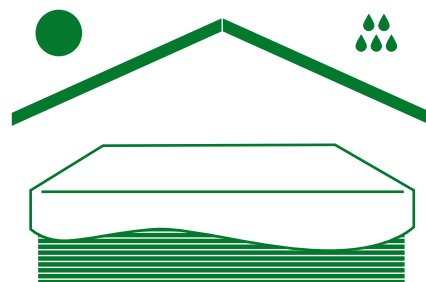
- 3.1** Store the panels in a closed and dry place, preferably at a room temperature between 10 and 30°C and 40-65% RH (Relative Humidity). In the event of temporary storage on the building site, it's advisable to choose a sheltered place.
- 3.2** Stack the panels on a flat horizontal surface (vertical storage can result in permanent deformation), covering the outer laminates with a waterproof protective layer. (see C-D)

Conditioning and installation

- 3.3** HPL laminates can slightly change size due to RH percentage in the atmosphere (see also technical data sheets at www.lamicolor.it). We therefore recommend that the Lamco HPL panels and the different substrates chosen be conditioned at the production site for at least 72 hours. (see 3.1)
- 3.4** Before assembly, laminates should be allowed to acclimatize for at least 72 hours to the same final ambient working conditions.



(C) WRONG



(D) RIGHT

Cutting

4.1 The cutting pattern must take into account the fibre direction (long side of the whole panel) (see E)

4.2 If the cut is made using a circular saw the quality of the cut can be optimized working on:

› **Type of blade:**

blades with tungsten carbide teeth (widia) or diamond blades are recommended.

› **Pressure on the cutting area:**

a suitable and stable pressure is advisable to avoid material vibrations.

› **Blade feed speed:**

slow down the speed according to the panel thickness.

› **Peripheral speed:**

should depend on the blade diameter and on the number of revolutions per minute.

› **Height of blade:**

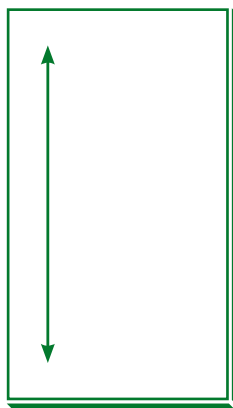
lift the blade to improve the cut of upper edges and lower it to improve the cut of lower ones.

› **Panel positioning:**

the exposed face must be turned upward.

In case of double side decorative surface it's advisable to use a scribing blade.

In consideration of the multiplicity of available equipment and processing units you should contact their producers before proceeding with manufacturing.



(E)

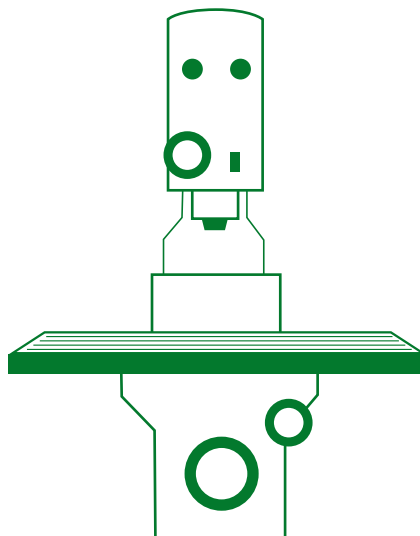
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Machining and edge finishing

- 5.1** It's advisable to use a fixed vertical cutter for edge finishing trying to avoid portable equipment. (see F)
- 5.2** The use of tungsten carbide or diamond tools with a rotation speed between 6.000 and 20.000 revolutions per minute is recommended.
- 5.3** To improve edge finishing of Lamco ^{HPL} Compact in its different versions, it is possible to perform the following operations:

- › Chamfering⁽¹⁾
- › Dressing with extra fine abrasive emery cloth
- › Polishing
- › Application of a thin oily protective layer

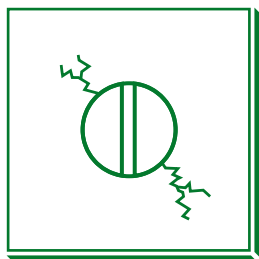
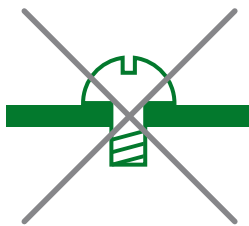
⁽¹⁾ recommended for Lamco ^{HPL} Compact RE outdoor panels.



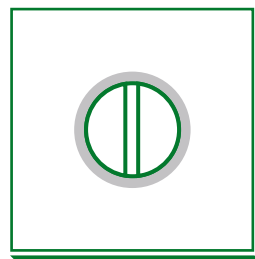
(F)

Drilling

- 6.1** It's necessary both in visible and invisible fixing. Ordinary portable or fixed drills can be used for this purpose with recommended rotation speed of approximately 1000 revolutions per minute and helical bits suitable for plastic materials.
- 6.2** Drilling speed should not result in overheating to prevent damaging of the decorative surface.
- 6.3** The diameter of through holes must be larger than the diameter of the screw according to the panel thickness and its dimensional variations. Screws should not block the laminate movement. In particular cases it's advisable to use plastic washers or bushes. (see G-H)
- 6.4** To prevent splintering on the exit side it is preferable to place the panel on a hard wood surface.



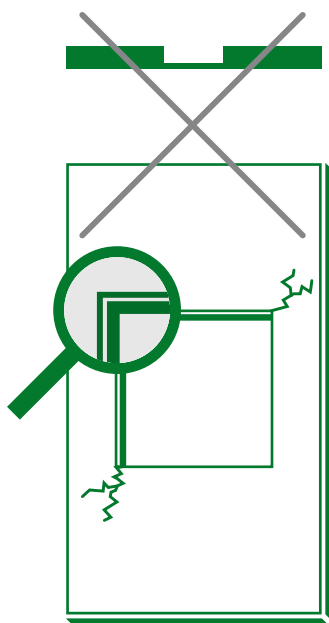
(G) WRONG



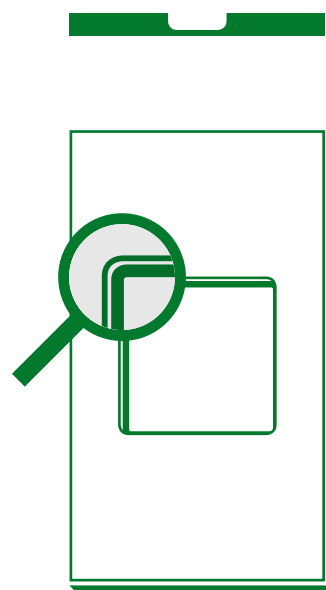
(H) RIGHT

Fretworking

- 7.1** Internal corners should always be rounded with the maximum possible radius. Avoid internal sharp corners and chippings along the cutting line, which could lead to cracking of the material. (see I-L)
- 7.2** It is advisable to round off fretworking with proper cutters to remove any possible chips.



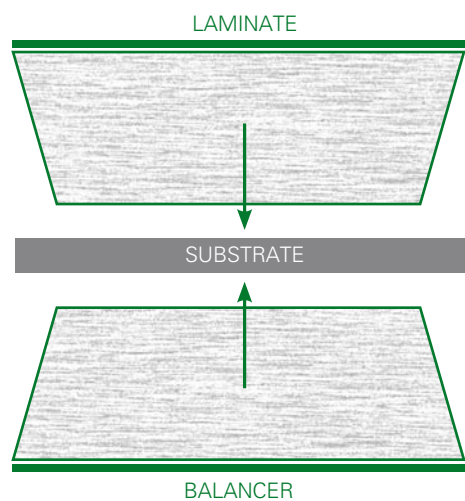
(I) WRONG



(L) RIGHT

Balancing

- 8.1** When Lamco ^{HPL} panels have to be glued to a substrate that is not supported by a rigid structure it will be necessary to glue another laminate with identical or similar characteristics on the back of the substrate. to maintain equilibrium about the centre point of thickness. Both sides of the substrate should therefore be glued simultaneously, with the same pressure and temperature conditions, and the panels placed in the same fibre direction. (see M)
- 8.2** The larger the area to be clad and the thinner is the substrate, the more essential it is the choice of the most appropriate laminate to be used as balancer and of the best gluing conditions.
- 8.3** It is advisable to carry out some preliminary tests before choosing the best balancer.



(M)

Bonding

- 9.1 The choice of the bonding agent depends on the type of substrate and application and on the available equipment.
- 9.2 There are a lot of bonding agents families on the market. The best ones for laminates are essentially divided into two big groups (see table):
 - › Thermoplastic adhesives:
neoprene, vinyl, acrylic, thermofusible.
 - › Thermosetting adhesives:
urea-formaldehyde, melamine-formaldehyde, polyurethane, epoxy, phenol formaldehyde, resorcinol.
- 9.3 Each adhesive needs a proper temperature, not lower than 15°C, a certain pressure, pressure duration and coating evenness on the whole surface. It is advisable to ask for the manufacturer's advice about the best bonding conditions.
- 9.4 Follow carefully gluing parameters to avoid imperfect gluing that may affect the product quality.

Substrates	Neoprene	Vinyl	Acrylic	Thermofusible	Urea-formaldehyde	Melamine-formaldehyde	Resorcinol-formaldehyde	Phenol-formaldehyde	Polyurethane	Polyester	Epoxy
Wood based	■	■	■	■	■	■	■	■	■	■	■
Paper based honeycomb	■	■			■	■	■	■	■	■	■
Foams or plastic-based honeycomb:											
-polystyrene ¹			■						■		■
-PVC ²	■		■						■		■
-phenol-formaldehyde	■	■			■	■	■	■	■	■	■
-polyurethane	■								■	■	■
metal sheets or metal honeycombs	■			■			■ ³		■	■	■
mineral-based sheets made of:											
-plasterboard		■			■						
-fibercement	■	■							■	■	■
-foamed concrete	■	■							■	■	■
-foamed glass	■	■							■	■	■

■ Thermoplastic adhesives

■ Thermosetting adhesives

¹ Solvent-free able to melt polystyrene

² Conditional to contraindications by the PVC producer

³ Useful in case of aluminum and light alloys

Assembly systems

[Lamco ^{HPL} Compact / Compact RE]

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10.1 Some steps are essential and common to all types of assembly systems:

› **Air circulation on both sides of the panel:**

Provide a cavity of at least 2 cm between the underlying structure and the Compact panel.

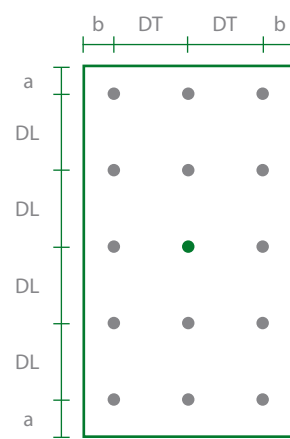
› **Possibility of movement:**

Allow the Compact to always have a space of movement with respect to fixing points and structure.

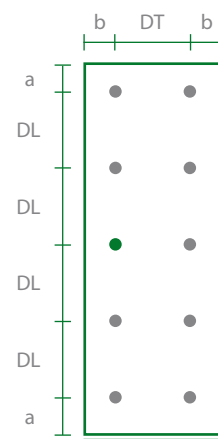
› **Respect for the fixing points:**

Keep these points as indicated in the table.

Thickness (mm)	DL max (mm)	DT max (mm)	a (mm)	b (mm)
6	550	400	20-40	20-40
8	700	500	20-40	20-40
10	800	600	20-60	20-60
12	900	700	20-60	20-60



Thickness (mm)	DL max (mm)	DT max (mm)	a (mm)	b (mm)
6	400	400	20-40	20-40
8	550	500	20-40	20-40
10	800	600	20-50	20-50
12	900	700	20-50	20-50



Assembly systems [Lamco ^{HPL} Compact / Compact RE]

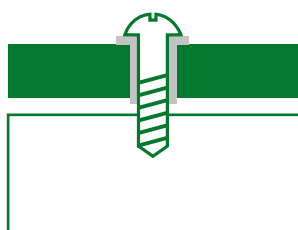
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10.2 Visible fixing with through holes: through holes diameter must be about 2 mm larger than the diameter of the screws to allow panel expansion (flexible sleeves can be used in the cavity). On this concern please refer to Lamicolor technical data sheets on its internet website and follow the indications about the maximum dimensional variation for each thickness.

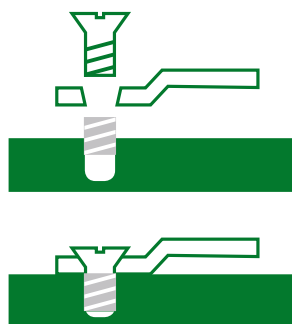
The screws, stainless steel or aluminum, must be directly screwed to the underlying structure. (see N)

10.3 Invisible fixing using screws with metallic sleeves: in this case holes are not through holes and are made on the back of the panel. Pre-drilling is necessary and the hole diameter must be smaller than the external diameter of the sleeve, while the depth of the hole must be at least 1 mm greater than the screw penetration depth and at least 2 mm less than the thickness (8 mm minimum) of the Compact panel.

With this system it is possible to place hooks of different type (hanging, grooved etc.) on the back of the panels according to the type of underlying structure. (see O)



(N)



(O)

Assembly systems [Lamco^{HPL} Compact / Compact RE]

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- Visible fixing with through holes
- Invisible fixing using screws with metallic sleeves
- Fixing with glue
- Internal doors assembly

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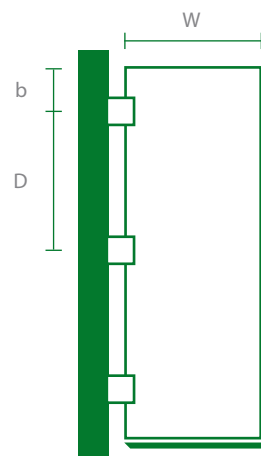
Assembly systems

[Lamco ^{HPL} Compact / Compact RE]

10.4 Fixing with glue: It is possible to install panels with a minimum thickness of 6 mm also using a polyurethane adhesive, suitable for this kind of application on underlying supporting structures made of aluminum, wood, metal.
It is advisable to contact the adhesive manufacturer for recommendations about the type, quantity and best application method.

10.5 Internal doors assembly: It is possible to make a door using the Compact panels provided that all previously described instructions about how to use this material are carefully followed, always keeping in mind the physical and mechanical characteristics of this material which are determining for the solidity of a door. Always prefigure the fixing points on the longitudinal side of the door as indicated in the table.

Thickness (mm)	Width (W) (mm)	Maximum distance between the fixing points (D) (mm)
10	400 450	600 300
12	500 600	700 350
14	600 700	850 450
16	800 900	1000 500



Distance "b" from the edge of panel to the fixing point:
maximum 100mm for the panels from 10 to 12mm thickness
and maximum 150mm for the panels from 13 to 16mm thickness