

Recommendation for laying ceramic tiles





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This manual is designed to improve the quality and maintenance of the installed ceramic tile by offering recommendations from professionals in the sector.

The user may follow all the recommendations given in the manual, or those relevant to the task in hand.

Both recommendations to follow and practices to be avoided are given.

Over the years, Geotiles has achieved sustainable growth in the competitive ceramic tile market. Our presence is now firmly established in the most important distribution channels across the globe, affirming the hallmarks of Geotiles identity: quality, design and innovation.

CERAMIC TILE MANUFACTURING PROCESS

Various stages are involved in the manufacture of ceramic tiles: raw material preparation, shaping and drying of the unfired piece, firing with or without glazes, additional embellishments and treatments, classification and packaging.

This manufacturing process results in various types of ceramic tiles:

Tile

This is the traditional name given to ceramic tiles with high water absorption; they are cold pressed, glazed and single fired.

The body or base, also known as the bisque, may be white or red; the colour of the bisque does not affect the product's properties.

Tile face: the glaze consists of an application of vitreous coating covering the piece. This gives the product certain technical and aesthetic properties: impermeability, ease of cleaning, shine and colour, characteristics that make tiles particularly suitable for indoor wall coverings.

Stoneware floor tile

This is the term most frequently used to describe glazed, dry pressed, single fired ceramic floor tiles with low to medium absorption.

The red semi-vitreous body or base has medium-low water absorption.

The tile face is glazed with an application of vitreous coating covering the piece, lending the fired product certain technical and aesthetic properties: impermeability, shine, colour, and surface texture.

These properties make the product suitable for both domestic and public areas.

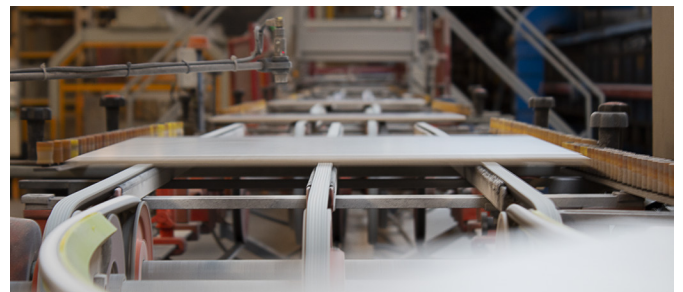
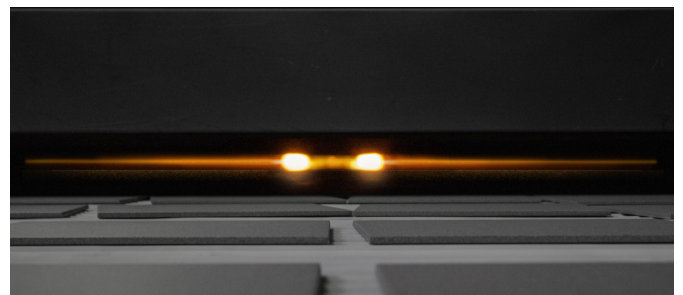
Porcelain stoneware

This term is universally accepted to refer to dry pressed, single fired ceramic tiles with very low water absorption. They may be glazed or unglazed (the glazed face is known as glazed porcelain stoneware and the face of unglazed porcelain stoneware is the same material as the base). Porcelain stoneware tiles may be used as they are after firing (natural porcelain stoneware) or the face may be highly polished to give it a smooth, intense shine (polished porcelain) or polished to a lesser degree (semi-polished or lappatto finish).

Polished porcelain stoneware

Due to its intense shine, the light's reflection may create optical effects that suggest a tarnished finish.

Its excellent technical and aesthetic properties and high chemical and mechanical resistance make this product ideal for all types of areas: interior, exterior (with the option of non-slip versions), intense or very intense pedestrian transit area, commercial and industrial spaces, facades, airports, areas subject to freezing, etc.



LAYING TECHNIQUES

Adhesion, understood as the strength of the bond between the ceramic piece and the base, plays a vital role in the

quality of the tiled surface. Good adhesion should guarantee that the tile is firmly fixed to the base. The development of new low porosity ceramic materials that are resistant to abrasion and subzero temperatures, large formats, and their installation in industrial or large commercial areas, facades, etc., has led to a corresponding development in adhesive products.

Increased knowledge about the use of special adhesives means that thick layer installation (mechanical adhesion) is being replaced by thin layer installation (chemical adhesion); the latter offers clear advantages, particularly in relation to quality of both adhesion and durability. The appropriate adhesive must be chosen, taking into account the surface to be tiled and the type of ceramic tile.

It is very important to use the right tools when laying the tiles (notched trowel, white rubber mallet, spirit level and suction cup). The substrate on which the tiles are to be laid must also be free of any plaster, paint residues etc., thus enabling the adhesive to be effective over time.

The adhesive manufacturer's instructions must be followed at all times



LAYING TECHNIQUES

MOVEMENT JOINTS

To ensure the correct installation of ceramic products, it is essential to always respect movement joints: structural, perimeter, expansion, and installation joints.

Structural joints

These must always be respected according to the project specifications, as determined by the specialized engineer or architect.

Perimeter joints

These must be continuous and have a width of no less than 8 mm. Their purpose is to isolate the ceramic flooring from other covered surfaces, such as wall-floor junctions (which are hidden by the baseboard), columns, and doorways.

Omitting perimeter joints is one of the most frequent causes of ceramic tile lifting.

Partition joints

These allow for deformations caused by thermal variations between the tiles, the layer, and the substrate. Large substrate surfaces covered with ceramic products should be subdivided into smaller sections, delimited by partition joints, to prevent the accumulation of expansions and contractions.

In floors subjected to heavy pedestrian traffic, hard-wheeled rolling, or the dragging of heavy loads, it is necessary to use specific partition joints suitable for heavy loads.

Installation joints

To ensure safety against any structural movement (expansion-contraction), a separation joint must always be placed between all adjacent ceramic tiles. It is recommended not to use a separation less than 2 to 3 mm.

Installation joints offer several advantages: they help absorb deformations from the substrate and reduce the stresses that occur underneath the tiles when subjected to loads. Accumulated stress can lead to tile lifting. They also play an important aesthetic role by enhancing the inherent beauty of the ceramic tiles.

Joints can have a flat finish, flush with the tiles, or a recessed concave finish. They are used in both interior and exterior wall and floor coverings.

There are also joint sealants available that are low-porosity, deformable, and water-repellent. These are suitable for facades, floors exposed to heavy traffic, and areas with persistent water presence.

In spaces frequently exposed to acids and alkalis, such as food-processing or sanitary facilities, it is essential to use sealants based on reactive resins – specifically, two-component systems like epoxy sealants. This type of grout is characterized by its composition of synthetic resins (typically epoxy resin). Its main properties include: chemical resistance, bacteriological resistance, excellent moisture resistance, and outstanding abrasion resistance.

The adhesive manufacturer's instructions must always be followed. The minimum spacing between tiles should not be less than 2-3 mm for interior installations and 3-5 mm for exterior installations. Installation joints containing micronized carbon (carbon black) in their composition should never be used and must always be avoided.

Classification of Sealants According to EN 13888 Standard

CEMENT-BASED MODIFIED SEALANTS (CG2)

Optionally classified as ArW (high abrasion resistance and low water absorption)

REACTIVE RESIN-BASED SEALANTS (RG)

Generally two-component, epoxy-based; resistant to chemicals, completely waterproof, and with high compressive strength.



LAYING TECHNIQUES ADHESIVE MATERIALS

Two types of techniques must be considered when installing ceramic products: thick-bed and thin-bed methods.

It is important to emphasize that the installation of porcelain stoneware requires the surface to be completely level and free from any substances that may hinder proper adhesion.

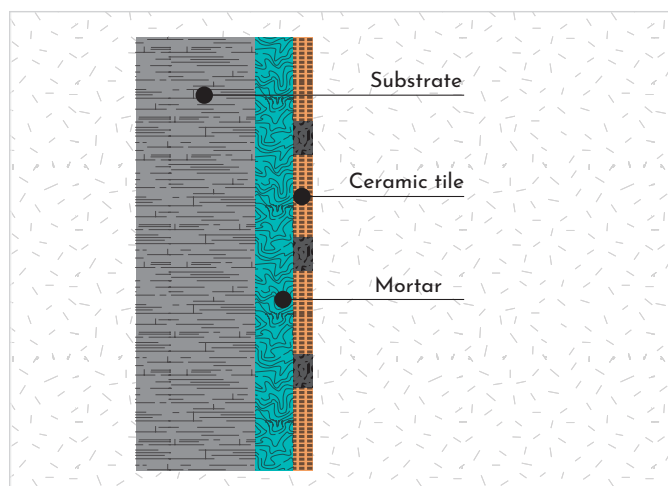
Installation must always be done using the thin-bed method, employing a notched trowel, white rubber mallet, bubble level, and suction cup.

For exterior applications and for tile formats larger than 900 cm², the double-bonding technique must be used—this involves applying the adhesive both on the substrate and on the back of the tile.

The adhesive manufacturer's instructions must be followed at all times

Thick-bed installation

This is the traditional technique. The ceramic is placed directly onto the substrate (partition wall, brick, slab, or sand-cement screed). This thick-bed method is more economical and also allows for compensating larger flatness defects. Traditional mortar is used as the bonding material in thick-bed applications.



Thick-bed

Thin-bed installation (with adhesives)

This is a more recent technique, adapted to current ceramic materials and the variety of substrates.

Installation is generally carried out over a prior leveling layer on the substrate, such as render on walls or mortar bases on floors. The advantages of this technique are clear, as it is suitable for any type of ceramic tile and compatible with any substrate. There are adhesives suitable for each type of substrate and ceramic to be installed. They have a long adjustment time, absorb substrate deformability, and provide stronger adhesion.

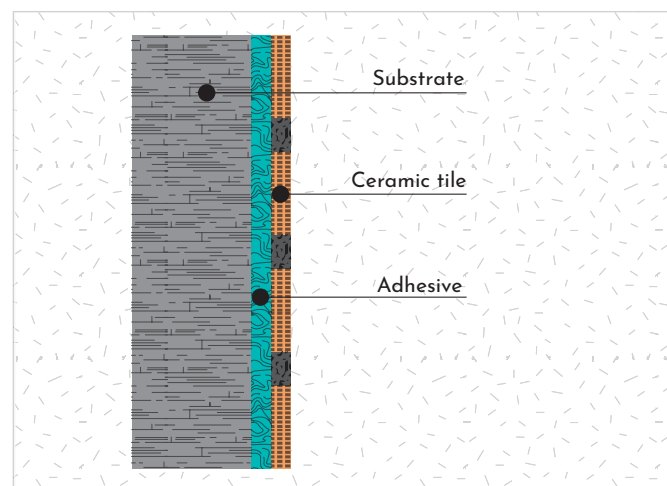
As bonding material in thin-bed installation, cement-based adhesives, adhesive pastes, and reactive resin adhesives are used. The following types of cement adhesives are considered, depending on the characteristics of the ceramic product to be installed.

Adhesives are classified according to standards EN 12004 and EN 12002, which define their adhesion and deformability.

Cement-based adhesives C2
Modified cement-based adhesives

Dispersion adhesives D2
Modified dispersion adhesives

Reaction resin adhesives R2
Reaction resin-based adhesives



Thin-bed

USE AND CARE OF PORCELAIN STONEWARE TILES

Due to the low porosity of porcelain stoneware, it is virtually impervious to staining.

However, certain strongly pigmented substances may accidentally spill or come into contact with the surface; if left for an extended period, the porcelain surface may become stained. Therefore, we recommend cleaning any such spills as soon as possible.

After the installation and grouting processes are completed, the ceramic surface often presents cement residues in the form of a film or small accumulations. In most cases, these can be removed with a diluted acid solution.

As a general rule, the following precautions should always be taken:

- * To ensure the durability and good condition of the ceramic tile, regular cleaning is recommended using environmentally friendly products.

- * Cleaning tasks should be carried out in an environmentally responsible manner: using the correct dosage of products as indicated by the manufacturer, minimizing water consumption through efficient methods, and properly managing wastewater, avoiding any direct discharge into the environment. Staff should also be trained in good environmental practices, the use of aggressive or polluting products should be avoided, and the reuse or recycling of protective materials used during maintenance should be promoted.

- * Acid cleaning should never be carried out on freshly installed ceramic products; acid reacts with unset cement, which can damage the joints and deposit insoluble compounds on the surface. Cleaners containing hydrofluoric acid must never be used, and the manufacturer's recommendations should always be followed.

- * Routine maintenance consists of regular cleaning with water and a degreaser. Neutral pH cleaners should be used that do not contain waxes or polishers—products such as AGC-Grease or similar.

- * For deep cleaning of stains and encrustations that have penetrated the surface and cannot be removed through standard procedures before attempting to remove a stain using an aggressive method, it is advisable to test the effect of the cleaning procedure on a spare, uninstalled tile. This helps prevent chemical damage that could further deteriorate the product.

- * For persistent stains, consult the manufacturer.

Always follow the manufacturer's instructions.

- * Do not use metal scrapers or abrasive pads.

- * After installation, the flooring should be properly protected using cardboard, a layer of sawdust, or other protective materials to avoid damage caused by subsequent construction work.

- * To prevent breakage or unwanted cutting defects, it is essential to use the appropriate tools for cutting and drilling porcelain stoneware. For straight cuts, use a manual tile cutter with a tungsten carbide scoring wheel, a water-cooled diamond blade cutter, and/or a low-power angle grinder equipped with a continuous (non-segmented) diamond blade.

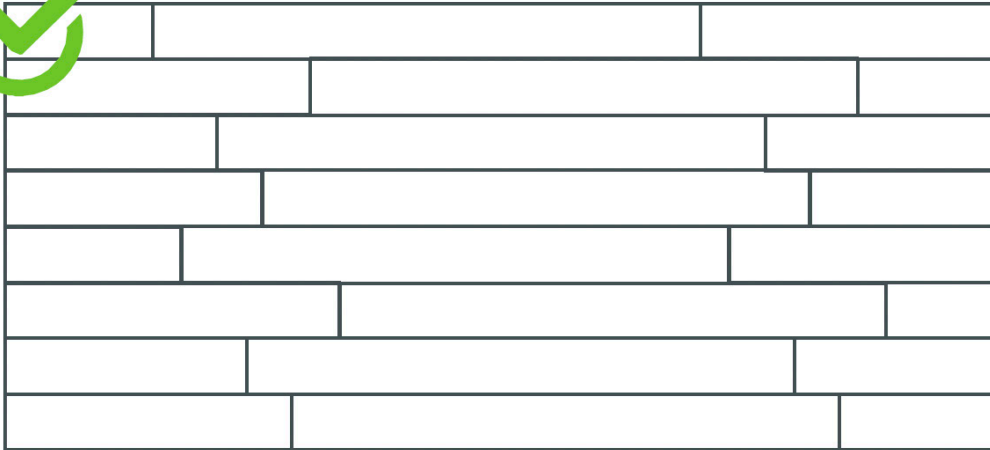
- * To drill porcelain stoneware, a diamond drill bit should be used. The drilling area must be periodically cooled with water to avoid increasing the temperature and melting the drill bit.

- * The following table outlines the most suitable cleaning products for each type of stain.

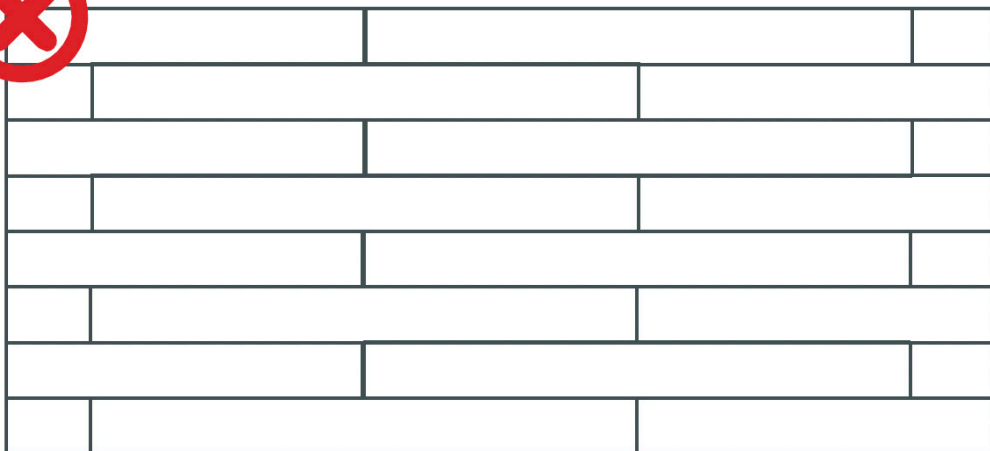
To preserve the properties and beauty of polished and semi-polished porcelain stoneware for longer, it is recommended to place doormats at entrances to paved areas. The mat traps minerals that may be carried in on the soles of shoes.



INSTALLATION TIPS FOR RECTANGULAR PRODUCTS



Staggered installation (with an offset between 2-20 cm)



Regular half-tile offset installation (not recommended)

Staggered installation with an offset greater than 14 cm should be avoided.

INFORMATION ON THE REUSE AND/OR HANDLING OF PACKAGING MATERIALS DURING THE TILE INSTALLATION PROCESS

According to the European Waste Catalogue (EWC) in compliance with Directive 75/442/EEC on waste and Directive 91/689/EEC, the waste generated from our products must be managed under the following codes:

EWC: 17 01 03 Tiles and ceramic materials

EWC: 15 01 02 Plastic packaging

EWC: 15 01 01 Paper and cardboard packaging

EWC: 15 01 03 Wooden packaging

Waste must be efficiently segregated with the aim of reducing, reusing, and recycling the highest possible percentage. Therefore, we recommend separating waste individually and maintaining it in proper hygienic and safe conditions within the construction site where it is generated.

Suitable containers must be provided, correctly labeled according to the type of waste they contain, so that workers know where to dispose of each type of waste.

When it is not technically feasible to carry out source separation due to lack of physical space on site, the sorting of waste fractions will be entrusted to a waste management company at an off-site construction and demolition waste treatment facility.

During the tile installation phase, packaging material waste is generated, and its management is the responsibility of the client receiving the goods.

Please consult the applicable legislation according to the destination country.

END OF LIFE OF CERAMIC TILES

Ceramic coverings at the end of their useful life become "construction and demolition waste." This waste must be managed under the following codes:

EWC: 17 01 03 Tiles and ceramic materials.

If ceramic materials are mixed with other demolition materials, the management codes will be:

EWC: 17 01 06 Mixtures or separate fractions of concrete, bricks, tiles, and ceramic materials, hazardous.

EWC: 17 01 07 Mixtures of concrete, bricks, tiles, and ceramic materials other than those covered by code 17 01 06.

Tile and ceramic waste is classified as "inert waste" because it is non-hazardous and does not undergo significant physical, chemical, or biological transformations. It is neither soluble nor combustible, does not react physically or chemically or in any other way, is not biodegradable, and does not adversely affect other materials it comes into contact with in a way that could cause environmental contamination or harm human health.

Ceramic tile waste should preferably be directed, in this order, to reuse, recycling, or other forms of recovery. Thus, it may be used as inert waste in restoration, conditioning, or filling works, provided it complies with the relevant applicable legislation.

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