




LAMINIAM[®]

Istruzioni per l'uso
Instructions for use
Verarbeitungshinweise



Instructions for use · Summary

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LAMINAM® is...

LAMINAM® is a completely innovative ceramic material, the only one of its kind, manufactured in 1,000x3,000 mm slabs, only 3 mm thick. Thanks to its unique characteristics, LAMINAM® is the ideal surfacing solution in any climate condition, suitable for both interior and exterior applications. LAMINAM® is obtained from fully-natural raw materials, coloured with inorganic pigments and, thanks to its manufacturing process, totally environmentally friendly and easily recyclable.

LAMINAM® is manufactured under licence, using the innovative production processes invented and patented by System spa. Therefore LAMINAM® is a ceramic Synterflex®-type surface.

For further technical details and possible applications, you can find data tables, a forum and video clips on the following web site:

www.laminam.com

Cutting and edge finishing

· Cutting with glass tools:

The main thing to remember is that LAMINAM® is extremely hard but fragile: a material that can be compared in many ways to glass. This means that it can be cut with tools normally used for glass, from small, simple "glass cutters" to big industrial cutting machines. The advantage of this kind of cutting is that it is extremely clean, very accurate and quick. You are advised, however, to make a few preliminary test cuts to get the right pressure with the cutter head on the sheet (normally, the pressure required to cut a laminate porcelain sheet 3 mm thick is slightly higher than for a glass sheet, and the shapes of the cutting wheels can also vary). If you use glass cutting machinery you can obtain all the finishes and shapes normally obtained with glass: grinding, chamfering, edge-rounding, drilling, threaded chamfering, flat-threaded chamfering, drilling, etc.

The dimensional tolerances of this cutting technique are determined exclusively by the degree of precision of the machinery used, which in general is approx. +/- 0.5 mm.

· Cutting with glass cutters

Using normal glass cutters requires a certain amount of experience, but, again, the results are highly satisfactory. When cutting, wear work gloves to protect your hands.

· Cutting with diamond saw blades

Finally, there is the traditional method most commonly used in the building industry: the diamond saw. The saw blades must be the continual crown diamond disk type and can be either on "hand-held" tools or cutting benches. In both cases, there must be a high rotation speed (2500 rpm) and a low advance speed (1 m/min).

Depending on the type of saw blade and length of cut, it may be necessary a water-cooling system. As for the best kind of wheel, it is enough to specify that the material to be cut is similar to porcelain stoneware.

The advantages of this technique lie in the ease of manual cutting (bearing in mind, however, that the material you are cutting is similar to glass) and the possibility of cutting while laying. The disadvantages, though, are that only straight cuts can be made and that the manual dry cutting creates a large amount of dust, making it essential to wear an FFP2 grade protective mask.

· Waterjet cutting

An excellent tool for all kinds of cutting is the waterjet machine. This equipment makes for a practically unlimited range of cutting possibilities, both for single LAMINAM® slabs and composite panels.

· Drilling

When drilling manually, we recommend to use glass bits up to a maximum diameter of 6 mm.

With these tools you are advised to:

1. water-cool around the drilling point
2. start drilling at low rotation speed
3. don't press too hard: set the pressure according to the toughness of LAMINAM®.

Holes of diameter greater than 6 mm can be drilled with water jet systems, hollow mills (mounted on hand drill or drill press), commonly used in the glass processing industry. In the case of hollow drills, use a diamond particle size similar to that used for porcelain slabs.

· Milling and edge finishing

Milling and edge finishing can be done in several different ways and to different degrees of precision.

LAMINAM® edges can be processed with excellent results using glass machinery and tools.

Good results can be obtained with machines and tools designed for machining natural stone, even if the level of finish obtained with natural stone machinery is lower than with glass processing machines. For manual processing with

electrical or pneumatic tools, corundum grinding disks, belts for expanding rubber drums, or adhesive diamond disks bond to supporting plates can be used. Hand pads with abrasive surface can be used for small edge finishing jobs.

How to bond LAMINAM®

The question of bonding is of primary importance when working with LAMINAM®.

The type of adhesive and bonding technique obviously depends on the field of application and the requirements of the product in its final application. The list below, by no means exhaustive, should be seen as a kind of guide, giving general indications and making reference to the types of adhesives available on the market for ceramic slabs and consolidated techniques generally used for ceramic products. To ensure that all characteristics of LAMINAM® are exploited, bonding must, of course, be professional.

· Laying interior and exterior floors

The main requirement for this kind of application is to start with a perfectly flat substrate (see standards DIN 18202, table 3, line 4 and 6) and the maximum recommended slab format is 50x50 cm. The maximum thickness of the adhesive should be 3 mm, using a 4 – 5 mm serrated spreader. The adhesive must be applied with the spreader on both the slab and substrate surface. This technique is ideal for laying on existing ceramic slabs (of any type), reinforced concrete or smooth slabs, prefabricated reinforced concrete, finish plasters, plasterboard or fibre cement board. If laying on more uneven or non-flat substrates such as rough reinforced concrete, concrete slabs or plaster, the surface will have to be levelled with levelling or self-levelling products.

Another important rule when “bedding” or repositioning with the adhesive still soft: the bedding must be done with both hands, exercising constant pressure on the entire surface of LAMINAM®. The usual kind of bedding action (i.e. using your fist) is to be avoided as is the use of other tools. When repositioning, re-levelling or checking the degree of adhesion, avoid lifting the slab by one side only: use suction cups to slowly “loosen” the slab.

· Use a cement-based adhesive for laying on horizontal and vertical surfaces

The information below has been compiled together with the KERAKOLL Study Centre – Subsurface – Laying Division, and so the materials listed below are from the KERAKOLL production range. This by no means implies that they are the only products to be used for laying LAMINAM®, as there are other similar or comparable products on the market.

The main situations where LAMINAM® can be used are:

- Interior/exterior laying on existing flooring;
- Interior/exterior laying on smoothed reinforced concrete
- Interior/exterior laying on rough reinforced concrete / concrete slabs
- Interior/exterior laying on cement plastering
- Interior/exterior laying on plasterboard

in the above cases, KERAKOLL recommends laying with H40 FLEX. The laying subsurface must be compact, with no crumbly zones, clean and properly set (clean with soda and make sure the setting shrinkage is complete). The maximum thickness of the adhesive should be 3 mm, spreading double (i.e. applying the adhesive to both the subsurface and slab) with a 4 mm serrated spreader. Uneven or non-flat substrates will have to be levelled before laying. For this, KERAKOLL recommends KERALLEVEL, a high-tech professional thixotropic leveller, normal setting and compensated shrinkage, suitable for high-resistance levelling up to a thickness of 10 mm on floors and walls. An alternative could be KERATECH R30 a professional, superfluid, HDE-technology (High Dispersing Effect) self-leveller with ultrafast setting, ideal for high-resistance levelling from 3 to 30 mm on uneven, non-flat surfaces. In both cases, existing joints should be respected and there should be expansion joints.

If the subsurface is gypsum or anhydrite, on either walls or floors, before laying you will have to apply a surface insulator such as PRIMER A (here too, the subsurface must be perfectly clean and dry). The same type of primer can be used to block the absorption of highly absorbent substrates such as plasterboard or slabs.

When laying facing slabs greater than 900 cm², slabs greater than 3600 cm² or laying in zones subject to temperature changes and frost, latex should be used instead of water for mixing. KERAKOLL recommends its TOP LATEX product. In technical jargon, the “joint” is the distance left between two slabs during laying/bonding: the joint can be seen as seam. In certain cases, joints can have a decorative function, but their main role is to cushion and dampen contrasting movements between subsurface and slabs. When laying floors with cement-based adhesive, there must be a joint of 3 mm and a movement joint every 10 m². For bigger joints (over 4 mm) the scaling of the movement joint can increase to up to 20 m². As for the final grouting, KERAKOLL recommends FUGABELLA 0 – 5.

Two other types of material can be added to the more

common situations listed above:

- Interior/exterior laying on polystyrene or polyurethane

In these cases two coats should be skimmed on the surface and a fibreglass mesh laid between the coats, using ISOBUILD 80. You can then use H40 FLEX, just like on the subsurfaces listed previously.

- Bonding with plywood, particle board panels, wood in general (absorbent types)

In these cases polyurethane adhesives can be used, with a level of elasticity that dampens contrasting movements that may occur between the two materials.

KERAKOLL recommends its product ELASTIK for these applications.

- Joints for furniture tops

The expansion coefficient of LAMINAM® is very low (approx. $0.007 \text{ mm/m} \times ^\circ\text{C}^{-1}$). For use on furniture, the combination of LAMINAM® with wood (particle board, MDF, HDF, etc) or polyurethane, the joint is virtually zero. On supports that have an expansion coefficient that differs greatly from that of LAMINAM®, suitable evaluations must be made when choosing the adhesive and size of the joints. In this case contact our technical service department for further information.

- Guidelines for choosing adhesives and support materials

The main point to take into account is that LAMINAM® is an impermeable product, and so if you want to bond it with another impermeable material (e.g. metal, plastic, etc.) then you have to use adhesives that bind by chemical reaction and not by evaporation of solvents. For bonding with permeable materials (e.g. wood), all types of adhesives can be used, including those that set by solvent evaporation. An exception is bonding with glass: in this case you can use PVB stratification technology, with excellent results.

Please note: With the information given in this booklet, Laminam srl has no intention of ruling out the use of other types of adhesives or instructing users to keep to specific types of adhesives.

The bonding of materials of similar or different characteristics is generally a problem that has to be evaluated on the basis of a series of factors, namely:

- Characteristics of locations:
 - in climates/environments with large temperature ranges

and freeze/thaw cycles you will obviously have to use adhesives capable of withstanding these stresses;

- In salty environments you will have to use adhesives resistant to the corrosive action of sea water.

- Type and characteristics of subsurface

- different kinds of subsurface react differently to mechanical and thermal stress. The adhesive used should therefore be able to compensate for these differences (within certain set limits) and prevent shearing and breaks by cushioning any contrasting movements;

- water-absorbent subsurfaces must be pre-treated with primers.

- Types of stress that composites have to withstand

- generally, flexible adhesives have a cushioning function, but if high impact resistance is required (such as in kitchen tops or work surfaces in general), it could be more practical to use a rigid adhesive that spreads the energy from the impact over a wider area;

- for work surfaces, it is important to assess whether the covering will have to withstand repeated temperature changes: LAMINAM® does not have a thermal insulation action.

- Behaviour of materials on temperature increase

The table below lists a series of materials with their coefficients of expansion and lengthening per degree Centigrade.

Material	Coefficient of expansion ($\times 10^{-6} \text{ } ^\circ\text{C}^{-1}$)	Lengthening mm/m per $^\circ\text{C}$
LAMINAM®	6,6	0,0066
cement	9,0	0,009
aluminium	23,0	0,023
iron	11,0	0,011
steel	17,0	0,017
fir	4,0	0,004
brick	5,0	0,005
glass	9,0	0,009
PVC	70,0	0,070
ABS	100,0	0,100

HANDLING LAMINAM®

LAMINAM® is normally handled by means of standard suction cup systems used for glass.

The number of suction cups to be used obviously depends on the diameter of the latter. At the production facilities of Laminam srl the products are handled by means of suction cups with a diameter of 80 mm, eight per square metre of surface area. If manual handling is required, a series of rules must be observed, which vary according to the dimensions of the material:

1. always wear glass protection gloves;
2. always wear safety footwear;
3. two people should be assigned to handle LAMINAM® slabs if dimensions exceed 1,000 x 1,000 mm.

The material weight is 7,1 Kg per square metre, and therefore an entire slab with the dimensions 1,000 x 3,000 mm weights slightly more than 21 Kg.



Figure 1 - LAMINAM® slab dimensions 1,000 x 3,000 mm

· Lifting and handling the slabs up to dimensions of 300 x 300 mm

Up to dimensions of 300 x 300 mm LAMINAM® pieces can easily be handled by supporting it from one corner only.

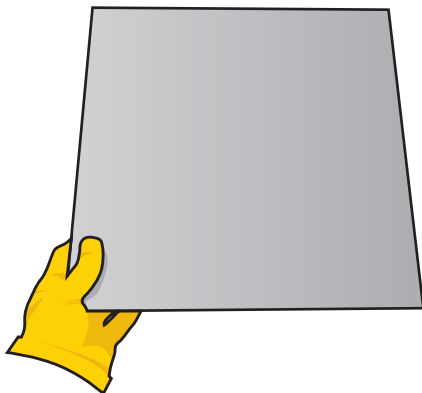


Figure 2 - LAMINAM® slab dimensions 300 x 300 mm

In the case of larger dimensions up to 1,000 x 1,000 mm the LAMINAM® slabs should be held with both hands.

· Lifting and handling the slabs of dimensions from 300 x 300 to 1,000 x 1,000 mm

LAMINAM® slabs of these sizes can easily be handled by one person only, considering that the weight of these elements ranges from approx. 0.6 to 7.2 Kg respectively.

When lifting this slab size it must be held with both hands on one side to move it to a vertical position.

To handle these slabs they must be picked up from above using both hands.

To place the slab on a flat surface, first take care to position one side of the slab and then slowly lower the rest of the slab onto the surface.

The reference figures for handling slabs of this size are the same as those for handling larger slabs.

Lifting and handling slabs with dimensions over 1,000 x 1,000 mm

LAMINAM® slabs of these sizes must be handled by two persons.

To lift the slab, it must be raised slowly to ensure a good grip in the hands (see fig. 3)



Figure 3 - Initial slab lifting phase

At this point the slab can be moved to a vertical position, keeping it straight (see figs. 4 and 5)



Figure 4 – Intermediate slab lifting phase



Figure 5 - Final slab lifting phase to vertical position

when the slab is in a vertical position, lift it from the upper edge and move, taking care to keep it straight at all times (see fig. 6).



Figure 6 - slab handling

The procedure to reposition the slab on a horizontal surface can also be performed by one person only.

To place the slab on a flat surface, lower one side of the slab first with care. At this point one of the two persons assigned must move to the middle of the slab and support it with the arms opened (see fig. 7):

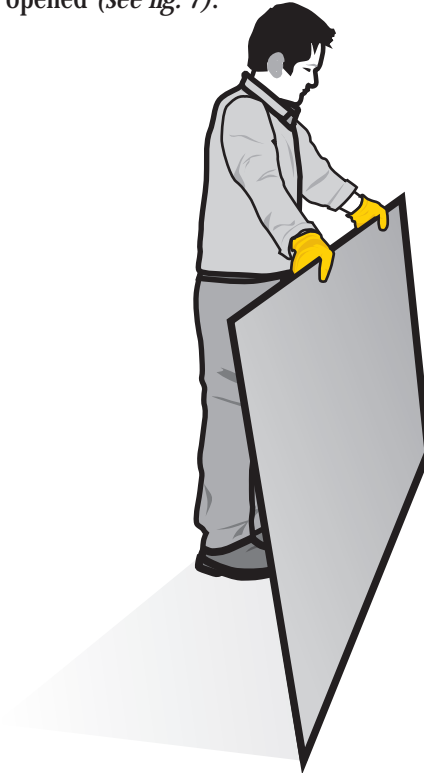


Figure 7 – Initial slab horizontal positioning phase

then slowly lower the slab onto the flat surface (see figs. 8 and 9).



Figure 8 – Intermediate slab horizontal positioning phase



Figure 9 – Final slab horizontal positioning phase

· Storing slabs

LAMINAM® slabs can be stored vertically or horizontally (edge or flat storing).

In the horizontal position, there are no special provisions other than the handling procedures described above. If stacking several slabs, take care that the surface of each slab is clean and that the support surface is completely flat. The maximum number of slabs that can be stacked horizontally is 50.

As regards vertical positioning the slabs should be placed on the longer edge (*placing a protection element on the support surface, such as polystyrene, rubber or similar, see fig. 10*):

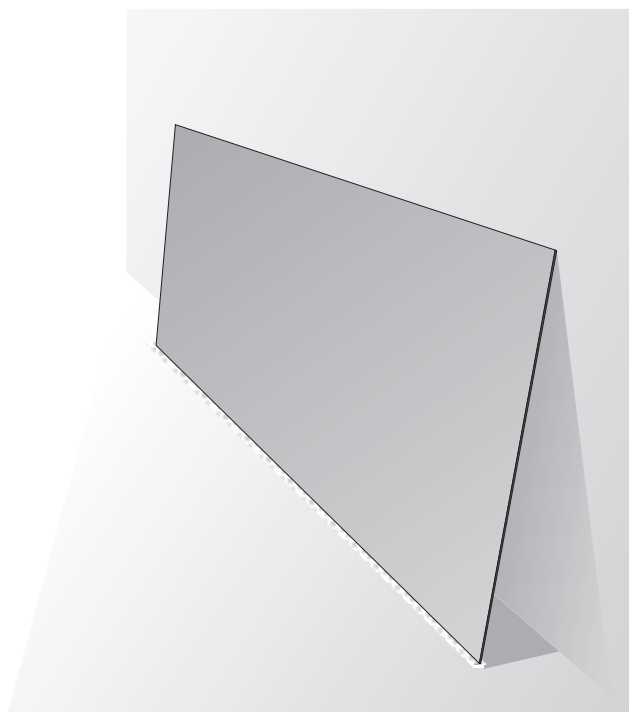


Figure 10 - Vertical positioning of LAMINAM® slabs

As regards handling with lift trucks, refer to figures 11 and 12.

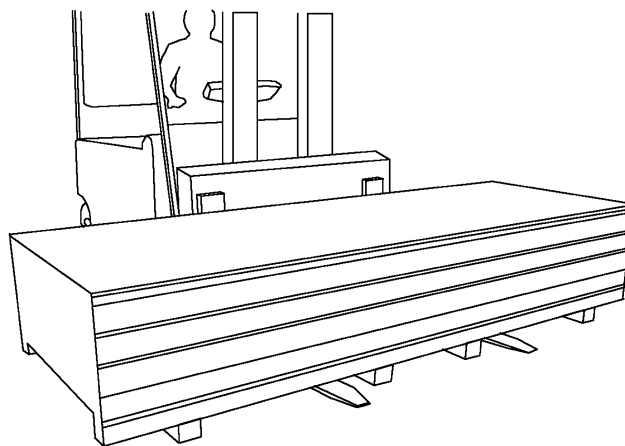


fig. 11 Correct lifting procedure, by means of lift truck, of a pallet holding LAMINAM® slabs

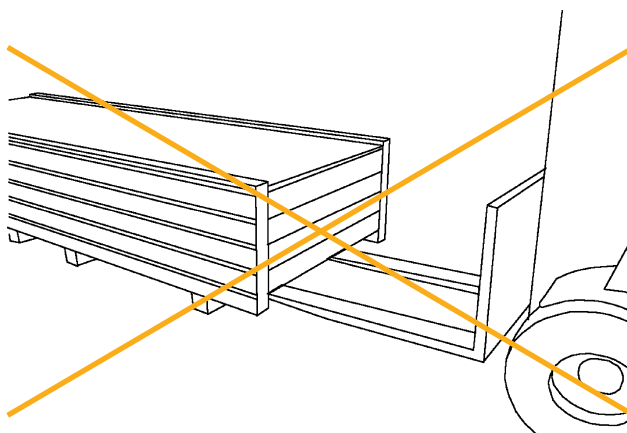


fig. 12 Incorrect lifting procedure, by means of lift truck, of a pallet holding LAMINAM® slabs

Descriptive texts for specifications

The following points must be stated for an exact description of LAMINAM®:

1. LAMINAM® manufacturer: Laminam srl
2. Thickness: 3.00 mm
3. Colours: see colour chart with names of collections
4. Type of surfaces: N (normal)
5. Description of material: LAMINAM® the Laminate Porcelain

Tips on cleaning and maintenance

· Daily cleaning

LAMINAM® is easy to clean. Liquids, grease stains and marks in general can be removed with a damp cloth, soapy water or a liquid abrasive cream.

To avoid lime scale stains, clean the zone concerned with a damp cloth and then dry with a soft cloth.

In more problematic areas e.g. around taps (bathroom, kitchen) a more aggressive detergent can be used from those recommended.

· Stain removal

Liquids do not penetrate LAMINAM® and remain on the surface. Stubborn stains can be removed using a cloth and abrasive cream.

If stains still persist use an abrasive sponge in place of a damp cloth.

· Detergents recommended for various types of dirt

Scale	Acid based detergents
Mortar	White vinegard
Rust	Deterdek (Fila)
Metallic residues	Decalc (Sutter)
Water based colours for walls	Kymax Primo (Zep Italia) heavy duty hand cleaner
Graphite (pencil lead)	PS/87 (Fila) Vim Clorex polvere (Lever) Jif Cream (Lever) + abrasive sponge
Beer	
Wine	
Ice-Cream	Mr. Muscle with bleach (P&G)
Ketchup	PS/87 (Fila)
Coca Cola	Jif Mircoliquid (Lever)
Coffee	bleach
Animal or vegetable fats	
Tyre rubber	Mr. Muscle with bleach (P&G)
Resins	Jif Active Cream (Lever)
Engine Oil	Vim Clorex (Lever)
Glazes	PS/87 (Fila)
Felt tip pen	Nitro Solvent
Ink.	SR 95 (Fila) White Jif Cream + Bleach, mixed together and left to dry on the stain

· Heat

LAMINAM® is heat resistant if heated uniformly, and maintains its original properties up to extremely high temperatures (800° C).

However do not place very hot objects directly on LAMINAM® to avoid impairing adhesion with the support below. LAMINAM® is not a thermal insulation.

· End notes

The information in this section is based on the current knowledge of our technical department and is to be considered as a general guideline only.

For any further information contact our Technical Service department.



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