# TERRAZZO FLOORING TECHNICAL REQUIREMENTS

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## WHAT IS VENETIAN TERRAZZO

Venetian Terrazzo is a type of flooring that is entirely unique compared to any other product on the market, as it is cast completely in situ. All raw materials arrive separately at the construction site, where they undergo a lengthy transformation process to create a finished product of high aesthetic value and indisputable quality. It is composed of traditional building materials: marble, cement, and lime—nothing more. Each element is handled with extreme care, according to the traditional construction rules that our company is committed to upholding. For this reason, we pledge to use only natural materials, avoiding epoxy resins, methyl methacrylate, unsaturated polyester, or any other synthetic industrial substances. The cement we use is 42.5 or 52.5R grade, free from impurities and offering maximum hardness, making it highly recommended for use in sustainable architecture (bio-architecture).

## CONSTRUCTION SITE ISSUES

Since Venetian Terrazzo is cast entirely in situ, several specific precautions are required that are generally not necessary for other flooring types. The site features, location, and logistical challenges significantly influence the final cost of the product. Furthermore, it must be considered that the installation phases are extensive, requiring installers to return to the construction site multiple times. Consequently, the distance between the company headquarters and the site increases the total project costs. To optimize these costs, the construction site must be easily accessible and provided with suitable areas for the storage of materials and equipment. Access to at least 10 kW of electrical power and a water connection is mandatory. Temperature and humidity levels also heavily influence the quality of the final result. Venetian Terrazzo installation should not be performed when the temperature is below 5°C or if the marble aggregates have been stored below 0°C for several days prior to use. 52.5 white cement is highly sensitive to humidity; therefore, the entire supply chain must guarantee that the cement has not been stored in a damp environment.

## THE RIGHT TIME TO START THE LAYING OF VENETIAN TERRAZZO

The installation of Venetian Terrazzo begins after the first fix of electrical and plumbing systems; specifically, immediately after they have been covered by the wall plastering and the lightweight screed (sub-base) for the floors. The marble thresholds and the first step of any staircases leading to lower levels, which come into contact with the Venetian Terrazzo, must also be installed before the Terrazzo works commence. Underfloor heating systems must also be installed prior to the screed (note that heavy masonry stoves and shower trays require specific, separate treatment). The underfloor heating must not be commissioned or switched on before the Venetian Terrazzo flooring has been laid.

## THE SCREED

The screed can be considered the soul of Venetian Terrazzo; furthermore, it is not a standard screed. It must possess levels of solidity and consistency that differ significantly from the screeds used for other flooring finishes. The technical requirements for the Venetian Terrazzo screed are as follows:
Venetian Terrazzo is typically approximately 2 cm thick (or 1.5 cm for very fine marble chips, and 2.5–3 cm thick for larger aggregates).
Site procedures begin with the setting of level references—specifically, verifying the required thickness and any level differences between thresholds using laser tools. The screed must have a minimum thickness of 60–70 mm, reinforced with a 50x50 mm or 100x100 mm galvanized welded mesh and glass fibres. If underfloor heating is planned, the specified thickness of the screed must be measured from the top of the heating pipes. The screed is composed of graded sand (0 to 6 mm) mixed with 42.5R grade cement (dosage: 250–300 kg/m³), levelled with a straight edge. The surface must not be completely smoothed; it should be left with a slightly rough texture, finished with a power trowel (helicopter). The diagram below illustrates two different types of Terrazzo sections:

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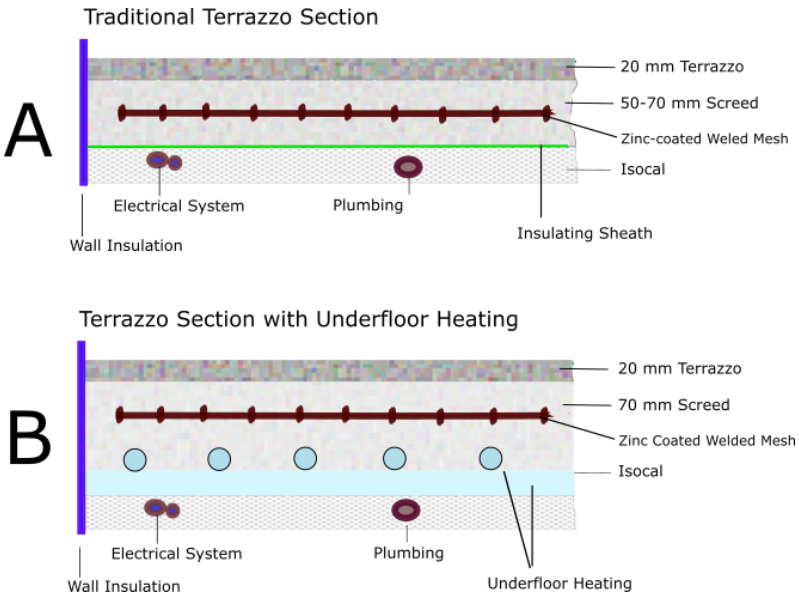
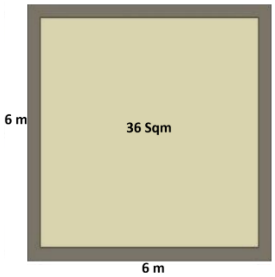



The screed must be completely isolated from the walls and the structural floor; therefore, before casting, a 5 mm polystyrene expansion strip must be placed along the walls at a level higher than the finished flooring, and building paper or damp-proof membranes must be laid over the floor framing. To achieve this decoupling effect, polyethylene sheets or acoustic membranes can also be used. These precautions can be omitted where an underfloor heating system is present. If plasterboard partitions are planned, the metal studwork for the slabs must be installed before the screed. A small water-resistant board, slightly higher than the finished Terrazzo level, must be fixed to the base of the metal structure to contain the screed.

(Note: the skirting board must have a minimum thickness of 20 mm to cover the perimeter insulation; if no skirting is planned, the screed and the Venetian Terrazzo must be recessed within the plaster thickness).

**Joint laying criteria**: The screed must be cut exactly where the movement joints will be positioned. These technical joints are designed to allow the surface to move based on the area's extension, its shape, the structural elements, and the type of marble chips used for the Terrazzo flooring. These joints can be made of brass, aluminium, mosaic tiles, or any other material compatible with Venetian Terrazzo. The criteria for positioning the joints follow the same rules applied to the laying of joints for all concrete floors. The fundamental rule is that surfaces must have regular geometric shapes, such as a square or a circle, where the stresses of hygroscopic shrinkage toward the centre are uniform throughout the surface. These sections, even if they have a regular shape, cannot under any circumstances exceed an overall area of 36 square metres. Therefore, a 6x6 m square is considered the maximum regular definable surface area.



There are some exceptions to this rule though.

***Surfaces with irregular shape***. Areas of 36 square metres or smaller with an irregular footprint develop uneven tension and require additional joints branching from their corners and edges. Fig. a can be split using Joint 1 or Joint 2; ideally, both should be used to divide the surface into three parts. A further, though less effective, option is the installation of Joint 3 alone. The room shown in Fig. b is also 36 m², but its shape is rectangular. It is mandatory to position a joint in the middle of rectangular rooms with an excessive length-to-width ratio, as the stresses of hygroscopic shrinkage are not uniform.

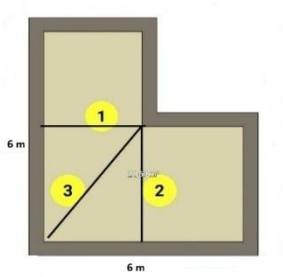



Fig.a

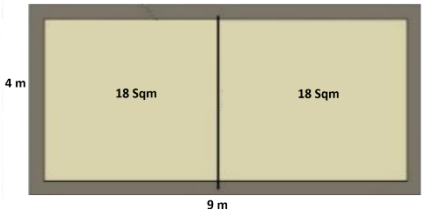
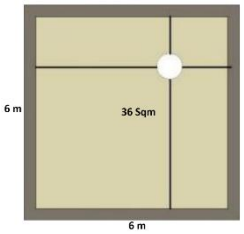


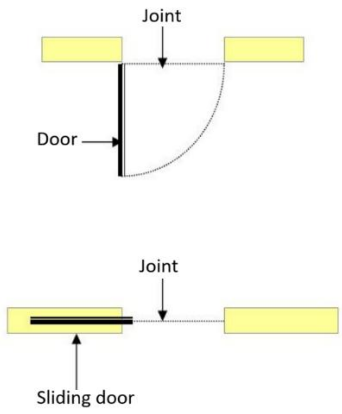

Fig.b

***The vertical structures***. Any vertical structure rising from the underlying floor that interrupts the homogeneity and, consequently, the free movement of the Terrazzo during hygroscopic shrinkage (columns, walls, MEP penetrations, inspection manholes, etc.) causes abnormal shrinkage. This requires the positioning of joints branching off from the four cardinal points. In the same way, very heavy structures installed subsequently—such as masonry, majolica stoves, etc.—which bear down on the Terrazzo, impede standard movement and create conditions for future cracking.

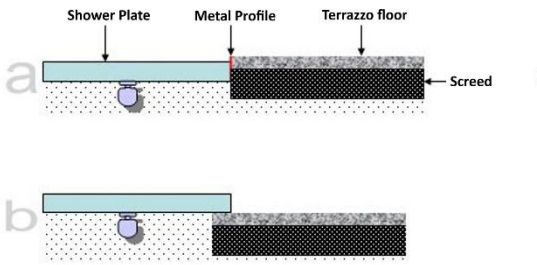



***Thickness reduction.*** All the screed must have the same thickness on the whole surface. Every reduction of its homogeneity creates the origin of a future crack.

***Internal doors.*** The screed must be interrupted at the thresholds of doors dividing two rooms. These joints must align exactly with the door leaf closure line. Since not all doors operate in the same way, it is fundamental to have the DWG architectural details or the supervision of the joiner/door installer. The images below show two common threshold details for internal doors.



**Shower trays** There are two different ways to deal with shower trays on a Terrazzo floor:
a) Flush shower tray (level access): The tray must be installed before the screed is laid, set 2–3 mm lower than the finished level of the Terrazzo flooring. An L-shaped joint (brass, aluminium) must be positioned between the shower tray and the Terrazzo.
b) Raised shower tray: In this case, it is mandatory to position the drainage pipe within the footprint of the shower tray before the laying of the screed. The edge of the screed must be recessed a few centimetres inside the shower tray footprint. You can then proceed with the laying of the Terrazzo up to the edge of the screed. Once the Terrazzo polishing has been completed, the shower tray can be installed.




## THE TERRAZZO LAYING

An appropriate curing period must be allowed after the laying of the screed. The duration of this period is determined by various factors, primarily climatic conditions such as temperature and humidity. After the screed has been cast, it is mandatory to avoid any works that could contaminate the surface. It is highly likely that the Venetian Terrazzo will fail to bond if the screed surface is dirty; for instance, dust generated from plasterboard installation is extremely hazardous to the bond.
The next step is to protect the walls with a 50 cm high nylon film. Plasterboard sheets must be installed only after the first grinding phase of the Terrazzo. If a majolica stove or other very heavy structures (such as walls with stone cladding) are to be installed on the same surface as the Terrazzo, it is vital to separate them from the Terrazzo and its screed by deep-cutting the screed itself. Logically, no underfloor heating or lightweight concrete should be placed under these heavy structures—only structural concrete.

In conjunction with wall protection and the positioning of the joints, the Terrazzo installer will begin fitting the brass or aluminium joints and any decorative elements. Once the decorations have completely hardened, the Venetian Terrazzo is laid according to the ancient techniques of "sowing" and rolling until a compact surface is achieved. For several days, the floor will be covered with a thin nylon film to slow down the drying process and the subsequent hygroscopic shrinkage. This increases the hardness of the floor, helping to enhance its final sheen. From the day following installation, the surface is walkable, although it is necessary to avoid any activities that could compromise its integrity.

After a sufficient curing period, we proceed with grinding and grouting. Prior to this phase, a designated area for the collection of grinding sludge must be established on-site. This waste material, which is entirely non-hazardous as it consists of water, marble, and concrete dust, can be disposed of with other site aggregates once the water has been eliminated. If the site conditions do not allow for the excavation of a collection pit, the sludge can be stored in big bags or large tanks.

Following the grinding process, the surface is grouted to eliminate any porosity created during the previous stage. Once grouting is complete, the flooring is again covered with nylon film to keep the surface moist and consolidate the grout. The grouted surface must not be stepped on for at least 3 days. At this point, the Terrazzo will no longer be visible as it is covered by a layer of cement-based grout. From this moment on, the client may proceed with other site works (excluding those specified below), while ensuring other trades exercise extreme caution. You must avoid spilling oily liquids or leaving organic fibres in the presence of water (for example, wood and iron release substances when wet that can penetrate deeply). The floor must cure properly before the next phase. It is worth noting that the longer this curing period lasts, the higher the gloss of the finished Terrazzo. During this phase, it is important for the client to carry out as much work as possible to ensure that high-risk tasks for the Terrazzo are not performed after the final polishing. For example, marble stairs leading to lower levels can be

installed now, as the first step was already fitted before the Terrazzo. Stairs leading to upper levels can also be installed, but the first riser—the one in contact with the Terrazzo—must be omitted. This riser can be installed only after the final polishing of the Terrazzo. All timber stairs must be installed only when the Terrazzo surface is finished and completely dry. Certain less problematic wall tiles or a first coat of paint may also be applied at this stage.

Polishing is the final working phase. Since the surface must be completely clean, it is recommended that no other trades occupy the areas being polished. To facilitate this phase, it is important to adhere to the following requirements:

- All rooms must be clean and empty;
- It is mandatory to avoid opening the WC drain seals, which are temporarily blocked by us to facilitate grinding and polishing operations;
- Radiators must not be installed;
- Internal and external doors in contact with the Terrazzo must not be installed. (If the owner wishes to postpone the polishing phase but needs to secure the building with external doors, we must perform a partial polishing of the thresholds and the Terrazzo at the door openings. External doors—excluding monobloc units—can be installed only if the thresholds have a honed, tumbled, or brushed finish);
- The final coat of paint must be applied only after polishing is complete.

Where present, we recommend commissioning the underfloor heating only after the polishing operations are finished. You must avoid activating the heating after the screed is laid, as the Terrazzo flooring must be processed while the screed is still "fresh." Turning on the heating after the final polishing must be carried out with extreme care, bringing the thermal mass to temperature gradually and in accordance with the technical specifications of the heating system itself. This procedure helps eliminate residual moisture from the final polishing and reduces the formation of salt efflorescence, which is typical in marble, thereby enhancing the beauty and lustre of the Terrazzo flooring.

## HOW TO USE THE TERRAZZO SURFACE AFTER COMPLETION

After the works are finished, it is normal to observe some ring marks on all marble surfaces. These are salt efflorescence rings resulting from the water-based grinding process.

In order to manage this phenomenon, it is advisable to clean the surface frequently using a well-wrung cloth and a pH-neutral detergent. Since humidity is the primary cause of salt efflorescence, you must avoid covering the surface with materials that prevent moisture evaporation (for example, leaving a nylon film on the surface for an extended period can irreparably damage the marble/Terrazzo). It is better to use fabric, geotextile, or other breathable floor coverings. Any such coverings should only be used temporarily during other site works and must be removed immediately thereafter.

It is crucial to keep the building open as much as possible during sunny and dry days to ensure proper ventilation; this is the most effective way to completely resolve issues related to humidity.

To install fixed vertical elements (such as tiles or marble skirtings), it is mandatory to leave an appropriate expansion gap between these elements and the Terrazzo surface. This space must be at least 2–3 mm wide and must be sealed with a flexible material, such as silicone.

## THE FINAL ASPECT OF THE FINISHED TERRAZZO SURFACE

Venetian Terrazzo is a highly versatile flooring. The combination of colours and materials is capable of meeting both classical tastes and modern aesthetic demands. Its mixed elements help to camouflage dirt, while the absolute lack of grout lines makes cleaning operations easier, keeping its aesthetic qualities intact over the years. Venetian Terrazzo is an artisan product, where the handmade component far exceeds the mechanical one. For this reason, there are certain features that are naturally observable:a) Venetian Terrazzo is an agglomerate of marble chips and

a cement binder; therefore, its final appearance cannot be perfectly homogeneous like a marble or granite slab, especially when viewed against the light. The standard polishing is not high-gloss but rather a light "amber" finish.b) It is normal to find small pores on the Terrazzo surface or occasional small voids due to the loss of marble chips or grout over time. These issues can, however, be easily restored.c) Even if every technical aspect has been accurately evaluated, minor or major cracks can still occur, sometimes many years after the Terrazzo surface has been completed. The causes of this phenomenon can be varied and are not always clear or predictable before the start of the project. In such cases, the surface can still be easily restored.d) Since Venetian Terrazzo is ground and polished in situ using manually operated grinding machines, the surface cannot be perfectly flat, particularly along the wall perimeters. Furthermore, normal hygroscopic shrinkage typically causes the surface to curve at the edges. For these reasons, there are no specific regulations defining technical tolerances for Terrazzo floorings. As it consists of a levelled mix of marble chips and cement, it is akin to a concrete surface. Consequently, we refer to the UNI 11146 regulation.Random laser surveys must be measured at least 50 cm away from manholes, thresholds, columns, joints, and any other type of vertical structure because of the natural property of concrete known as "curling". Laser surveys must be conducted strictly within 72 hours of the screed laying; otherwise, the loss of water will produce false results due to the curling effect.



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