

## AGGLOSTYLE TERRAZZO FLOORING

**A line of innovating materials, ideal for indoor flooring, outdoor paving and cladding.**

**AGGLOSTYLE® from BELOTTI TILES** is a natural product, enhancing the aesthetic and mechanical features of the highly valued materials used to manufacture it.

Through the exclusive Breton process of vibro-compaction under vacuum, a product with outstanding physical-mechanical characteristics is obtained.

Produced using the innovative technology that binds precious stone materials such as marble, calcareous stone, granite and siliceous stone with cement and water, the resulting material leads the vanguard and is ideal for any application.

### INSTRUCTIONS FOR LAYING

The base of the reinforced-concrete or latero-cement bearing structure constitutes the FLOOR (SLAB in jargon). Tiles are hardly ever placed directly on the "slab". The foundation for the tile flooring (natural stone, wood and resilient) is always formed of screeds, with a few exceptions.

#### SCREED OR "CALDANA"

The screed is a building unit produced and laid on a bearing foundation (floor), on a non-stick layer ("floating" screed) or on an intermediate insulating layer (soundproofing: acoustic; heat insulation: cork, polystyrene, lightened material, e.g. light concrete), which can be used as it is, or may be coated with a green-laid lining or stuck later with an adhesive (see Fig. 1)

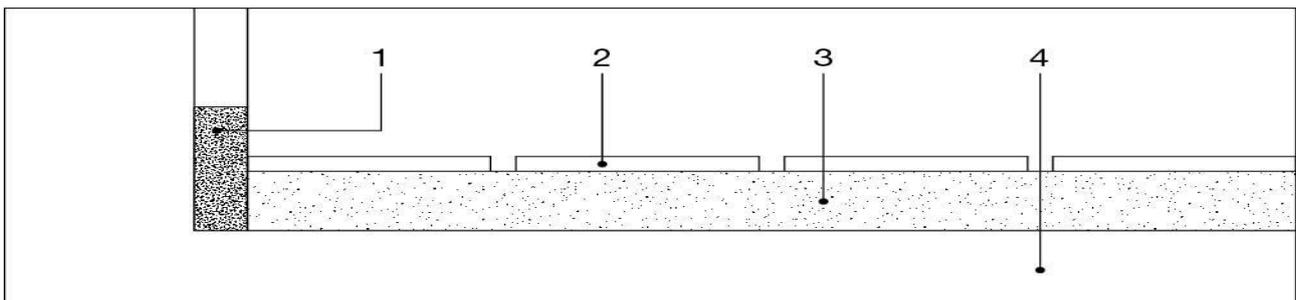


Fig. 1

- 1 compressible material
- 2 **AGGLOSTYLE BELOTTI TILES**
- 3 setting bed (SCREED)
- 4 bearing floor

The laying of **AGGLOSTYLE** tiles can be executed as follows:

#### TRADITIONAL LAYING ON MORTAR

(tiles are directly laid while preparing the screed): in this case, it is advisable to have the laying performed by competent personnel, possibly already experienced in laying **AGGLOSTYLE BELOTTI TILES** -like products (compound stone with cement binder).

#### LAYING WITH ADHESIVE

The screed is cast and smoothed, then it must be dried and aged for at least 28 days before tiles are installed with adhesive.

#### LAYING ON MORTAR

##### a) laying on wet cement mortar

- ◆ Prepare the mixture by blending 4 parts of clean sand with 1 part of cement (use suitable, high-grade materials) and add clean water.
- ◆ Remove any possible dust and trace of old mortar or other materials from the surface on which the tiles are expected to be laid. Dampen lightly the surface where the cement mortar mixture will be laid (the foundation must already be set).

- ◆ Lay and level the cement mortar mixture so as to get an even layer approx. 5 cm thick (there must not be water on the setting bed of cement mortar: it has just to be slightly damp).
- ◆ Do not lay large areas of cement mortar at the same time because, depending on the environmental conditions, it may lose its softness after some time, thus affecting the subsequent laying and levelling of tiles.
- ◆ Once the cement bed is properly laid and levelled (foundation), its surface has to be evenly dusted with dry cement: the so-called "dusting" operation.
- ◆ After having plunged the **AGGLOSTYLE** tiles in clean water for a few seconds and drained them well so as to get the tile back-face damp, lay them on the foundation according to the type of joint required (it is advisable to always leave a joint of at least 2 mm between the tiles).
- ◆ Press and gently tap the tiles so as to position them flat and with a uniform contact with the foundation, while making sure the cement mortar does not surface from the joints.
- ◆ In order to be sure the operation has been properly performed, check occasionally if a certain homogeneous quantity of cement mortar remains stuck to the back-face of the laid tile once the tile is removed.
- ◆ Seal up the joints about 4-5 days after the tile laying so as to allow a minimum setting of the cement mortar. When performing this operation, it is advisable to clean up tiles as quickly as possible from any possible trace of filler caused by the excess of sealing material in the joints.

b) Laying on semidry cement mortar

- ◆ Prepare the mixture by batching 150 to 200 kg of cement per cubic metre of aggregates (the particle size of the aggregates is 0-4 mm). If possible, the mortar must be machine-mixed.
- ◆ The setting bed (foundation) must then be compacted and levelled so as to be as flat as possible.
- ◆ The so-called "dusting" operation is then carried out: a thin layer of pure, dry cement is dusted on the still fresh bed of cement mortar, immediately before tiles are laid.
- ◆ Tiles are laid and wetted so that water, while penetrating the joints not yet sealed, makes the mixture softer and enables the precise arrangement of tiles; moreover, water enables the cement to react and achieve a correct hydration degree.

At last, each tile is tapped in order to guarantee its flawless contact with the surface below (see Fig. 2).

- ◆ The quantity of water used to perform this operation must be the one strictly necessary for the foundation to grip the tile. Such operation is harder (and more risky as well) because, due to the large size of tiles, it is difficult for the water to wet their entire back-face.
- ◆ Seal up the joints about 4-5 days after the tile laying so as to allow a minimum setting of the cement mortar. It is advisable to remove any possible trace of filler as quickly as possible so that the material does not get dirty.

- 1 Spreading of mortar
- 2 compaction
- 3 levelling
- 4 "dusting"
- 5 tile laying
- 6 wetting (in case of LAYING on semidry mortar)
- 7 tile tapping
- 8 sealing of the joints

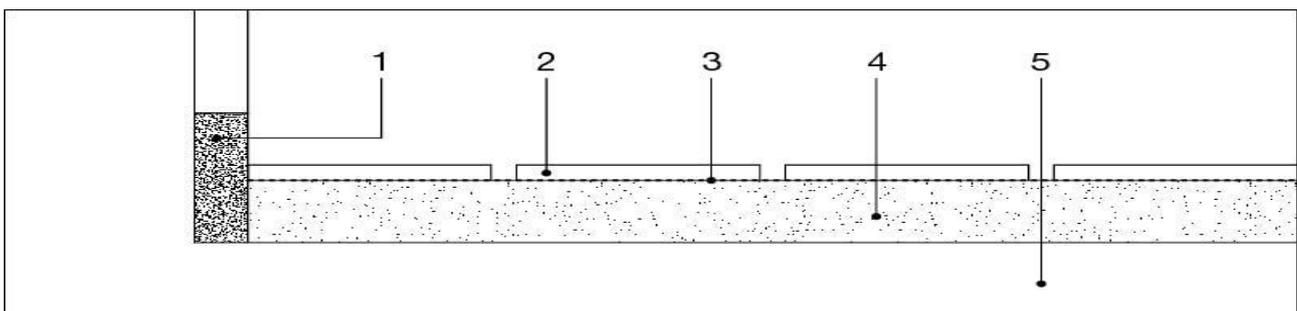


Fig. 2

- 1 compressible material
- 2 **AGGLOSTYLE BELOTTI TILES**
- 3 "dusting"
- 4 setting bed (screed)
- 4 bearing floor

N.B. In case of outdoor applications, in direct contact with the sunbeams, lay some wet cloths or sacks on the entire surface for at least 24 hours after tiles have been tapped.

### Advantages of the laying on mortar

- ◆ The thick layer of mortar used on the area to be tiled, allows to compensate for any possible unevenness of the foundation, therefore this type of laying is advisable when the substratum needs to be remarkably heightened.
- ◆ Lower costs.

### Drawbacks and risks of the laying on mortar

- ◆ An excess of water in the mixture may jeopardise both the adhesion and the planarity of the surfaces.
- ◆ It is hard to get all the foundation cement hydrated with a consequent risk of partial adhesion.
- ◆ Should some aggregates be polluted, the feared "efflorescence" phenomenon (salts coming to the tile surface) may occur.
- ◆ The system is not much flexible since it cannot bear shocks and stresses due to both weather conditions (temperature, rain, etc.) and mechanical stresses (vibrations, structural settlements, etc.).
- ◆ It takes quite a long time before you can step on the tile flooring.
- ◆ The substrata must be firm enough so as to prevent the formation of depressions or sags.

### LAYING WITH ADHESIVE:

It is essential the screed is perfectly prepared to have a successful laying with adhesive, therefore its preparation must stick to a precise procedure.

The screed is prepared, levelled, float-finished and aged (for at least 28 days); then tiles can be installed with the adhesive (see Fig. 3).

- 1 The screed is prepared
- 2 it is levelled and float-finished
- 3 it must be hardened enough
- 4 tiles are laid
- 5 joints are sealed

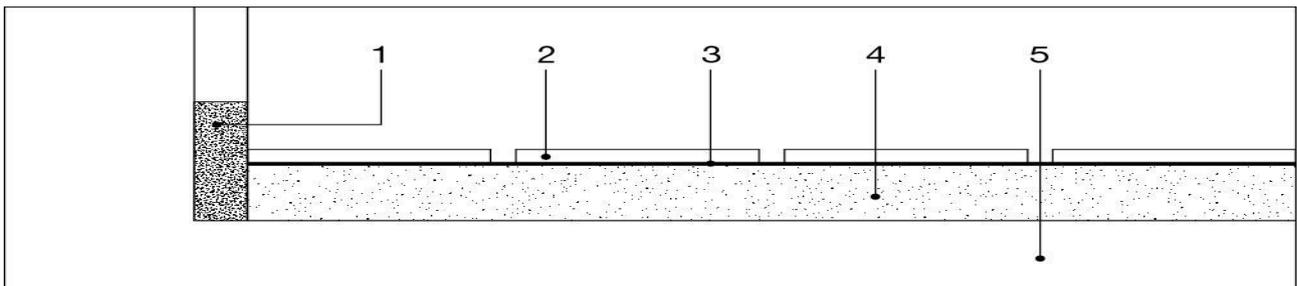


Fig. 3

- 1 compressible material
- 2 **AGGLOSTYLE** tiles
- 3 adhesive
- 4 screed
- 5 bearing floor

Solutions allowing for a quick-hardening and drying screed are available on the market. For instance, using KERAKOLL or MAPEI products, the object is achieved even in few days. In any case, the screed must satisfy some precise requirements, such as:

#### **AGEING**

One week for each centimetre of thickness (or 28 days at least) is deemed necessary for the ageing to take place. There must anyway be a residual humidity equal to <2% for the cement screed and <0.5% for the anhydrite screed. The residual humidity is the balance between the humidity of the air and that of the cement products.

It is necessary to observe the time specified above because all the cement foundations shrink: shrinkage is an unavoidable process, typical of cement that, due to water evaporation, shrinks (gets shorter).

In cement screeds, the shrinkage is a loss of volume particularly rapid in the first weeks and causes a screed shortening equal to approx. 1 mm/metre (but can even be greater).

The shrinkage duration lasts longer when thickness is higher because there is more water to evaporate than in thinner screeds; therefore water needs more time to evaporate and slows down the "shrinkage process".

#### **COMPACTNESS**

Compactness is another essential characteristics of a screed to be considered as suitable. Empirical test: scraping a nail on the screed, neither deep scratches nor dust must form; similarly, when tapping it with a hammer, no mark must be seen and the upper part of the screed must not subside. In case of a chalky screed, once the dust is removed, it must not crumble leaving scraps when you rub it with the hand. If the screed is too lean (with little binder), incoherent or burnt it is advisable to make it again.

#### **LEVELLING**

The surface must be flat. To check such planarity by means of a 2m levelling bar there must be no disparities higher than 3mm.

#### **CRACKING**

The capillary static cracks caused by the usual shrinkage of the cement mix do not create any problem to the glued system.

The visible cracks caused by an inhomogeneous shrinkage can be V-widen, provided the screed has dried; they must be previously made sound and blocked by making suitable expansion joints, where necessary.

Should any pre-existing joints be eliminated or restored, act in the following way: remove the old joint, V-widen the remaining crack, cut it crosswise in several points for 30-40cm, then put some iron rods in the middle of the screed thickness and fill it with epoxy resins + quartz powder.

Act in the same way even in case of remaking a cast not properly carried out. Any void under the screed must be filled up with expansion mortars or suitable products.

**THE EXPANSION JOINTS IN THE SCREED MUST BE STRICTLY RESPECTED IN THE CLADDING!!!**

#### **CLEANING**

Check that the screed is clean, without dust or any friable part to be removed in order to prevent the adhesive from sticking to a non-adherent layer.

#### **THE SCREED MUST BE**

**AGED, COMPACT, SMOOTH, FLAT, WITHOUT CRACKS, CLEAN AND DRY.**

#### **ADHESIVES (GLUES)**

The right choice of the adhesive is essential for a correct laying. The availability on the market of various types of adhesive entails a suitable information and most of all to scrupulously keep to the instructions of the manufacturing industries.

The choice of the adhesive shall be based on the climatic conditions, the type of application, the structure and nature of the foundation, the environment (internal or external).

Lay the adhesive on the foundation and place the tiles on the wet adhesive before this forms the superficial pellicle. The open time of the various adhesives (indicated in the specifications) changes notably according to the climatic conditions: ask your supplier in advance about the characteristics of the adhesive you will use.

Start the laying operation after checking that temperature and humidity comply with those set out in the technical cards of the adhesives.

Temperature should not be below +5°C or over +35°-40°C during the laying and for the 1-2 following days. Any surface strongly exposed to sun could be cooled by humidification with water (it is otherwise recommended to lay during the fresher hours). In dry and breezy climates, pay attention to the formation of the pellicle on the adhesive. Lay the adhesive on small areas and check wetting.

The suitable adhesives for laying **AGGLOSTYLE** can be schematically classified in:

### **UNMODIFIED HYDRAULIC BOND-BASED ADHESIVES**

They are white or grey powders to be mixed with water when used, composed of cement, loads and synthetic resins.

These adhesives retain the water needed to hydrate the cement contained in them, even if used in a thin layer and without wetting either the floor or the material to be laid.

Although usable, this type of adhesives is not recommended: because of the low absorption of **AGGLOSTYLE**, it results in a low mechanical fixing of the tile to the screed and the consequent risk of partial adhesion.

### **MODIFIED CEMENT ADHESIVES**

These are white or grey powdered adhesives to be mixed with water when laying (single-component) or with synthetic latex (two-component).

These adhesives are similar to the hydraulic ones, but (during the powder production or the laying with liquids in dispersion) they are mixed with polymer additives, which give them a higher adhesive strength and elasticity.

They are recommended for internal and external applications on foundations, whether absorbent or not, which are subject to expansion movements, water, frost and permanent water. Since it is a quick-setting adhesive with low water in excess, it is the ideal product for laying **AGGLOSTYLE**. In case of elevated temperatures and ventilation, we suggest to immerse the tiles in clean water for a few seconds before the laying and then drip the excess water away in order to guarantee a safer grip between the tile and the foundation.

### **REACTIVE RESIN-BASED ADHESIVES**

These adhesives are in form of paste or thick liquids to be mixed when used, composed of resins (polyester, polyurethane, epoxy) and a hardener. These products react chemically, independently of the contact with air or the absorption degree of either the laid material or the foundation.

Moreover, they are sensitive to temperature. Stick to the temperatures indicated in the specifications of the manufacturing industries. If you work at lower temperatures, the reaction will be very slow, thus not very practical for usage. These products are suitable for particular laying (on metals, rubber, pvc, etc.) Once hardened, they are waterproof. Recommended for environments that are subject to chemical attacks.

### **JOINTS**

We suggest to lay the tiles with at least a 2mm joint; in fact, all the international regulations we comply with advise against the butt joint pattern since it is the major cause of adhesion failures and even the least laying defect (uneven screed, inexperienced labour) appear much more visible. It is anyway possible to carry out either a butt joint pattern, where the elements are strictly in contact one another with just a very narrow unavoidable gap in between (in this regard we suggest you to

pass the trowel's point between the elements) or an open joint pattern in which the adjacent elements do not abut, leaving a gap depending on their size, the type of material to be laid and the intended aesthetic appearance. The joints between the cladding elements are fundamental for any glued system and serve to absorb strains and differential movements of the entire system.

Usually joints are filled with cement-based, even coloured fillers. The filling operation is carried out using a suitable rubber spatula.

Start cleansing when the filler becomes opaque using a sponge and clean water so as to avoid any damage on the tile face. Sometimes, it can be extremely difficult to eliminate the traces of coloured filler from the tile face, especially when they contrast with the colour of the tile (e.g. black filler on a white marble **AGGLOSTYLE**). In case of doubt, carry out a preliminary test. If the surface cannot be perfectly cleaned, it must be pre-treated with a suitable protective product.

### **EXPANSION JOINTS**

- Strictly observe all the expansion joints existing in both the floor and the walls.
- In case of vast areas, create "dividing joints" of approx. 1cm as follows: for high-traffic surfaces and foundations that are subject to movements or bending stresses, it is necessary to foresee panels of approx. 5x5 m; for interiors and stable surfaces, approximately every 60 m<sup>2</sup>.
- Place the tiles approx. 1 cm far from walls, columns, edges, corners, etc.
- Use silicone sealant to fill the expansion joints.
- When particular mechanical strength is required (for instance heavy traffic), special prefabricated joints or two-component polyurethane sealant can be used.

## **SOME LAYING SOLUTIONS**

### **LAYING ON EXISTING CERAMIC FLOORS**

#### **Glazed ceramic, red or porcelain stoneware, marble**

It is necessary to check the cleaning and stability of the floor. The old flooring must be well fixed to the foundation, solid and without cracks (tapping on each tile, one can understand from the sound the degree of adhesion). To remove grease, stains or normal dirt, use caustic soda 10-15% diluted in hot water; to remove mortar, cement, plaster or sealant, use cleansing agents already tested, while waxes, glazes and suchlike can be removed by means of suitable dewaxing solvents. Any existing paint or the "marble lead-sealing" must be eliminated. Rinse accurately.

### **LAYING IN CASE OF MOQUETTE**

Remove completely the existing moquette by means of a mechanical scraper, a scarifying machine or a shot-blasting machine. The adhesive stuck to the foundation must be mechanically removed as well. Clean by means of a vacuum cleaner.

### **LAYING ON HEATING FLOORS**

The floor heating systems usually consist of a hot water or an electric plant, which is installed under the screed or inside it. They can be steel panels, radiant heaters or coils inside the screed. Screeds must have an ageing of not less than 21 days. Once turned the heating on, the temperature must be increased of 5°C each day up to the maximum level. Keep the temperature at the max. level for at least 10 days, and then reduce it of 5°C per day until the complete turn-off. In cold weathers, temperature must be kept around 15°-18°C during the whole period of laying and for at least three days after the work is over. At this point, the heating can be turned off or set to the standard operating temperature.

### **EXTERIOR LAYING**

In interior laying, at least 70% of the tile backing must be wet with the adhesive, while 100% is recommended for outdoor laying.

For exteriors, we suggest not to use a spatula with less than 10mm teeth. We suggest the "double spreading" operation that consists in spreading the adhesive on the laying bed (floating) and "buttering" the tile backing. This technique guarantees a perfect adhesion of the tile even in case of formation of the pellicle.

The double spreading allows to cover the entire tile backing with the adhesive.

In this way you can avoid that:

- ✓ any void due to the spatula's teeth remains in the tile backing; this could cause cracks in the tile itself because of the mechanical stresses (in case of voids, the resistance to compression is reduced since the mechanical stresses tend to release in these points instead of in the screed underneath).
- ✓ in exterior paving, the water that slips through the voids by infiltration becomes frozen during Winter and causes some cracks because of the ice expansion.
- ✓ in exterior cladding, the "condensate" freezes (i.e. the vapour that forms in interior environments passes through the transpiring walls of the facade and condensates into drops of humidity; in winter these drops can freeze and jeopardize the whole glued system)
- ✓ the formation of efflorescence.

## **INITIAL WASHING AND MAINTENANCE**

Once laid, the tiles can show a "television" effect, meaning that their edges, which start drying when still in the pack, will be lighter; in a short time, especially under good climatic conditions, their colour will become uniform on all the surface.

It is very important that this humidity remains on the tile because in this way the tile keeps a perfect balance in terms of humidity between surface and backing: that is why we suggest you to immerse the tiles in clean water a few seconds before laying the paving and then drip the excess water away so as to restore a balanced humidity on both faces of the tile.

After laying, we suggest to always protect the floor with suitable canvas, avoiding absolutely to apply adhesive tape directly on the tiles or use cardboard with coloured writings, magazine pages and whatever can transfer foreign substances on the tiles floor.

**Don't use products that contain acid or alkaline** detergents because the tile gloss could be damaged: use always neutral detergents readily available on the market.

- Proceed to wash with a neutral detergent diluted 1:10 with water (increase the concentration in case of strong dirt), then rinse with abundant water and let it dry out. This operation is easier using a single-brush machine equipped with soft disk and liquid-sucker.
- For a highly-protective treatment (recommended for floors exposed to high wear like, for instance, bars, grill-rooms, restaurants and in any other place where the floor can be dirtied with mechanical oil), you must wash using a degreasing detergent (diluted 1:10 with water). When the floor surface is dry and clean, apply a non-stainable impregnating oil-repellent and hydro-repellent product that doesn't alter the aesthetic appearance of the tiles. In alternative to the highly-protective treatment, it is possible to apply a coat of floor-finishing wax with a brush, a rag or with a suitable applicator.
- For the cleaning of floors without a wax-finish, wash with a neutral detergent (diluted with water); then often rinse the rag in the detergent always making sure it gets squeezed properly.
- For the cleaning of floors having a wax-finish, wash with a neutral detergent (don't use hot water). In order to restore the tile gloss, wash periodically with the finish wax solution you have used at the beginning diluted with water (2 glasses of wax every bucket of water).

Every product for cleaning and maintenance can be readily found on the market.

**The AGGLOSTYLE - BELOTTI TILES floors, like those made of marble and granite, can be re-polished over the time.**