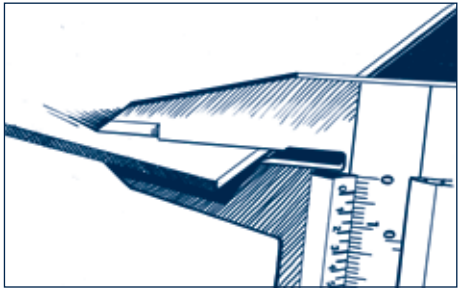
OVERVIEW OF LAYING INSTRUCTIONS

FORMATS	kerlite 3mm				kerlite plus						kerlite twin	
	300x100 cm		Other formats		300x100 cm			Altri formati			300x100cm	Other formats
	Interior covering	Exterior covering	Interior covering	Exterior covering	Interior flooring	Interior covering	Exterior covering	Interior flooring	Interior covering	Exterior covering	Interior flooring	Interior flooring
Minimum recommended gap	1 mm	5-6 mm	1 mm	5-6 mm	2 mm	1 mm	5-6 mm	2 mm	1 mm	5-6 mm	2 mm	2 mm
Waiting time necessary before the floor can be walked on	X	X	X	X	48 h.	X	X	24 h.	X	X	24 h.	24 h.
Waiting time necessary before use	X	X	X	X	at least 15 days	X	X	according to instructions of adhesive manufacturer	X	X	according to instructions of adhesive manufacturer	according to instructions of adhesive manufacturer
Application of double layer of adhesive	NO	YES	NO	YES	YES	NO	YES	YES	NO	YES	NO	NO
Use of levelling system of the RAIMONDI R.L.S. TYPE	YES	YES	YES	YES	NO	YES	YES	NO	YES	YES	YES	YES
Brush recommended for applying adhesive to base tile	with 6 mm teeth, inclined	with 6 mm teeth, inclined	with 3-4 mm teeth, inclined	with 6 mm teeth, inclined	with 8 mm teeth, inclined	with 6 mm teeth, inclined	with 6 mm teeth, inclined	with 6 mm teeth, inclined	with 3-4 mm teeth, inclined	with 6 mm teeth, inclined	with 6 mm teeth, inclined	with 6 mm teeth, inclined
Brush recommended for applying adhesive to back of slaba	NO	with 3 mm straight teeth	NO	with 3 mm straight teeth	with 3 mm straight teeth	NO	with 3 mm straight teeth	with 3 mm straight teeth	NO	with 3 mm straight teeth	NO	NO
Recommended adhesives	SEE TABLE ON PAGE 47											
Expansion joints	FOR SURFACES GREATER THAN 4 SQ.MTS. SEE THE SPECIFICATIONS ON PAGES 37, 40 AND 42											

SIZES AND THICKNESS

Single slabs of Kerlite have a thickness of only 3 mm: this makes them flexible, light and extremely easy to handle. The minimal thickness is the innovative feature, which makes the product suitable for a variety of different applications.
Slabs exiting the kiln have a rated size of 1000x3000 mm. Kerlite is now available in three different types for different intended uses.



The Kerlite slab is the outcome of the latest technology. It is produced in the 300x100 cm size with a thickness of 3 mm, using a porcelain stoneware mixture composed of top quality clay and raw materials.
It is pressed using a force of 15,000 tons.
Firing takes place in innovative and environmental-friendly kilns, and is the result of Panariagroup's research activities and know-how.

Kerlite® 3mm

The new surface for architecture

Porcelain stoneware slabs that are extra large and have a thickness of 3 mm.

WHERE CAN IT BE INSTALLED?
Suitable for residential walls, public buildings, exterior and interior environments.

SUBSTRATE
It must be clean, dry and stable. Check the flatness of the surface and level off if necessary.

INSTALLATION
Spread the adhesive full-bed on the substrate using a trowel with 4 mm teeth. Tap the slab surface with a rubber trowel to enable correct adhesion. For installation on exterior walls, always adopt the 'double-spread' technique.

Kerlite® plus

Renovate your home without demolishing

Porcelain stoneware slabs with a large size and a thickness of 3,5 mm, reinforced on the rear side by means of fibreglass mesh.

WHERE CAN IT BE INSTALLED?
For covering old floors and new slabs in residential environments or areas subject to intense pedestrian traffic but not heavy concentrated loads.

SUBSTRATE
It must be clean, dry and stable. Check the flatness of the surface and level off if necessary.

DOUBLE-SPREADING TECHNIQUE
Spread the adhesive full-bed on the old floor or new slab using a trowel with 6 mm tilted teeth. Spread adhesive also on the rear side of the slab using a trowel with 3 mm flat teeth. Tap the slab surface with a rubber trowel to enable correct adhesion.

Kerlite® twin

Two-layer slab with a high resistance

These are "double-layer" porcelain stoneware slabs of a large size and with a thickness of 7 mm, composed of two Kerlite slabs that have been reinforced in between with fibreglass mesh.

WHERE CAN IT BE INSTALLED?
For floors and all substrates. Ideal for areas subject to heavy loads.

SUBSTRATE
It must be clean, dry and stable. Check the flatness of the surface and level off if necessary.

INSTALLATION
Spread the adhesive full-bed using a trowel with 6 mm tilted teeth. Tap with care using a rubber trowel to ensure perfect adhesion. The double-spreading technique is not necessary.

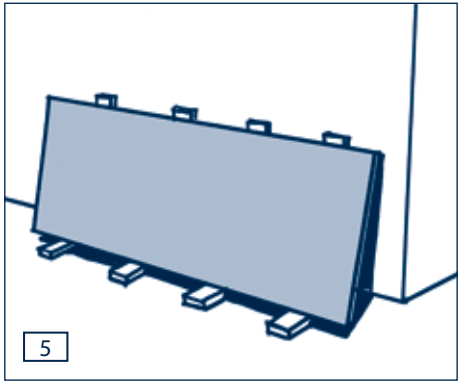
ENG

HANDLING

Owing to its lightness, KERLITE is easy to transport and handle, much easier than marble, granite or natural stone slabs that are very thick and therefore very heavy.
It is possible to transport up to 4 times more sqm than traditional material. A slab of the 100x100 cm format is only 7,4 kg in the KERLITE 3mm version, 7,8 kg in the KERLITE PLUS version and 16 kg in the KERLITE TWIN version.

HANDLING WHOLE SLABS (300x100 cm)
300x100 cm slabs of KERLITE 3mm and KERLITE PLUS can be lifted by one person.
Lift the slab with open hands. Slowly raise the longer side so as to eliminate the suction effect, due to contact with the underlying slab, and ensure a good grip **(fig. 1)**.
You can now lift the slab to its upright position, keeping it as straight as possible **(fig. 2)**.
When the slab is upright, hold it from its top edge and shift it keeping it straight and upright; this operation should be performed with the aid of a second person (**figg. 3 e 4**). Slabs of KERLITE TWIN must be handled by two persons using the special **KERLITE FRAME**. Fasten the frame to the slab when it is still on the pallet. Now raise the frame and slab to eliminate the suction effect.

STORAGE OF WHOLE SLABS (300x100 cm)
Slabs of KERLITE 3mm, KERLITE PLUS and KERLITE TWIN (300x100 cm) can be stored both upright or horizontal. If you place one slab on top of the other, make sure that each slab is clean and that the surface the slabs are resting on is flat. When storing in the upright position, place the long side of the slab on a wooden board (**fig. 5**).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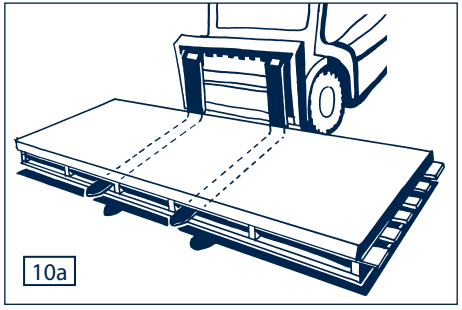
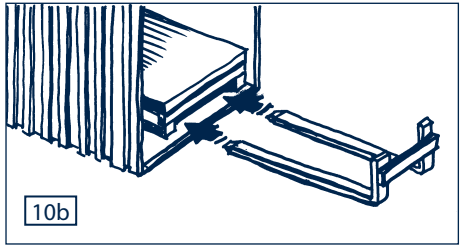
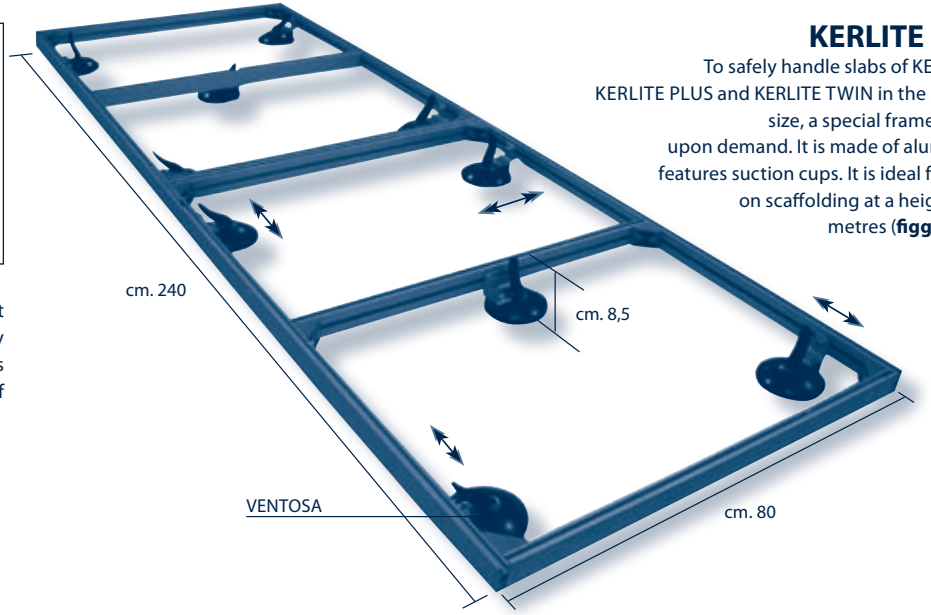
HANDLING PACKAGES WITH 300x100 cm SLABS

To correctly lift and handle the palletised packs using a forklift truck, position the forks at a distance of at least 1 metre from eachother, perpendicular to the long side of the pallet and at the centre of the same. Forks must be supporting the entire surface of the pallet (**fig. 10a**).





Should it be necessary to insert the forks in the short side (e.g. when unloading containers), it is necessary to use forks with a length of at least 2,5 metres so as to ensure perfect support and protect the contents of the package (**fig. 10b**).



KERLITE FRAME

To safely handle slabs of KERLITE 3mm, KERLITE PLUS and KERLITE TWIN in the 300x100 cm size, a special frame is available upon demand. It is made of aluminium and features suction cups. It is ideal for installing on scaffolding at a height of over 2 metres (**figg. 6, 7, 8 e 9**).

CUTTING, DRILLING AND EDGE-FINISHING

A striking feature of KERLITE is its extreme ease-of-installation: it can be easily cut, shaped or drilled with automatic machines and tools used for glass and porcelain stoneware.

PREPARATION

It is essential to work on a flat and clean surface. For this purpose, you may use the cover of the pallet of the KERLITE 300x100 cm slab.

K-BLADE

CUTTING WITH GLASS CUTTERS (KERLITE 3mm and KERLITE PLUS only)

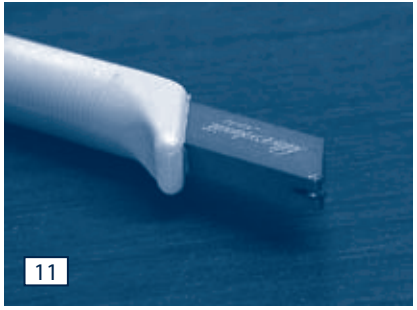
You can achieve excellent results in terms of shape and clear cuts by scoring KERLITE 3mm and KERLITE PLUS with the glass cutters sold by BOHLE ITALIA, such as the Silberschnitt 2000 Special Glass Cutter (available upon demand). This is a 'Toplife' type glass cutter with wheels and a plastic handle to ensure a better grip. To obtain good results, when scoring KERLITE 3mm and KERLITE PLUS, never lose the contact between the glass cutter and the slab throughout the entire cutting operation.

To ensure that the scoring is as straight as possible, you may use aluminium levelling rods of the type commonly used by bricklayers (**figg. 12 e 21**). After completing the cut, it is sufficient to snap the slab to detach the two pieces (**fig. 13**). As far as KERLITE PLUS is concerned, after engraving the ceramic part and splitting the slab, complete the operation by cutting the fibreglass mesh with a standard cutter (**fig. 14**).

CUTTING WITH DIAMOND DISCS

All versions of KERLITE can be cut using diamond discs. Discs must be of the "smooth crown" type and can be used on electrical or hand-held grinding machines or cutting benches (**figg. 15 e 16**).

In both cases, disc rotation speed must be high (>2500 RPM) and speed at which tool is pushed low (<1 m/min). Depending on the type of disc and the length of the cut, it may be necessary to cool the disc with water. Recommended discs are the thin types generally used for cutting porcelain stoneware. The advantages of this type of cut include ease-of-execution and the possibility to cut during installation. Cotto d'Este has used TYROLIT VINCENT smooth crown diamond discs with excellent results. These discs do not need to be cooled with water.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HYDROJET CUTTING AND SHAPING
For shaped cuts, hydrojet cutting machines can be used. For this type of work, contact specialised firms.

DRILLING
As far as drilling is concerned, you can use bits for glass or bits made of tungsten made by TYROLIT, **with diameters up to 8 mm**, fitted to electrical drills or battery-operated screwdrivers (**fig. 17**). When using these tools:
1. Cool the point drilled with water.
2. Begin drilling at a low speed.
3. Never exert excessive pressure and take into consideration the resistance of KERLITE.
If you are drilling **holes larger than 8 mm**, you may use angle grinders or cutting discs fitted to your **grinding machine** (**fig. 18**).
Recommended dry-operating cutters are supplied by TYROLIT VINCENT, RUBI ITALIA and MONOLIT.

IF YOU ARE USING A DRILL, DO NOT ADOPT THE HAMMERING MODE.

If you have to drill several holes for pipes or perform several cuts for switch boxes or other items on 300x100 cm slabs, you must use only the KERLITE PLUS reinforced version.

EDGE-FINISHING
Edges can be finished by hand using abrasive diamond sponges or sand paper. With a light passage on the side of the slab, you can obtain a slightly rounded-off edge or with repeated passages a bevelled effect (**fig. 19**). The same results can be obtained with TYROLIT VINCENT sanding discs applied to angle grinders.

WALL INSTALLATION

kerlite 3mm
kerlite plus

PREPARING THE SURFACE
To prepare the surface for installation of KERLITE, perform the same operations normally performed for standard porcelain stoneware tile of large sizes.
As a general rule, cement supports must be dust-, oil- and grease-free, and also dry and with no rising damp. They must feature no brittle debris, such as residues of cement, plaster or paint; any debris must be removed. The supporting surface
must be stable and without cracks. It must also be seasoned and hygrometric shrinkage must have ended. Any differences in level must be corrected beforehand using suitable levelling products.


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WALL INSTALLATION ON EXTERIOR PLASTER
For installation on exterior plaster walls, glue KERLITE 3mm and KERLITE PLUS onto a high performance substrate that can resist mechanical stress, such as the weight of tiles, thermal expansion and adverse weather conditions. In this case, Cotto d'Este recommends plaster such as KR100 made by Fassa Bortolo or BF02 by Grigolin, or plaster with the same characteristics. Plaster must have an average adhesion to brick of at least 1 N/mm^2 (about 10 kg/cm^2).

During installation, pay attention to string-courses and structural joints. Never install KERLITE on two or more surfaces that do not constitute a single stable structure, such as for instance reinforced concrete and brick.For installation in exterior environments, always adopt the double-spreading technique.
(See also specifications on page 43)

PREPARING A SURFACE WITH A HIGH ABSORPTION
Plaster work that is very absorbent and has a powdery surface (gypsum for instance) must be treated with one or two coats of concentrated, water-based professional insulating agent (PRIMER), as indicated in the instructions for use; this preliminary operation will reduce water absorption and improve adhesive application.

APPLICATION OF ADHESIVE AND INSTALLATION
Spread the adhesive on the wall using a 3-4 mm notched trowel (**figg. 20 e 23**). Make sure the amount of adhesive is consistent and evenly spread full-bed. Work on small areas of wall at a time. To ensure correct adhesion of the slab, tap the surface with a rubber trowel (**figg. 24 e 27**).


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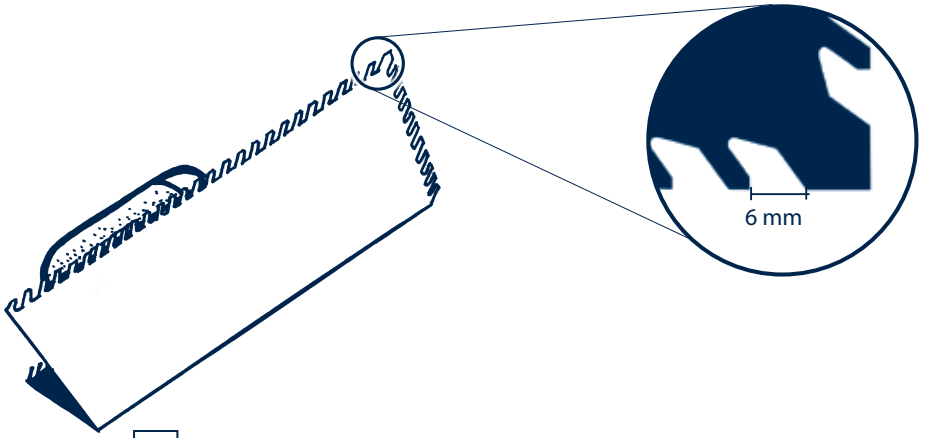

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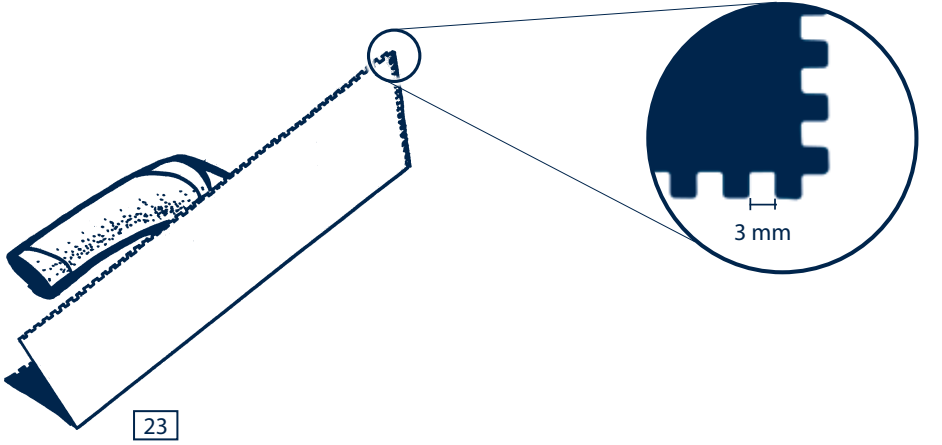

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JOINTS BETWEEN PIECES

For **interior** environments, leave joints using special spacer crosses of at least **1 mm** (**fig. 26**).

For installation in **exterior** environments, wider joints must be provided. Width depends on the size installed and on the weather conditions (abrupt temperature changes) existing in the specific area. An indicative width is 5-6 mm, however this must be checked with the Building Supervisor and engineer.

EXPANSION JOINTS

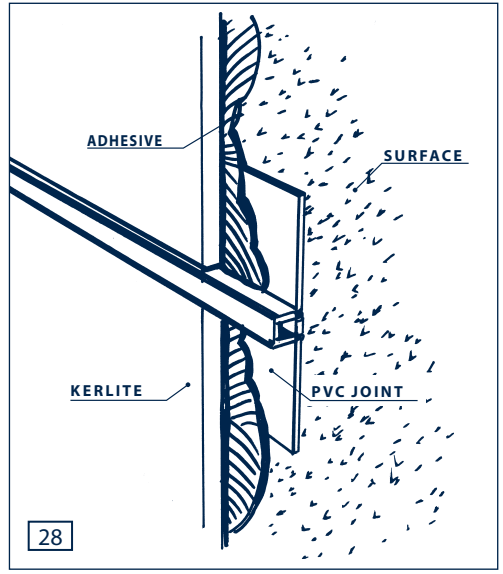
Thermal expansion (or shrinkage) of KERLITE strictly relates to its expansion coefficient, which is $7.0x10^{-6}$ $°C^{-1}$ (e.g.: for a range of temperature of 70°C, expansion is 0,5 mm every linear metre). **In any case, provision of expansion joints must be calculated by the person in charge of the building site.** On large surfaces, in particular outdoors, use PVC expansion joints such as for instance BWS45 made by Schlüter Systems (**fig. 28**). **For expansion joints, you can also use silicone-based products.**

WALL INSTALLATION OF THE 300x100 cm SLAB

The 300x100 cm size with a thickness of 3 mm for KERLITE 3mm and 3,5 mm for KERLITE PLUS is suitable for vertical wall covering. The KERLITE PLUS 3,5 mm version, with fibreglass mesh reinforcement, is suitable if you have to drill holes or perform cuts.

For correct installation of the 300x100 cm size, follow the simple rules provided below:

1. Check if the substrate is perfectly flat and if necessary level it off.
2. After checking the above conditions, position the references for correct levelling and alignment of the slab with respect to the surfaces.
3. Spread the adhesive full-bed on the substrate using a trowel with tilted teeth (**fig. 22**), then shift the slab using the aluminium frame with suction cups (**KERLITE FRAME**) which can keep the slab perfectly steady and ensure safe handling.
4. Secure the slab to the wall, level and tap the entire surface with a rubber-coated trowel.
5. To handle KERLITE 300x100 cm at a height of over 2 metres, two operators on ground level must lift the slab secured to its frame and hand it over to two operators on the scaffolding. It may be necessary to use a hoist secured to the frame.



FLOOR INSTALLATION

kerlite plus

INSTALLATION ON A NEW SLAB
KERLITE PLUS version (reinforced with a fibreglass mesh) can be installed on new slabs, even in areas with heavy pedestrian traffic but not subject to heavy concentrated loads (e.g. it is not suitable for areas subject to the passage of trolleys with hard wheels).
In order to correctly prepare the floor, the slab must be made according to the instructions provided below and guaranteed by the Building Supervisor.

REQUIREMENTS OF THE SLAB FOR CORRECT INSTALLATION OF KERLITE PLUS

CURED AND STABLE IN TERMS OF SHRINKAGE: the curing/seasoning time is of essential importance for a cement-based slab.
Curing time of a conventional sand and cement slab is about 7-10 days per cm of thickness.

DRY: for cement-based slabs, a moisture content of less than 2% (before installation) is acceptable.

CLEAN: the surface of the slab must be clean. Dust, dirt and debris must be removed as they may compromise adhesion of the adhesive to the slab.

FLAT: Flatness checking should be performed using a screed with a length of at least 2 metres. Place the screed on the slab in all directions; the allowed tolerance is 2 mm. (**figg. 29 e 30**).

COMPACT: the slab must be compact and even all over and all the way through. The presence of layers or areas with a more brittle consistence means that the mechanical characteristics are poor and may cause breakage or dislodging of tiles from the floor.

MECHANICALLY RESISTANT: mechanical resistance, such as the thickness, must be suitable for the intended use and for the type of floor tile to install. As a general rule, resistance to compression of a slab for civil environments, suitable for any kind of covering, must not be lower than 20 N/mm^2.

NO CRACKS: the presence of cracks due to hygrometric shrinkage is caused by one or more of the following factors: too much water in the mixture, too fine a grain size of the aggregates, too much cement. Before installation of KERLITE PLUS, seal all and any cracks.

ALL THESE FEATURES CAN BE GUARANTEED BY USING "PREMIXED" PRODUCTS THAT ARE AVAILABLE ON THE MARKET, SUCH AS TOPCEM PRONTO MADE BY MAPEI OR KERACEM ECO PRONTO MADE BY KERAKOLL.

GENERAL RULES FOR CORRECT CONSTRUCTION OF A SLAB
AGGREGATES: these must be clean and not contain impure particles. The grain size must be suitable for the thickness of the slab to make.

LEVELLING STRIPS: these must be made using the same binding agent used for the slab.

SEALING BETWEEN HARDENED SURFACES AND MOIST MIXTURE: joints between hardened slabs and moist mixture must be made by applying adhesion grout, water and binding agent to the end of the hardened slab (clearly cut, perpendicular to the support).

PRESENCE OF PIPELINES IN THE SLAB: above any pipes, a minimum thickness of mortar of about 2,5 cm is mandatory. It is necessary to place a metal mesh with a wire thickness of 2 mm above the pipelines so as to provide the necessary reinforcement beneath the thin layer of slab above and prevent cracking.

FINISH: finishing can be performed with a hand-held trowel, a steel disc or smoothing tool, paying attention to neither moisten the surface too much nor to work for too long on the same area.

CHECKING RESIDUAL MOISTURE: this must be performed after the slab has reached the end of its curing period.

CHECKING THE QUALITY OF THE SLAB

COMPACTNESS: tap the slab with a 750 g mallet. No marks should form and it should not sound hollow. When the surface is tapped no dust should form. The surface must not crumble.

THICKNESS: this is checked by drilling a hole in the slab and measuring the thickness.

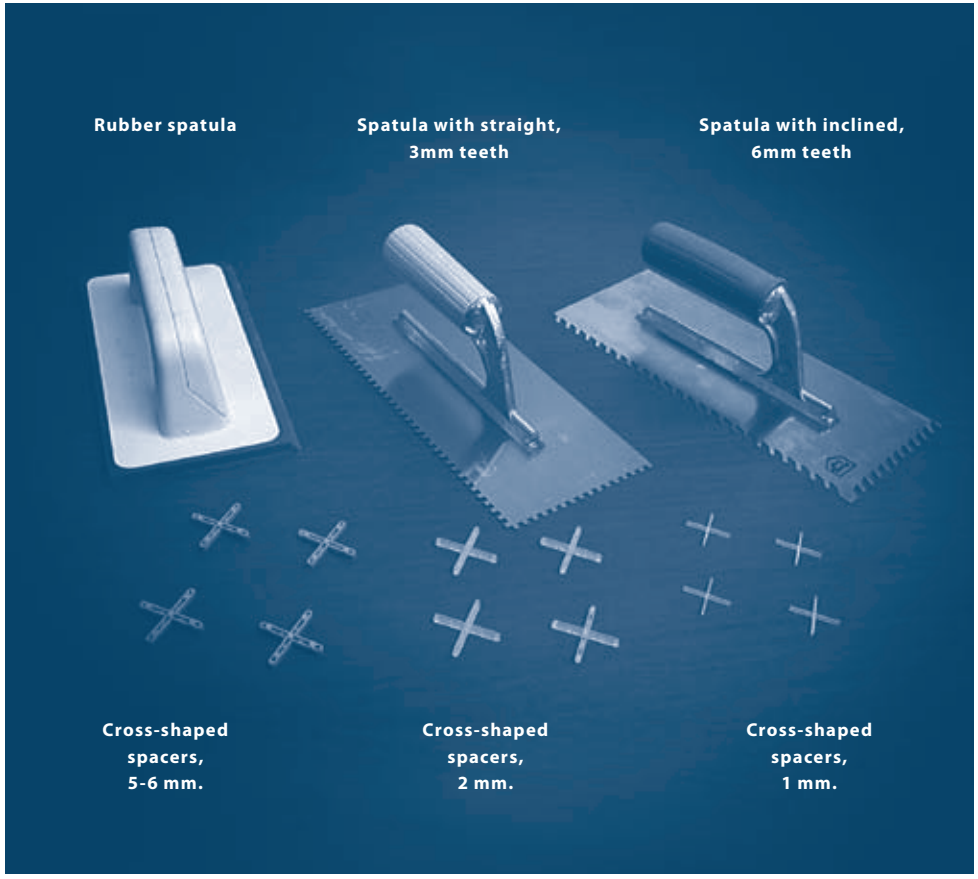
STIFFNESS: the slab must be sufficiently steady to withstand the intended static and dynamic loads without any deformation. The more the layers under the slab (for instance heat/acoustic insulation materials) are compressible, the steadier the slab must be. A greater rigidity is obtained with more compactness and a greater thickness.

SURFACE HARDNESS: when the surface is scratched with a steel nail, no deep scratches or crumbling should appear and no visible dust should form.

MOISTURE: this is measured with a carbide hygrometer capable of determining directly, by means of a chemical reaction, the moisture content of the slab, irrespective of its composition.

CHARACTERISTICS REQUIRED FOR DIFFERENT SUBSTRATES TO TILE WITH KERLITE PLUS

Concrete: concrete must be sufficiently cured (this may take 6 months or more, depending on its thickness, its composition, the thermo-hygrometric requirements of the environment, …) and must not feature surface treatments such as mould release agents, resin, antievaporation treatments, old adhesives, etc. Apart from the structural joints present, one must provide splitting joints that are suitable for the dimensions of the surface.



Slabs must be insulated from rising damp.

Anhydrite slabs: before installation, these surfaces must be sandpapered, cleaned and perfectly dry (the maximum permissible moisture content is 0,5%).

Heated floors: slabs built on heated floor systems must be stable, must have undergone shrinkage due to seasoning and not feature cracks. They must also have a mechanical resistance suitable for usage. Before starting the heated floor system,
wait at least 14 days after laying the slab. As prescribed by the UNI EN 12644 standard, in § 4.4, heating begins at an initial temperature ranging from 20°C to 25°C, which must be maintained for at least 3 days. Then set the maximum permissible
temperature and maintain it for at least 4 days. Once the floor has reached ambient temperature, tile installation can begin.

Example of suitable adhesive:
- H40 FLEX+TOP LATEX (Kerakoll)
- LATICRETE 335+LATICRETE 282 (Laticrete)
- KERABOND + ISOLASTIC (Mapei)

Apart from the indications given, to install 300x100 cm KERLITE PLUS on new slab, attentively follow the instructions given in the "FLOOR INSTALLATION OF THE 300x100 cm SIZE" paragraph.

INSTALLATION ON EXISTING FLOORS

KERLITE PLUS can be installed on old floors of areas with heavy pedestrian traffic but not subject to heavy concentrated loads (e.g. it is not suitable for areas subject to the passage of trolleys with hard wheels). With respect to other ceramic products, KERLITE PLUS allows you to save time and money, as well as to eliminate dust, noise, debris disposal and modification of doors. **The product can be installed in external environments upon condition that these are covered (balconies, terraces, verandas) and perfectly water-proof.**

Preparing the surface

The existing floor must be dry, stable, solid, perfectly flat and clean, which means that there must not be brittle fragments compromising adhesion. Flatness checking should be performed using a screed with a length of at least 2 metres (**figg. 29 e 30**). Place the screed on the slab in all directions. Any differences in level must be corrected beforehand using suitable levelling products. Wash old glazed ceramic floors with a solution of water and caustic soda and rinse thoroughly before installation. If chemical cleaning is not possible, adopt mechanical abrasion techniques.

CHARACTERISTICS OF SURFACES ON WHICH KERLITE PLUS CAN BE INSTALLED

Parquet: make sure that the existing floor is firmly secured in place and perfectly flat. Sandpaper the surface of the parquet until it is rough. Use a class R2 adhesive (for instance Keralastic made by Mapei) or a R2T (for instance Superflex made by Kerakoll).

Other wooden surfaces: wooden elements must be used in dry environments only. The wooden surface must be assembled in accordance to the instructions of the manufacturer. The surface must be firmly secured in place and stable over time.

Existing floors: as far as old ceramic, cotto, stone, marble or PVC floors are concerned, make sure they are sound and firmly fixed. Eliminate any residues of oil, grease or wax by washing with a solution of water and caustic soda followed by thorough rinsing. If chemical cleaning is not possible, adopt mechanical abrasion techniques.

CUTTING KERLITE PLUS

KERLITE PLUS can be cut in the same manner as KERLITE using a glass cutter. After positioning the slab to cut on a perfectly flat and clean surface, score the surface with a straight and clean cut, from edge to edge. Applying light pressure, snap the porcelain stoneware part and separate the two sections by using a cutter to cut the fibreglass mesh (**figg. 12 e 13**).

APPLICATION OF ADHESIVE AND INSTALLATION

Apply adhesive with the double-spreading technique i.e. by spreading the adhesive full-bed on the surface to tile using a notched trowel with tilted teeth at a distance of 6 mm apart (for instance RAIMONDI item n°138HFV6) (**fig. 22**). Also apply the adhesive on the under side of the slab, using a trowel with 3 mm teeth (**fig. 23**). Remember to spread extra adhesive on the corners of the slab (**fig. 32**). Position the slab and tap it repeatedly using a rubber trowel to ensure adhesion all over and prevent air gaps and bubbles forming (**fig. 27**).

JOINTS

For interior environments, provide joints using spacer crosses with a size of at least **2 mm**. For installation in exterior environments, wider joints must be provided. Width depends on the size installed and on the weather conditions (abrupt temperature changes) existing in the specific area. An indicative width is **5-6 mm**, however this must be checked with the Supervisor and engineer.

EXPANSION AND PERIPHERAL JOINTS

On large surfaces, you must use expansion joints placed on the existing ones on the underlying slab.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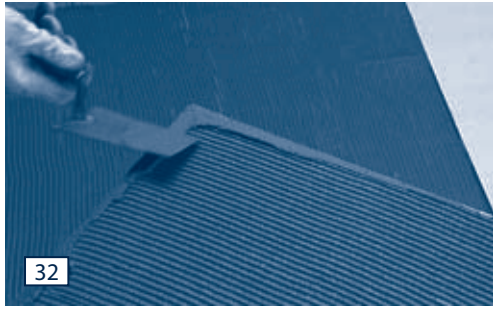
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Use only expansion joints with metal edges, such as SCHLÜTER SYSTEMS EKSB45 (**fig. 33**). Thermal expansion (or shrinkage) of KERLITE strictly relates to its expansion coefficient, which is $7.0x10^{-6}$ $°C^{-1}$ (e.g.: for a range of temperature of 70°C, expansion is 0.5 mm every linear metre). Provide peripheral joints of 5-8 mm around fixed elements of the supporting structure such as walls, steps, columns, etc. (**fig. 34**). In any case, arrangement of expansion joints must be calculated by the person in charge of the building site.

USE OF FLOOR

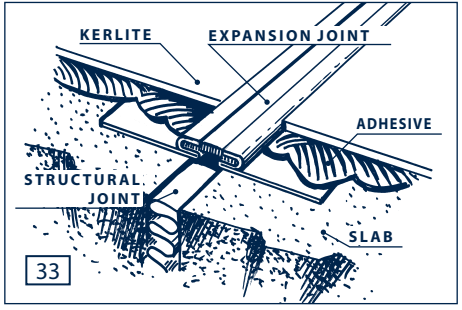
NEVER WALK ON THE FLOOR DURING AND AFTER INSTALLATION UNTIL THE ADHESIVE HAS DRIED.

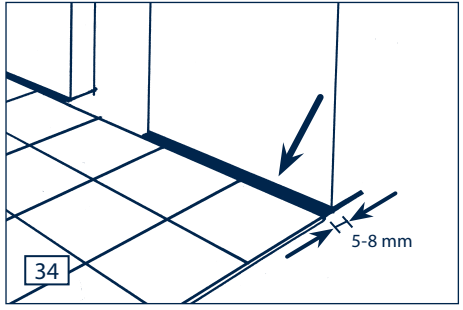
As a general rule, a floor can be walked on after at least 24 hours from completing installation. In any case, always refer to the drying time indicated by the manufacturer of the adhesive.

FLOOR INSTALLATION OF THE 300x100 cm SIZE

Considering the dimensions of 300x100 cm KERLITE PLUS, based on the many laboratory tests performed by Cotto d'Este with some of the leading manufacturers of adhesives and the simulated installation procedures performed to create the conditions of a work site, to correctly install your floor, it is essential to follow these instructions:

- If you are installing on a new slab, make sure it has been made in accordance to the instructions given in the "INSTALLATION ON A NEW SLAB" paragraph.
- If you are installing on an existing floor, pay particular attention to its preparation, in accordance to the instructions given in the "INSTALLATION ON AN EXISTING FLOOR" paragraph.
- Use an adhesive with standard bond strength (or, if necessary, a quick-dry adhesive) using the 'double-spreading' technique.
- Spread the adhesive with a notched trowel with 3 mm teeth on the rear side of the slab, and also, using an 8 mm notched trowel, on the slab or existing floor. When fitting the slab, make sure that the direction in which the adhesive is spread on the support is perpendicular to the direction in which the adhesive is spread on KERLITE PLUS.
- Leave joints of at least 2 mm. - Respect any joints on the support and leave expansion joints every 12 sqm.
- Leave a gap of at least 5 mm from walls, columns and other vertical elements (**fig. 34**).
- Wait at least 48 hours before treading on the floor and 15 days before actually using it.





FLOOR INSTALLATION

KERLITE TWIN can be installed on all building substrates.
It is ideal for environments which are subjected to loads of a certain weight. It is possible to lay the product outdoors if the surface is covered (balconies, terraces, verandas etc….) and made perfectly water-proof.

PREPARATION OF THE SUBSTRATE
Follow all the indications mentioned in the chapter "**FLOOR LAYING - KERLITE PLUS**" paragraph "**INSTALLATION ON A NEW SLAB**". (page 38).

CUTTING KERLITE TWIN
Must be cut using only diamond discs fitted to electrical grinding machines or wetsaws.

APPLICATION OF ADHESIVE AND INSTALLATION
1. Spread the adhesive full bed using a trowel with tilted teeth at a distance of 6 mm apart **(fig. 22)**.
2. Position the slab and tap it repeatedly using a rubber trowel or by pressing on it with your hands to ensure adhesion all over and prevent air gaps and bubbles forming **(fig. 27)**.

JOINTS
For indoor environments, space tiles using special cross-shaped spacers which are at least 2 mm wide **(fig. 26)**.
When laying outdoor tiles, wider spacers are required, also taking account of the size of the tiles used and the local temperature range. A general guideline could be 5-6 mm; this value should be checked every time by the designer and the Supervisory Team.

EXPANSION AND PERIPHERAL JOINTS
On large surfaces, you must use expansion joints placed on the existing ones on the underlying slab. Use only expansion joints with metal edges, such as for instance SCHLÜTER SYSTEMS EKSB45 **(fig. 33)**.
The heat-related expansion (or contraction) of KERLITE is based on its expansion coefficient, which is $7{,}0 \times 10^{-6}$ $°C^{-1}$ (i.e. for a temperature range of 70°C, expansion is 0,5 mm per linear metre).
Fit peripheral joints measuring 5-8 mm around the edge of fixed elements in the supporting structure, such as walls, steps, columns , etc. **(fig. 34)**.
In any case, arrangement of expansion joints must be calculated by the person in charge of the building site.

FLOORING STRENGTH

NEVER WALK ON THE FLOOR DURING AND AFTER INSTALLATION UNTIL THE ADHESIVE HAS DRIED.

As a general rule, a floor can be walked on after at least 24 hours from completing installation.
In any case, always refer to the time indicated by the manufacturer of the adhesive.

INSTALLATION ON EXTERNAL WALLS

kerlite® plus

WALL INSTALLATION ON EXTERIOR PLASTER

For installation on exterior plaster walls, glue KERLITE 3mm and KERLITE PLUS onto a high performance substrate that can resist mechanical stress, such as the weight of tiles, thermal expansion and adverse weather conditions. In this case, Cotto d'Este recommends plaster such as KR100 made by Fassa Bortolo or BF02 by Grigolin, or plaster with the same characteristics. Plaster must have an average adhesion to brick of at least 1 N/mm^2 (about 10 kg/cm^2).

During installation, pay attention to string-courses and structural joints. Never install KERLITE on two or more surfaces that do not constitute a single stable structure, such as for instance reinforced concrete and brick.For installation in exterior environments, always adopt the double-spreading technique.

PREPARING A SURFACE WITH A HIGH ABSORPTION

Plaster work that is very absorbent and has a powdery surface (gypsum for instance) must be treated with one or two coats of concentrated, water-based professional insulating agent (PRIMER), as indicated in the instructions for use; this preliminary operation will reduce water absorption and improve adhesive application.

EXPANSION JOINTS

On large surfaces, in particular outdoors, use PVC expansion joints such as for instance BWS45 made by Schlüter Systems (**fig. 28**).
For expansion joints, you can also use silicone-based products.

TECHNICAL CHARACTERISTICS

Technical characteristics		Test method	Requirements of the EN 14411-G / ISO 13006-G BIa-UGL Group standard	kerlite 3mm	kerlite plus	kerlite twin
Water absorption (E)		ISO 10545-3	≤ 0,5 %	0,1 %	0,1 % (*)	0,1 % (*)
Flexural strength		ISO 10545-4	≥ 35 N/mm^2	≥ 35 N/mm^2	≥ 120 N/mm^2 (**)	≥ 55 N/mm^2 (**)
Breaking stress (S)		ISO 10545-4	≥ 700 N	Not applicable to wall tiles	≥ 1000 N (**)	≥ 1800 N (**)
Compression strength		-	-	Not applicable to wall tiles	≥ 400 N/mm^2	≥ 400 N/mm^2
Deep scratch resistance		ISO 10545-6	≤ 175 mm^3	≤ 145 mm^3	≤ 145 mm^3	≤ 145 mm^3
Linear thermal expansion		ISO 10545-8	Requirement not applicable	α ≤ 7x10^{-6} °C^{-1}	α ≤ 7x10^{-6} °C^{-1}	α ≤ 7x10^{-6} °C^{-1}
Thermal shock resistance		ISO 10545-9	Requirement not applicable	Resistant	Resistant	Resistant
Chemical resistance to acid and alkali with a high (H) and low (L) concentration		ISO 10545-13	As declared by manufacturer	ULA, UHA (resistant)	ULA, UHA (resistant)	ULA, UHA (resistant)
Resistance to chemicals for domestic uses		ISO 10545-13	UB min.	UA (resistant)	UA (resistant)	UA (resistant)
Resistance to stains		ISO 10545-14	Min. Class 3	5 (Resistant)	5 (Resistant)	5 (Resistant)
Frost-resistance		ISO 10545-12	No alteration	Resistant	Resistant	Resistant
Size characteristics	**Length and width**	ISO 10545-2	± 0.6 %	± 0.6 %	± 0.6 %	± 0.6 %
	Straightness of sides	ISO 10545-2	± 0.2 %	± 0.2 %	± 0.2 %	± 0.2 %
	Right-angle corners	ISO 10545-2	± 0.2 %	± 0.2 %	± 0.2 %	± 0.2 %
	Flatness	ISO 10545-2	± 0.5 %	± 0.5 %	± 0.5 %	± 0.5 %
	Thickness	ISO 10545-2	± 5 %	± 5 %	± 5 %	± 5 %
Heat conductivity		UNI EN 12524:2001		λ = 1,3 W/m°K λ = 1,1 kcal/mh°C λ = 0.7 Btu/fth°F	λ = 1,3 W/m°K λ = 1,1 kcal/mh°C λ = 0.7 Btu/fth°F	λ = 1,3 W/m°K λ = 1,1 kcal/mh°C λ = 0.7 Btu/fth°F

(*) value refers to ceramic material
(**) value refers to complete piece (slab and reinforcement)

RESISTANCE TO SLIPPING

Technical characteristics	Test method	Reference requirements	kerlite 3mm	kerlite plus	kerlite twin
Dynamic friction coefficient	B.C.R.	> 0,40 L.13/89 - D.M. 236/89 Leg. Decree 503/96	Not applicable to wall tiles	> 0,40 (excluding the Over serie) leather-dry / rubber-wet	> 0,40 (excluding the Over serie) leather-dry / rubber-wet
Slip resistance	DIN 51130	R9 (6° ≤ α ≤ 10°)	Not applicable to wall tiles	**R9** (excluding the Over serie) **R11** (Geoquartz Serie)	**R9** (excluding the Over serie) **R11** (Geoquartz Serie)
	DIN 51097	Class C (A+B+C) (α ≥ 24°)	Not applicable to wall tiles	**Classe C (A+B+C)** (Geoquartz Serie)	**Classe C (A+B+C)** (Geoquartz Serie)

FIRE-RESISTANCE CHARACTERISTICS

Technical characteristic	Test method	References for classification	kerlite 3mm	kerlite plus	kerlite twin
WALL INSTALLATION					
Fire-resistance	-	Italian Standards M.D. 14/01/85 - M.D. 15/03/05	Class 0	Class 1	Classe 1
Fire-resistance	UNI EN 13823:2005	European Standard 89/106/CE Directive - 2000/147/CE Decision - UNI EN 13501-1:2005	Class A1	Class A2 - s1,d0	Classe A2 - s1,d0
FLOOR INSTALLATION					
Fire-resistance	-	Italian Standards M.D. 14/01/85 - M.D. 15/03/05	Class 0	Class 1	Classe 1
Fire-resistance	UNI EN ISO 9239 :2006	European Standard 89/106/CE Directive - 2000/147/CE Decision - UNI EN 13501-1:2005	Class $A1_{fl}$	Class $A2_{fl}$ - s1	Classe $A2_{fl}$ - s1

RECOMMENDED ADHESIVES

Here below is a list of the most common supports used in building with the relative adhesive and class in accordance to the EN 12004 (adhesion) and EN 12002 (deformability) standards.

Adhesive for **interior walls** with standard bond strength

Surface	Manufacturer	Product	Class
Plaster for civil buildings, gypsum-based plaster with a prior coat of PRIMER, cement, plasterboard, fibre cement panels, light-weight blocks.	Mapei / Kerakoll Laticrete / Litokol	KERABOND + ISOLASTIC / H40 ECO IDEAL LATICRETE 335 + LATICRETE 282 / SUPERFLEX K77	C2ES2 / C2TE C2TES1 / C2TES1
Concrete, old ceramic, marble, stone.	Mapei / Kerakoll Laticrete / Litokol	KERABOND + ISOLASTIC / H40 ECO TENAFLEX LATICRETE 335 + LATICRETE 333 / SUPERFLEX K77	C2ES2 / C2TE C2TES2 / C2TES1
Particle board, metal.	Mapei / Kerakoll Laticrete / Litokol	KERALASTIC / T SUPERFLEX ECO LATALASTIK / LITOELASTIC	R2T / R2T R2T / R2T

Adhesive for **exterior walls** with standard bond strength

Surface	Manufacturer	Product	Class
Plaster	Mapei / Kerakoll Laticrete / Litokol	KERABOND + ISOLASTIC / SUPERFLEX ECO LATICRETE 335 + LATICRETE 333 / CEMENTKOL K21 + LATEXKOL	C2ES2 / R2T C2TES2 / C2S2
Concrete	Mapei / Kerakoll Laticrete / Litokol	KERABOND + ISOLASTIC / SUPERFLEX ECO LATICRETE 335 + LATICRETE 333 / CEMENTKOL K21 + LATEXKOL	C2ES2 / R2T C2TES2 / C2S2

Adhesive for **special supports** with standard bond strength

Surface	Manufacturer	Product	Class
Work benches made of marine grade plywood, metal, etc.	Mapei / Kerakoll Laticrete / Litokol	KERALASTIC / SUPERFLEX ECO LATALASTIK / LITOELASTIC	R2 / R2T / R2T

R2T

RECOMMENDED ADHESIVES

Here below is a list of the most common supports used in building with the relative adhesive and class in accordance to the EN 12004 (adhesion) and EN 12002 (deformability) standards.

Adhesive for **interior floors** with standard bond strength

Surface	Manufacturer	Product	Class
Cement slabs and heated floors, concrete, old ceramics, marble slabs and stone.	Mapei / Kerakoll Laticrete / Litokol	KERABOND + ISOLASTIC / H40 ECO EXTRAFLEX LA- TICRETE 335 + LATICRETE 333 / SUPERFLEX K77	C2ES2 / C2TES1 C2TES2 / C2TES1
Wood, PVC, rubber, linoleum, metal, resin.	Mapei / Kerakoll Laticrete / Litokol	KERALASTIC / SUPERFLEX ECO LATALASTIK / LITOELASTIC	R2 /R2T R2T / R2T

Adhesive for **interior walls** with standard bond strength

Surface	Manufacturer	Product	Class
Plaster for civil buildings, gypsum-based plaster with a prior coat of PRIMER, cement, plasterboard, fibre cement panels, light-weight blocks.	Mapei / Kerakoll Laticrete / Litokol	KERABOND + ISOLASTIC / SUPERFLEX ECO LATICRETE 335 + LATICRETE 282 / SUPERFLEX K77	C2ES2 / R2T C2TES1 / C2TES1
Concrete, old ceramic, marble, stone.	Mapei / Kerakoll Laticrete / Litokol	KERABOND + ISOLASTIC / SUPERFLEX ECO LATICRETE 335 + LATICRETE 333 / SUPERFLEX K77	C2ES2 / R2T C2TES2 / C2S2
Particle board, metal.	Mapei / Kerakoll Laticrete / Litokol	KERALASTIC T / SUPERFLEX ECO LATALASTIK / LITOELASTIC	R2T / R2T R2T / R2T

Adhesive for **exterior walls** with standard bond strength

Surface	Manufacturer	Product	Class
Plaster	Mapei / Kerakoll Laticrete / Litokol	KERABOND + ISOLASTIC / SUPERFLEX ECO LATICRETE 335 + LATICRETE 333 / CEMENTKOL K21 + LATEXKOL	C2ES2 / R2T C2TES2 / C2S2
Concrete	Mapei / Kerakoll Laticrete / Litokol	KERABOND + ISOLASTIC / SUPERFLEX ECO LATICRETE 335 + LATICRETE 333 / CEMENTKOL K21 + LATEXKOL	C2ES2 / R2T C2TES2 / C2S2

Adhesive for **special supports** with standard bond strength

Surface	Manufacturer	Product	Class
Work benches made of marine grade plywood, metal, etc.	Mapei / Kerakoll Laticrete / Litokol	KERALASTIC / SUPERFLEX ECO LATALASTIK / LITOELASTIC	R2 / R2T R2T / R2T

DESCRIPTIONS FOR SPECIFICATIONS

Title	Description
Thickness	**KERLITE 3MM**: 3 mm.
	KERLITE PLUS: 3,5 mm.
	KERLITE TWIN: 7 mm.
Sizes	**KERLITE 3MM**: cm. 100x300 - 100x100 - 40x100 - 4,9x100 - 50x50 - Trilogy 40x100 - Stripes 40x100
	KERLITE PLUS: cm. 100x300 - 100x100 - 50x100 - 50x50 - 20x150 - 14,3x100
	KERLITE TWIN: cm. 100x300 - 100x100 - 100x75
Series and colours	**COLORS**: LAKE, SAND, SNOW, STEEL, SMOKE, NIGHT
	ELEGANCE: VIA TORNABUONI, VIA CONDOTTI, VIA MONTENAPOLEONE, VIA FARINI
	BUXY: AMANDE, CARAMEL, CENDRE, NOISETTE, PERLE
	BLUESTONE AVANTGARDE: BLUESTONE, PIETRA D'IRLANDA, PIETRA CHIARA
	OVER: LOFT, OFFICE, OPENSPACE, ROAD
	OAKS: FOSSIL, LAND, RAIN, TIMBER
	BLACK-WHITE: BLACK, WHITE
	GEOQUARTZ: DOVER, SINAI, ETNA

Title	Description
Type of surface	Unglazed (UGL)
Shaping method	Pressing
Water absorption in accordance to EN ISO 10545.3	≤ 0,5%
Classification in accordance to EN 14411/ISO 13006	Bla
Reference specifications for first grade product in accordance to EN 14411/ISO 13006	EN 14411/ISO 13006 Appendix G
Performance classification in accordance to	EN - ISO – DIN - BCRA
Declared safety features	Slip resistance • BCRA Method: > 0.40 (leather/dry, rubber/wet) • DIN 51130 Method: R9 • DIN 51097 Method: class C (A+B+C)
	Release of toxic/harmful substances ISO 10545.15 - none
	Fire resistance, Italy (MD 14/01/85, DM 15/03/05, method ISO/DIS 1182.2) • KERLITE 3MM: class 0 • KERLITE PLUS e KERLITE TWIN: class 1
	Fire resistance, European Union (Dir. 89/106/CE, Dec. 2000/147CE, UNI EN 13501-1:2005, method UNI EN 13823:2005) • KERLITE 3MM: class A1 (walls), class A1fl (floors) • KERLITE PLUS e KERLITE TWIN: class A2-s1,d0 (walls), class A2fl-s1 (floors)
Data for the Technical Chart	New ceramic mineral produced in 3000x1000 mm slabs of porcelain stoneware, obtained using raw materials of high quality and purity (light clay, feldspar fluxes and ceramic pigments with a high chromatic performance). After wet milling, the mixture is coloured and spray dried, then pressed by compacting on a belt with a force of 15,000 tons and fired at a temperature of 1200°C.

CLEANING AND MAINTENANCE

CLEANING "AFTER INSTALLATION"

1. "After-installation" cleaning is necessary for removing any residues of grout from joints or residues of cement or grout. It must be performed at the end of the construction phase.
2. Badly performed cleaning after installation or, worse still, failure to perform after-installation cleaning, may cause stains that will impair the floor. Poor cleaning, even if this is performed daily.
3. Whenever possible, especially for medium to large surfaces, use motorised brushes with soft discs (white or beige).

CEMENT-BASED PLASTER MIXED WITH WATER

Cleaning is performed with special acid buffer detergents that must be diluted. Some of the most commonly used types are indicated in the following table.

1. Clean after 4-5 days from grouting (grout must be hard) and within 10 days. After 10 days, cleaning can become very troublesome.
2. Before cleaning, moisten the floor with water. The grout will therefore soak up water and contact with detergent will be reduced.
3. Let the detergent act for a short time and rinse thoroughly with water as soon as possible.
4. This must not be done when the tiled surface is too hot (e.g. exposed to sunlight during the hottest months) since the chemical action and aggression potential of the detergent increase. In summer, clean during the coolest hours of the day.
5. Always perform tests before using a cleaning product (on a spare tile).

These detergents are readily available in retail stores, some of which are indicated in **Table A**.

CLEANING EPOXY ADHESIVES OR CEMENT-BASED PLASTER (WITH THE ADDITION OF LATEX OR RESIN, ETC.)

These must be removed immediately and accurately since these adhesives harden very rapidly, even in just a few minutes. Follow the instructions of manufacturers. Always perform tests before using a cleaning product (on a spare tile).
Clean thoroughly the following day using alkaline detergents, some of which are indicated in **Table B**.
For the instructions of use, please follow the manufacturer's specifications.

DAILY CLEANING

Always use neutral and diluted detergents that do not contain wax and that do not leave glossy films. Rinse the floor thoroughly after washing. We recommend using products which are readily available on the market (see **Table C**).

EXTRA-DUTY CLEANING

This is performed to remove particularly old or deep stains or residues.
The most effective detergents and the types of stain they tackle are indicated in the **table D**.

WARNING: Always test the product on a spare tile.

REMOVING GLOSSY FILM

Do not use wax products on flooring and wall coverings in KERLITE.

Many standard detergents contain wax or polishing additives that tend to deposit on the floor and create glossy films and troublesome stains. These films can also result from the use of some types of grouts for joints. Simple products, such as Coca Cola, wine, water, etc., if spilt on the floor will remove this glossy film and give the tiles their initial matt appearance.
The matt areas will resemble stains whereas they are actually the cleaner areas of the floor. In these cases:

1. Remove the glossy film (see **table E**).
2. For daily cleaning, use neutral detergents that do not contain wax or polishing additives (see the previous paragraph, "**daily cleaning**").

TABLE A - STANDARD CLEANING (CEMENT-BASED PLASTER, GROUT, CEMENT, PLASTER)

TYPE OF DETERGENT	NAME OF DETERGENT	MANUFACTURER
Acid base	KERANET	MAPEI
	CEMENT REMOVER	FABERCHIMICA
	DETERDEK	FILA
	LITOCLEAN PLUS	LITOKOL

TABLE B - THOROUGH CLEANING

TYPE OF DETERGENT	NAME OF DETERGENT	MANUFACTURER
Alkali base	WAX REMOVER	FABERCHIMICA
	PS 87	FILA
	CIF degreaser with sodium bicarbonate	UNILEVER ITALIA
	LITONET	LITOKOL

TABLE C - DAILY CLEANING

TYPE OF DETERGENT	NAME OF DETERGENT	MANUFACTURER
Neutral detergent or degreaser	GLASSEX degreaser	RECKITT BENCKISER
	AJAX	COLGATE PALMOLIVE
	CIF degreaser with sodium bicarbonate	UNILEVER ITALIA
	FLOOR CLEANER	FABERCHIMICA
	FILA CLEANER	FILA

TABLE D - EXTRA-DUTY CLEANING

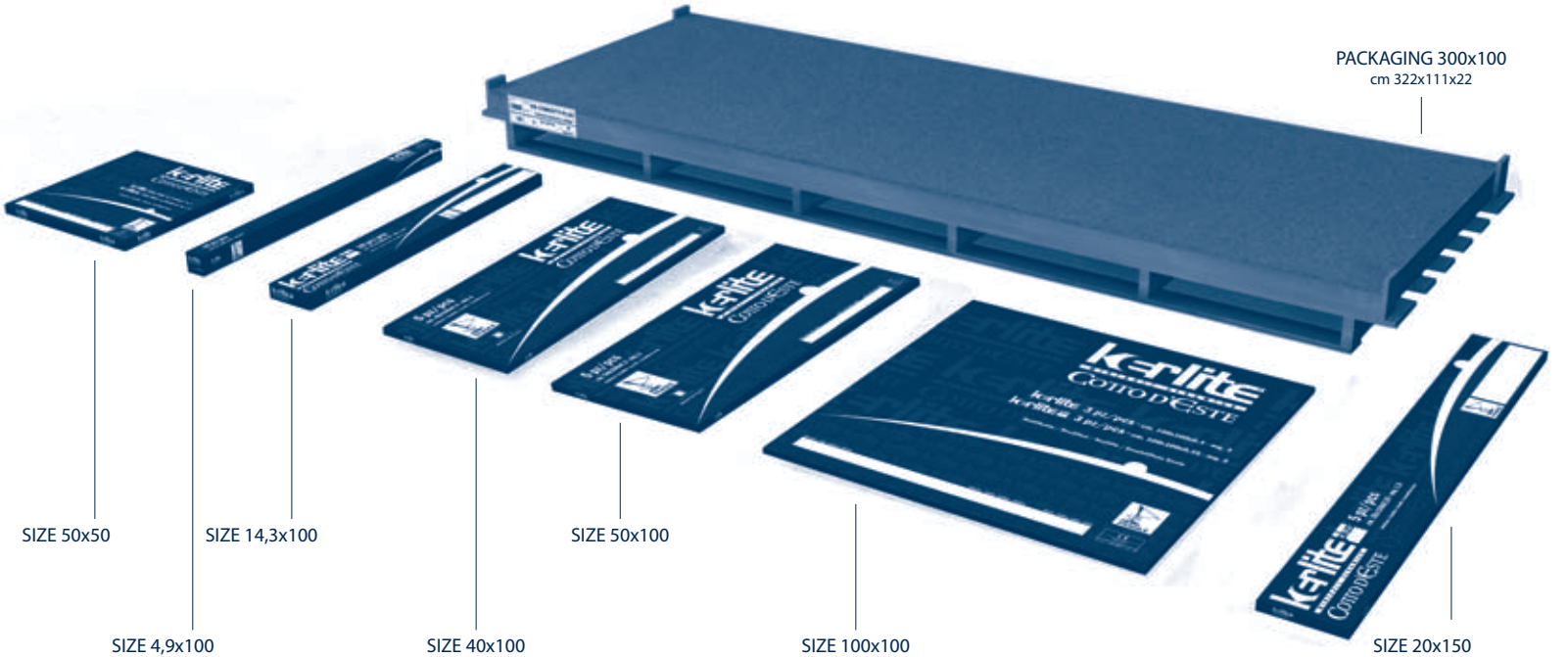
RESIDUE TO REMOVE	TYPE OF DETERGENT	NAME OF DETERGENT	MANUFACTURER
Coffee, Coca Cola, fruit juice, wax, grease, etc.	Multipurpose, alkaline-based	COLOURED STAIN REMOVER	FABERCHIMICA
		PS 87	FILA
		CIF degreaser with sodium bicarbonate	UNILEVER ITALIA
Wine	Oxidizer	OXIDANT	FABERCHIMICA
Lime deposit	Acid base	VIAKAL	PROCTER & GAMBLE
Rust	Acid base	DILUTED MURIATIC ACID	VARIOUS MAKERS
Ink, felt-tip pen	Solvent- based	NITRO THINNER, TCE, TURPENTINE	VARIOUS MAKERS
		COLOURED STAIN REMOVER	FABERCHIMICA
Tire marks, rubber marks, suction cup marks, metal or pencil marks	Abrasive paste	VIM CLOREX POWDER	GUABER
		POLISHING CREAM	FABERCHIMICA
		DETERGUM	ZEP ITALIA
		Eraser (for pencil marks only)	-

TABLE E - REMOVAL OF WAX AND GLOSSY FILM CAUSED BY DETERGENTS

TYPE OF DETERGENT	NAME OF DETERGENT	MANUFACTURER
Acid base	VIAKAL (*)	PROCTER & GAMBLE
	TILE CLEANER, undiluted (*)	FABERCHIMICA

(*) Do not follow the instructions on the pack but apply the detergent undiluted; let it work for 15-30 minutes then rub with soft or mildly abrasive pads (white, yellow, red). Rinse thoroughly with water.

PACKAGING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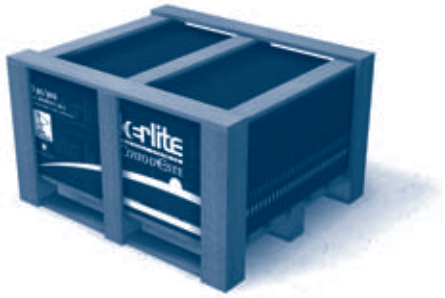


PACKAGING 40x100 and 14,3x100
cm 106x92x61

PACKAGING 50x50
cm 106x92x71

PACKAGING 20x150
cm 158x108x40

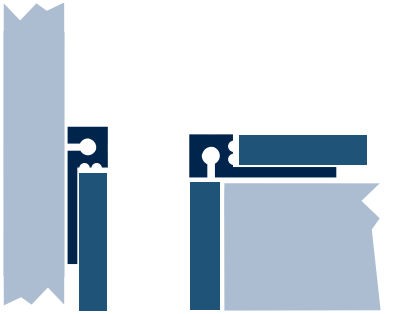
Size	Pieces per box	Sq.mt. per box	Kg per box	Boxes per pallet	Sq.mt. per pallet	Kg per pallet
100x300x0,7 KERLITE TWIN	-	-	-	5 pcs.	15	240
100x300x0,35 KERLITE PLUS	-	-	-	12 pcs.	36	280,8
100x300x0,3 KERLITE 3 MM	-	-	-	13 pcs.	39	288,6
100x100x0,7 KERLITE TWIN	2	2	32	20 pcs.	40	640
100x100x0,35 KERLITE PLUS	3	3	23,4	25 pcs.	75	585
100x100x0,3 KERLITE 3 MM.	3	3	22,2	25 pcs.	75	555
20x150x0,35 KERLITE PLUS	5	1,5	12,8	40	60	512
75x100x0,7 KERLITE TWIN	1	0,75	24	20	15	480
50x100x0,35 KERLITE PLUS	5	2,5	20	32	80	640
40x100x0,3 KERLITE 3 MM.	5	2	14,2	35	70	497
40x100x0,3 Trilogy KERLITE 3 MM.	4	1,6	11,2	15	24	168
40x100x0,3 Stripes KERLITE 3 MM.	1	0,4	2,8	80	32	224
50x50x0,35 KERLITE PLUS	7	1,75	13,65	48	84	655,2
50x50x0,3 KERLITE 3 MM.	8	2	14,8	48	96	710,4
14,3x100x0,35 KERLITE PLUS	10	1,43	12	40	57,2	480
4,9x100x0,3 KERLITE 3 MM.	10	0,490	3,9	39	19,11	152,1

PROFILES FOR CORNERS AND EXPANSION JOINTS

KERLITE and KERLITE PLUS walls can be finished by adding profiles for edges and corners currently available on the market.
In the table here below you will find a few suggestions concerning aluminium profiles sold by PROFILIITALIA-PROFILITEC S.p.A.

Profile for connecting walls to floors or inner corners.

CRM 44A



Profile for connecting outer corners to terminal elements.

SJM 44A

Profile for connecting outer corners.

RJF 44A

Profile for protecting outer corners with rounded edge.

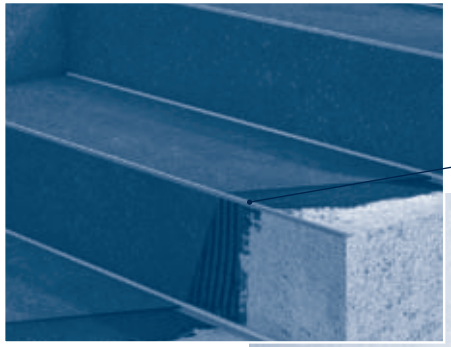
RJM 44A

PVC joint for wall tiles: BWS45 made by SCHLUETER SYSTEMS.

Metal joint for walls: EKSB45 made by SCHLUETER SYSTEMS.

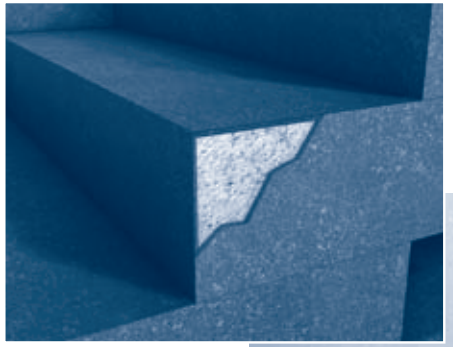
STEPS

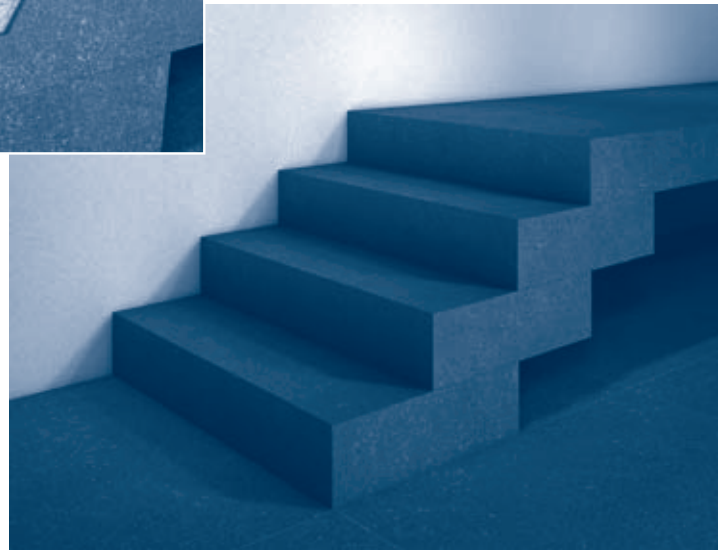
kerlite® plus



Profilo Step

kerlite® twin





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