

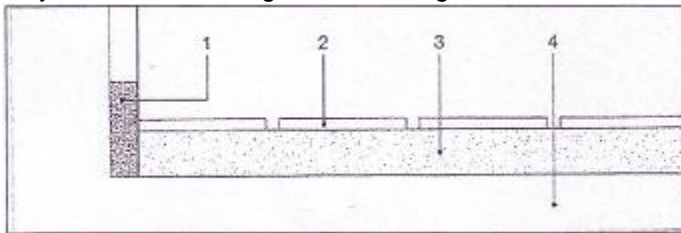
## Installation of Terrazzo

### Instructions for Laying

The base of the reinforced-concrete bearing structure constitutes the Slab. 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)



1. Compressible material
2. Terrazzo Tiles
3. Setting bed (screed)
4. Bearing floor

### Installation of terrazzo tiles can be executed as follows:

- 1) Traditional Laying on Mortar
- 2) 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.

- 1) 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 mold 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. 2" thick (there must not be water on the setting bed of cement mortar: it has just to be slightly damp.)

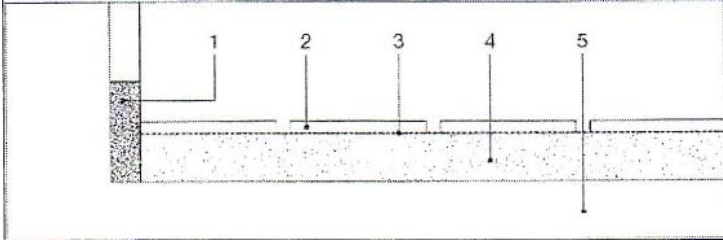
- Do not lay large areas of cement mortar at the same time because, depending on the environmental conditions, it may lose its softness after some time, thus affecting the subsequent laying and leveling of tiles.
- Once the cement bed is properly laid and leveled (foundation), its surface has to be evenly dusted with dry cement: the so-called "dusting" operation.
- After having plunged the terrazzo 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 2mm 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 homogenous 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 semi dry cement mortar

- Prepare the mixture by batching 9 to 12lbs of cement per cubic foot of aggregates (the particle size of the aggregate should be 0-4 mm). If possible, the mortar must be machine mixed.
- The setting bed (foundation) must then be compacted and leveled 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 least, 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 large size
- Seal the joints about 4-5 days after the tile installation 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. Leveling
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. Terrazzo tiles
3. "Dusting"
4. Setting bed (screed)
5. Bearing floor

Note: 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 laying on mortar

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

#### Drawbacks of laying on mortar

- An excess of water in the mixture may reduce adhesion and the levelness 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 flexible and cannot withstand shocks and stresses due to either weather conditions (temperature, rain, etc.) or mechanical stresses (vibrations, structural settlements, etc.).
- Long time before you can step on the tile flooring.
- The substrate must be firm so as to prevent the formation of depressions or sags.

## 2) Laying with adhesive

It is essential the substrate be perfectly prepared in order to use adhesives.

The screed must be leveled; 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 leveled and float-finished
3. It must be hardened enough
4. Tiles are laid
5. Joints are sealed

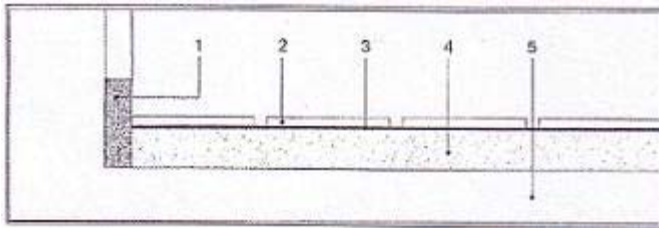


Fig.3

1. Compressible material
2. Terrazzo 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 a few days. In any case, the screed must satisfy some precise requirements, such as:

### Ageing

One week for each 1/3" of thickness (or 28 days at least) is deemed necessary for the ageing to take place. There must 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 cement foundations shrink: shrinkage is an unavoidable process, typical of cement due to water evaporation.

In cement screeds, the shrinkage is a loss of volume particularly rapid in the first weeks. The shrinkage duration takes longer with increased thickness due to more water evaporation than in thin screeds.

### **Density**

Density is another factor to review. 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. 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 re-do it.

### **Leveling**

The substrate must be flat. Disparities should not be more than 1/8".

### **Cracking**

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

Visible cracks caused by an inhomogeneous shrinkage can be V-widened, provided the screed has dried;

Should any pre-existing joints be eliminated or restored, do the following: remove the old joint, V-widen the remaining crack, cut it crosswise in several points for 10-15", then put some iron rods in the middle of the screed and fill it with epoxy resins + quartz powder.

Any void under the screed must be filled up with expansion mortars or suitable products.

**EXPANSION JOINTS IN THE SCREED MUST BE STRICTLY FOLLOWED IN CLADDING APPLICATIONS.**

### **Cleaning**

Check that the screed is clean, without dust or dirt that could prevent the adhesive from sticking to a non-adherent layer.

The screed must be

- Aged
- Compact
- Smooth
- Flat
- Without Cracks
- Clean and dry.

### **Adhesive Glues**

The right choice of adhesive is essential for a correct laying.

The choice of the adhesive should be based on the climatic conditions, the type of application, the structure and nature of the foundation.

Lay the adhesive on the foundation and place the tiles on the wet adhesive. The open time of the various adhesives changes notably according to the climatic conditions: follow manufacturer guidelines.

Start the laying after checking that temperature and humidity comply with those set out in the manufacturer's instructions.

Temperature should not be below 40F or over 100F during the laying and for 1-2 following days. Any surface strongly exposed to sun could be cooled by wetting it with water (otherwise lay during cooler hours).

Suitable adhesives for laying terrazzo can be classified in:

#### **a) Unmodified Hydraulic bond-based adhesives**

White or grey powders to be mixed with water; composed of cement, fillers and synthetic resins. Although usable, this type of adhesive is not recommended: The low absorption of terrazzo may result in reduced adhesion of the tile to the screed.

#### **b) Modified Cement Adhesives**

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 are mixed with polymer additives, which give them higher adhesive strength and elasticity.

They are recommended for interior and exterior installations, which are subject to expansion movements, water, frost and permanent water. Since it is a quick-setting adhesive it is the ideal product for laying terrazzo.

In case of elevated temperatures, we suggest immersing the tiles in clean water for a few seconds before laying and then dripping the excess water away to give a safer grip between tile and foundation.

Kerakoll: H 40 Rapid; H 40 Marmorex    Mapei: Granirapid

#### **c) Reactive resin-based adhesives**

These adhesives come in form of a paste or thick liquid to be mixed when used. They are composed of resins (polyester, polyurethane, and epoxy) and a hardener. These products react chemically, independently of contact with air or the absorption degree of either the laid material or the foundation. Please refer to manufacturer guidelines. Once hardened, they are waterproof.

Kerakoll: SuperFlex    Mapei: Keralastic

### **Joints**

Tiles should be laid with at least 1/8" joint. 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 colored 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. Sometimes, it can be difficult to eliminate the traces of colored filler from the tile, especially when they contrast with the color of the tile. Always test first before installation. If the surface cannot be perfectly cleaned, it must be 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 large areas, create "dividing joints" of approx. 1/3" as follows: for high-traffic surfaces and foundations that are subject to movements or bending stresses, it is necessary to create panels of approx. 15'x15'; for interiors and stable surfaces, approximately every 600 sf.
- Place the tiles approx. 1/3" from walls, columns, edges, corners, etc.
- Use silicone sealant to fill the expansion joints.