TECHNICAL ASSISTANCE

USER MANUAL

Elizabeth

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1. Ceramic tiles

In addition to customizing spaces and adding aesthetic value to the property, ceramic tiles make their cleaning and maintenance practical and efficient, preventing the emergence of rising humidity (sweating). As part of project finishes, ceramic tiles are one of the components that will become apparent. The choice of the model and its specification are key points to achieve maximum performance of the ceramic tile system, which is why knowledge and careful handling, laying, and maintenance are important.

The production and marketing of the manufacturer's ceramic tiles comply with domestic and international standard specifications, establishing the requirements required for the products to offer functionality and safety in the application or use for which they are intended.

The standards provide manufacturers with safe references for the production of a product that can be marketed with adequate guarantee to the consumer, since they have minimum and/or maximum limits to the dimensional, visual, physical and chemical characteristics of all classes of ceramic products.

The manufacturer is committed to its customers and products, therefore, its production is fully compliant with the technical standards in force in the domestic and international market – ABNT NBR ISO 13006 and ABNT NBR ISO 10545, ensuring the quality and high performance of the products produced.

In addition, the manufacturer is committed to the search for cleaner and more efficient production processes. The company is concerned with the adoption of environmentally responsible practices in the preparation of its products, reducing the impact on the environment.

The quality and durability of a ceramic tiled surface are directly related to the following aspects:

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1. Specification – correct choice of ceramic tiles that meet the guidelines and recommendations provided in the place of use;

2. Receipt, handling, and storage of pieces;

3. Quality of construction and laying;

4. Carrying out corrective and preventive maintenance.

1.1 Specification and characteristics of ceramic tiles

When choosing a product, it is important to know all its specifications. This manual aims to assist in choosing the best tile coating for your project.

2. Planning: correct choice of ceramic tiles

The correct choice of tile coating begins with the place of use, whether it is internal, external, low or high-foot traffic area, then choose the texture and finish along with the decoration that seems more appealing.

2.1 Criteria for classification of surface quality of ceramic tiles

Quality A
According to ABNT NBR ISO 13006, they are products with at least 95% of the pieces free of visible defects when observed at a standard distance of 1.0 meter, with controlled lighting.

Quality C
All pieces have visible defects of medium intensity. There may be a broken tip, chips, difference in shade, difference in size and/or planarity above the maximum tolerance established by the standard for Quality A, including, without limitation: holes, cracks, black spots, pitting, bubbles, difference in texture, difference in brightness, failure in decoration, failure to polish without them mischaracterizing the product.

In the case of visible defect above the limit allowed by standards on Quality A products, please contact the manufacturer's Technical Support before laying (being certain that laying means you have accepted them).

Manufacturer's Technical Assistance

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Before laying, please check that: reference, size, shade, and quality of the product match all boxes, as well as the purchase order specifications.

2.2 Classification

According to ABNT NBR ISO 13006, ceramic sheets can be classified as follows:

2.2.1. Regarding the manufacturing process: in Extruded (A), Pressed (B).
2.2.2. As for the Surface Type: Glazed (GL) and Unglazed (UGL).
2.2.3. As for Water Absorption, pressed products are classified according to Table 01.

WATER ABSORPTION (%)	GROUP ABSORPTION	PRODUCT NAME	SURFACE
0,0 < Ev ≤ 0,5	BIa	Porcelain tiles	GL / UGL
0,5 < Ev ≤ 3,0	BIb	Sandstone	GL
3,0 < Ev ≤ 6,0	BIIa	Semi-Sandstone	GL
6,0 < Ev ≤ 10,0	BIIb	Single firing	GL
Ev > 10,0	BIII	Monoporosa Tiles	GL

Table 01: Classification according to absorption group

One of the classification parameters is the absorption of water that has a direct influence on other properties of the product. The mechanical strength of the product, for instance, is the greater the lower the water absorption.

Surface treatment after firing

BIIa Absorption Group: They have no treatment after firing.
BIIb Absorption Group: They have no treatment after firing. They do not have resin application after firing.
Polished Unglazed BIa Absorption Group: They have resin application after firing.
Natural Unglazed BIa Absorption Group: They have no treatment after firing.
Polished Glazed BIa Absorption Group: They have resin application after firing.
Natural Glazed BIa Absorption Group: They have no treatment after firing.

Specific group of ceramic tiles

Annex G: Dry-pressed ceramic sheets with low water absorption Ev ≤ 0.5% BIa Group
Annex H: Dry-pressed ceramic sheets with low water absorption 0.5% < Ev ≤ 3% BIb Group
Annex J: Dry-pressed ceramic sheet 3% < Ev ≤ 6% BIIa Group
Annex K: Dry-pressed ceramic sheets 6% < Ev ≤ 10% BIIb Group
Annex L: Dry-pressed ceramic sheets Ev > 10% BIII Group

2.3 Concerning side finish

Rectified: has straight and polished edges with minimum size variation between the pieces ensuring smaller grout joints and greater continuity to the floor.
Bold: has slightly rounded edges and greater size variation between the pieces, with larger joints being used to prevent compromise of the continuity to the floor.

Rectified

Bold (Not Rectified)

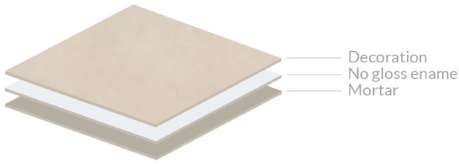
2.4 Concerning surface finishing

The manufacturer classifies its ceramic tiles pursuant to Table 02.

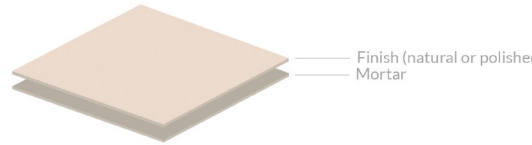
SURFACE FINISHING		
FINISHING	ACRONYM	DESCRIPTION
Satin	AC	Matte finish with a soft touch, bringing versatility and warmth to environments. Can have COF I and COF II for internal use.
Natural	NA	Finish with light texture and no shine in order to simulating closeness to nature. Ideal for indoor spaces.
External	EXT	Rough, slip-resistant texture ensuring greater safety and comfort.
Shine	BR	Texture with a special enamel that makes the surface of the piece shine, bringing elegance and charm to the environment.
Polished	PO	Extremely smooth texture with high gloss, easy to clean, ideal for luxurious and sophisticated spaces.
Mate	MT	Finish that has a smooth appearance with very little shine, conveying style and versatility.

Table 02: Classification according to surface finishing

SATIN
No gloss piece

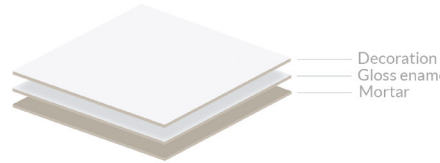


NATURAL



OUTDOORS
Rough piece for outdoors

GLOSS
Gloss piece



POLISHED
Deep polishing of the piece that generates high gloss

3. Concerning shade variation

Shade Variation is a characteristic that may be intrinsic to the manufacturing process of ceramic tiles or intentionally caused for a certain aesthetic effect in order to reproduce the conditions of nature or to create a unique aesthetic effect. Shade variation can change from one output to another, so all packages state product shade coding, as well as the variation within the same package pieces.

The classification in relation to Shade Variation is performed pursuant to Table 03.

SHADE VARIATION CLASS		
VARIATION	APPEARANCE	DESCRIPTION
V1	Uniform	Minimum difference between pieces.
V2	Slight variation	Noticeable differences in similar color patterns.
V3	Moderate variation	Significant difference of shades in the same colors from one piece to the other.
V4	Random	Random and different colors from one piece to the other.

Table 03: Classification Pursuant to Shade Variation

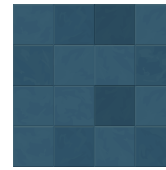
V1

When there is ***no*** shade variation.

V2

When there is a slight shade variation.

V3



When there is a substantial shade variation.

V4

In addition to shade variation, they may be color variation.

For a better view of shade variation, we recommend assembling a sample layout with pieces from different boxes. Before starting the laying, make sure that the shade number is the same on all packages. Do not lay products with different shade numbers at the same space.

4. Place of use

The definition of class and place of use, in addition to the chemical and physical characteristics of the coating surface, takes into account its performance of use.

The classification of use is a tool that helps users, architects, designers, and specifiers to resolve any doubts, making product specifications easier, which should, whenever applicable, follow the project prepared by engineers, architects, and qualified professionals, always observing what the Place of Use Manual allows or recommends.

The main purpose of the **PLACE OF USE MANUAL** is to provide the relationship between ceramic tile and the place of use that is suitable for its performance.

PLACE OF USE TABLE

The code of the place of use now has three (3) letters.

The acronyms beginning with the letter F (Floor) indicate that the tile coating should preferably be used on floors.

All ceramic tiles used in flooring can also be applied to walls, as they are places with less critical characteristics than floors.

The acronyms beginning with the letter W (wall) indicate that the tile coating should be used exclusively on walls. The two letters that complement the acronyms of the new places of use indicate the preferred applications for the tile coating, as follows:

FIR: Floor – Indoor Residential

FLC: Floor - Light to Medium Indoor Commercial

FMC: Floor - Medium to Heavy Indoor Commercial

FHC: Floor - Very Heavy Indoor Commercial

FMO: Floor - Light to Heavy Outdoor Commercial and Outdoor Residential

FHO: Floor – Very Heavy Outdoor Commercial and Outdoor Residential

FRM: Floor - Ramp Light to Heavy Outdoor Commercial and Outdoor Residential

FRH: Floor - Ramp Very Heavy Outdoor Commercial and Outdoor Residential

FWI: Floor – Wet Indoor

WRC: Wall – Residential and Commercial

WWS: Wall – Swimming Pool

WFA: Wall – Facade

WID: Wall - Indoor Dry Residential and Commercial

To facilitate communication and market language, the manufacturer's new Place of Use table shows the acronyms and a short, straightforward text stating the meaning. In addition, a series of illustrative icons supplement the communication to make understanding easier:

FIR

ALL INDOOR RESIDENTIAL ENVIRONMENTS

FLC

INDOOR COMMERCIAL ENVIRONMENTS WITH LIGHT TO MODERATE TRAFFIC OF PEOPLE, INCLUDING FIRM ENVIRONMENTS

FMC

INDOOR COMMERCIAL ENVIRONMENTS, WITH MODERATE TO HEAVY TRAFFIC OF PEOPLE AND LIGHT EQUIPMENT, INCLUDING FLC AND FIR ENVIRONMENTS

FHC

INDOOR COMMERCIAL ENVIRONMENTS WITH HEAVY TRAFFIC OF PEOPLE, HEAVY EQUIPMENT AND VEHICLES, INCLUDING FMC, FLC AND FIR ENVIRONMENTS

FMO

OUTDOOR COMMERCIAL ENVIRONMENTS WITH HEAVY, MODERATE AND LIGHT TRAFFIC, LIGHT EQUIPMENT AND OUTDOOR RESIDENTIAL ENVIRONMENTS

FHO

OUTDOOR COMMERCIAL ENVIRONMENTS WITH HEAVY TRAFFIC OF PEOPLE, HEAVY EQUIPMENT AND VEHICLES, INCLUDING FMO ENVIRONMENTS

FRM

OUTDOOR COMMERCIAL ENVIRONMENTS, WITH SLOPES AND RAMPS (MAXIMUM SLOPE OF 8.33%) WITH HEAVY, MODERATE AND LIGHT TRAFFIC OF PEOPLE, LIGHT EQUIPMENT AND OUTDOOR RESIDENTIAL ENVIRONMENTS INCLUDING FMO ENVIRONMENTS

FRH

EXTERNAL COMMERCIAL ENVIRONMENTS, WITH SLOPES AND RAMPS (MAXIMUM SLOPE OF 8.33%) WITH HEAVY TRAFFIC OF PEOPLE, HEAVY EQUIPMENT AND VEHICLES, INCLUDING FRM, FHO, AND FMO ENVIRONMENTS

FWI

WET INDOOR
ENVIRONMENTS

WRC

ALL RESIDENTIAL WALLS AND INDOOR OR OUTDOOR
COMMERCIAL PREMISES UP TO 3 M IN HEIGHT,
INCLUDING WID

WWS

INTERNAL POOL WALLS, INCLUDING WRC
AND WID ENVIRONMENTS

WFA

EXTERNAL FAÇADES, INCLUDING WRC
AND WID ENVIRONMENTS

WID

ALL DRY INDOOR RESIDENTIAL
AND COMMERCIAL WALLS

5. Slip resistance

Slip resistance is an important feature of products earmarked for floors, to the extent that, when it comes to slipping, the safety of space surface does not depend only on the characteristics of the tiles chosen, but on the space itself, which implies a number of factors, such as title friction coefficient, floor slope, presence of water, sand, grease, oil, type of footwear in use, and walking speed.

According to the result of the wet friction coefficient (COF), tiles are classified and recommended for different locations.

5.1 Friction coefficient

It is the index that measures the slip resistance in relation to ceramic tiles, the higher the friction coefficient the greater the slip resistance. Based on the method defined by ABNT NBR 16919 – Determination of Friction Coefficient, and pursuant to the provisions of ABNT NBR 15575, we classify our products as per the table below, according to its recommendations for use.

CLASS	WET DYNAMIC FRICTION COEFFICIENT	RECOMMENDED INDICATION
I	< 0,40	Recommended for dry and wet areas
II	≥ 0,40	Recommended for wet areas

FRICTION COEFFICIENT		
CLASS	USE	GUIDELINE
Class I (COF < 0,4)	Recommended for use where slip resistance is not required.	These are products that can be used in dry and wettable indoor areas. Observe Place of Use.
Class II (COF ≥ 0,4)	Recommended for use where greater slip resistance is required.	These are products that can be used in wet indoor areas and outdoor areas. Always observe the Place of Use.

Table 04: Classification according to COF

Wet Areas – areas of a building where the condition of use and exposure imply the creation of water layer, in normal use conditions (for instance, bathroom with shower, service area, and uncovered areas).
Wettable Areas – areas of a building that receive water splashes owing to their condition of use and exposure, but that do not imply the creation of water layer, in normal use conditions (for instance, bathroom without shower, half bathroom, kitchen, and covered balcony).
Dry Areas – areas where, under normal conditions of use and exposure, the direct use of water (e.g., washing with hoses, water buckets, etc.) is not foreseen, even during cleaning operations.

⚠

For the correct specification of the ceramic tile for a given space, always take into account the Place of Use table and the Friction Coefficient.

6. Size

Size variation is inherent in the manufacturing process of ceramic tiles. The ABNT NBR ISO 13006 standard establishes that:

I - Nominal Dimension (Nominal Size) N is the "dimension used to describe the product." It is usually reported in centimeters (cm).
II - Working Dimension (Manufacturing Size) W is the "dimension of the sheet specified by the manufacturer in which the actual dimension must fulfill the specified permissible deviations." It is usually reported in millimeters (mm).

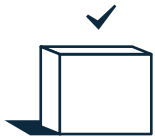
To avoid laying difficulties and the risk of compromising the aesthetic effect, the manufacturer separates and classifies the tiles into size classes, so it is important to check, upon receipt, that all packages delivered have the same size identification.

7. Receiving, handling and storing ceramic tiles

Please follow the recommendations and know the correct procedure for receiving, storing, and handling ceramic tiles.

7.1 Receiving of ceramic tiles

When receiving the product at the work site it is important to check some points before releasing the shipment of tiles, namely:



Packaging: make sure that each packaging is suitable and free from damage. Observe if the products have undergone any damage during transportation, such as breakage of corners, cracks, and chips.

Invoices: check if the products being delivered match those on the invoice, observing: reference, shade, size, and class. This information is found on the main view of the package or on one of its sides. Please keep your purchase invoice, warranty is only valid upon submission of this document. In addition, keep the product batch information included in the packaging, in case you need to supplement or call for technical support.

Order: assess whether the products delivered, as well as the quantity, match the purchase order(s).

Quantity: count the number of boxes.

⚠ WARNING

If the product being delivered is different from what is described on the invoice, please do not receive the goods, and contact the manufacturer's Technical Support.

If you identify damaged pieces, immediately inform the manufacturer's Technical Support.

Please do not forget to record your remark on the carrier's bill of lading.

Manufacturer's Technical Assistance

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7.2 Delivery and unloading

The delivery date, as well as the storage location, must be planned in advance to avoid pre-stock and, consequently, rework and movements that may result in breaks or damage to the material as a result of improper handling.

Whenever possible, unload the products with machines or equipment that maintain the original palletizing. The manual process can cause damage and breakage of the ceramic.

If manual unloading is necessary, products must be stacked in the same plant shipment setup. For instance, if the pieces are delivered in an upright position, this should be the position adopted in manual stacking. Except for screened products, always store packages (boxes) vertically.

Whenever vertical or inclined storage is necessary, the bottom must be protected with cardboard, Styrofoam, wood or materials that prevent chipping of the pieces. Note: Never put the boxes in direct contact with the ground.

When it is necessary for the pieces to be supported in an inclined way, make sure that all boxes are placed with the back of the pieces facing the support wall, thus avoiding damage to the finishing surface of products.

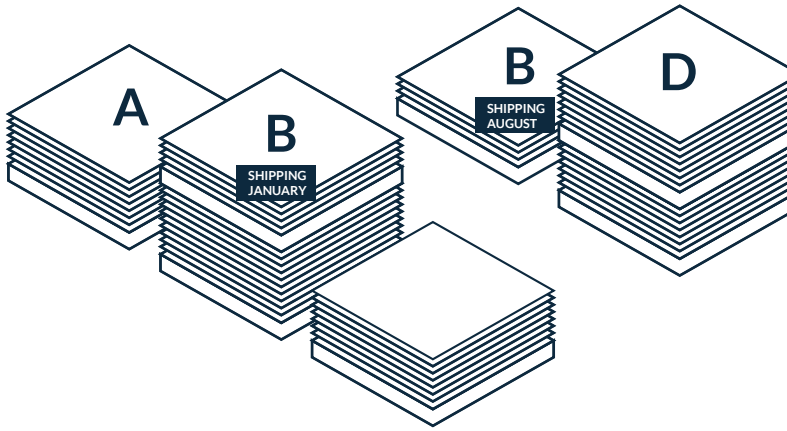
The place for storage must be covered, flat, level, protected from moisture, with sufficient strength to withstand the load of pallets to be packed, as well as close to the area where the material will be used or vertical transport, reducing handling, and the risk of breakage. In the case of uncovered location, keep products on pallets and shrink-wrapped, or covered with plastic sheeting.

Note: transport companies are advised about the obligation to deliver the product at a distance of a maximum of 30 meters from the vehicle and in a straight line. Delivery situations different from this definition are the responsibility of the customer.

7.3 Storage/warehousing

In storage/warehousing, products must be separated so that only items of the same reference, shade, size, and class are placed in each stack. Products must be properly marked and separated so that there is no possibility of error in the use of the goods or even mixing of batches. The ideal is that materials from different batches are separated in different environments, if this is not possible, various batches should be marked with identification labels. Proper organization facilitates the removal of stacked pieces. Ideally, storage locations should have controlled access.

Each shipment may be supplied in one or more shades and sizes, which may be different from those delivered in the previous shipment. Therefore, with each new storage, this data must be observed following the previous recommendations. Check and plan with the sales representative what is the best way and in what quantity the products should be made available.



In the case of storage/warehousing in slabs, check in advance if the site has resistance capacity to avoid overloading, and possible structure rupture. If necessary, distribute the load so as not to risk damage or accidents.

7.4 Stacking

The packages (boxes) must be carefully stacked to a maximum height of 1.5 meters (for loose stacking) and 4.5 meters (for palletized stacking), on a level floor.

When stacking boxes or pallets, it is important that the packaging is stacked appropriately, thus avoiding damage to products, such as breaking corners or even the piece itself.

If necessary stacking the pieces on a wall, avoid contact of the glaze with the floor. Contact can damage the finish layer and compromise product aesthetics. Thus, the back of sheets should always face the support wall.

For special cases or conditions such as decoration/finishing pieces, cement-based products or special types, the manufacturer must always be consulted for the most appropriate form of storage.

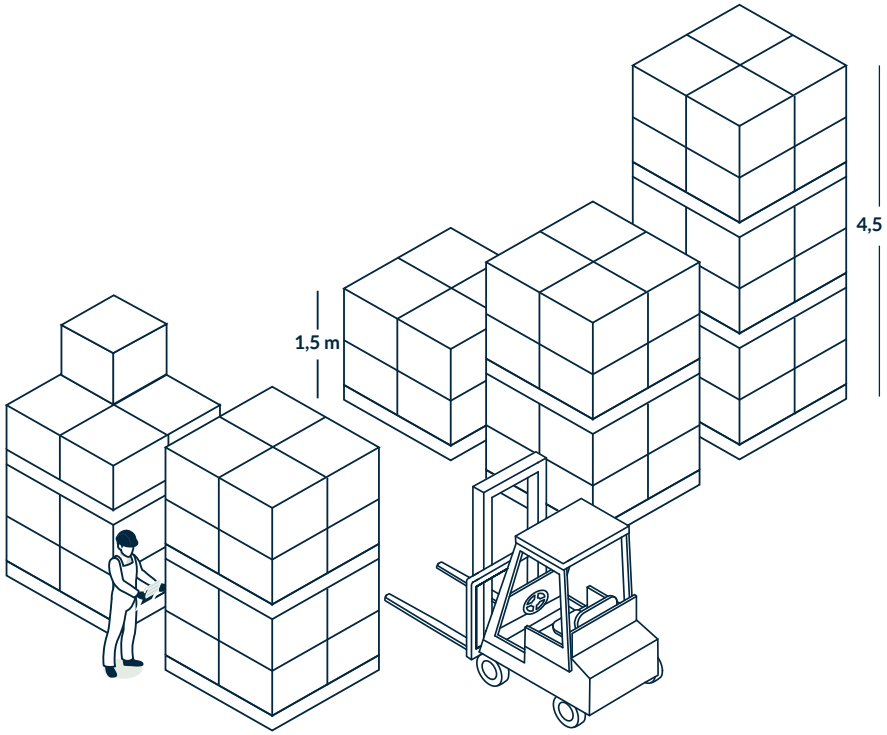
7.5 Stacking in store or warehouse

It is important to correctly stack the pallets, i.e., making sure of their vertical alignment, avoiding falls, ensuring the safety of users and the integrity of products. In addition, vertical boxes typically support more weight on them without undergoing any damage.

Fractional pallets should be stacked whenever possible in a pallet rack or at the top of the stack, for safety reasons, and to avoid product damage.

In the case of large format pieces (over 120x120 cm), stacking must be performed in the original palletizing, never exceeding the maximum limit established by the manufacturer.

For screened products, they must be stored horizontally, and pallet stacking on pallets is not allowed.



7.6 Stock in store or warehouse

The storage of products requires minimum spacing between the pallets to allow the circulation of people, and facilitate the visualization of information described on packagings.

Maintaining adequate space in the aisles facilitates access/maneuvering of forklift machines, thus avoiding product damage due to stock handling.

To handle the products in storage, especially in the horizontal direction, forklifts must be suitable for the use of pieces in these dimensions.

7.7 Transport of piece/handling

Despite their strength, ceramic tiles must be handled carefully due to their rigidity, especially as concerns rectified products, because they have “sharp edges” that are more susceptible to chipping in the case of impacts, so professionals need to be advised to be careful in the transport and handling of tiles.

We recommend that large-format pieces be transported using handling equipment, such as suction cups, or by at least two people properly wearing protective equipment, such as gloves, protective arm sleeves, and goggles. This care reduces the risk of damage to products, such as breaks, chips, or cracks, as well as damage to the physical integrity of the transportation personnel.

If necessary, large pieces can be placed directly on the floor or supported on the walls. In the latter case, the wall must have sufficient strength to support the weight of pieces, always making sure that the piece back faces the wall, in order to protect the finishing layer. In both situations (stacked on the floor or wall), contact with the floor must be protected by wood or Styrofoam to prevent material edges from chipping.

8. End-of-life product guidelines

Ceramic sheets are classified as class A inert waste – reusable or recyclable as aggregate, according to the National Environment Council (CONAMA) Resolution No. 307. According to the same resolution, generators should have as a priority objective the non-generation of waste and, secondarily, the reduction, reuse, recycling, treatment of solid waste and environmentally appropriate final disposal of waste.

Following CONAMA Resolution No. 307 and Law 12305/2010, National Solid Waste Policy, taking into account the environment and sustainable development, the manufacturer recommends that ceramic tile waste first undergo a sorting process, which should preferably be carried out by the generator at the origin, or be carried out in the disposal areas licensed for this purpose, in keeping with the established waste classes. Afterwards, this waste must be reused or recycled in the form of aggregates or sent to a class A waste landfill where it will be reserved for future uses.

It is important to highlight that the reuse of any material generated by the civil construction industry requires compliance with the technical requirements that ensure the safety of these materials, such as ABNT NBR 15.115 (Recycled aggregates of solid construction waste – Performance of paving layers – Procedures) and ABNT NBR 15.116 (Recycled aggregates for use in Portland cement mortars and concretes – Requirements and test methods), which requires producers of recycled material to seek technologies and certifications that guarantee compliance with applicable laws.

9. Quality of construction and laying

9.1 Planning

9.2 Hiring the tile installer

It is essential to hire professional tile installers to perform this type of service, and this step is essential to avoid future problems in the work. Before hiring the title installer, it is important to check the quality of their previous work, with attention to their knowledge of the rules and regulations for service performance and if:

a) They use grout joints correctly;

b) They lay tiles with good alignment and leveling;

c) They are organized, keeping the environment tidy and clean during and after laying;

d) They have appropriate tools and in good condition: plumb line, chalk line, straightedge, square, trowel, masonry brush, tile cutters, notched trowel, level, angle grinder, rubber mallet, measuring tape, etc.

9.3 Product inspection

In the manufacturing process of ceramic tiles, variations in size and shade may occur. According to Brazilian and international industry standards, 95% of the pieces must be free of visible defects. If the number of defective pieces is

within this allowed limit (5% of the purchased batch), separate them and use them for cutouts. If the number exceeds this limit, please contact the manufacturer's Technical Support before starting piece laying.

Before laying, it is recommended to check that the reference, size, shade, and quality of the product match all boxes, pursuant to the purchase document. Some references intentionally include shade differences between pieces; this variation is an aesthetic element that gives the product greater artistic value.

Then, we recommend opening two or three random boxes and using the pieces to create a sample layout, checking if the expected aesthetic effect is achieved. Mixing the pieces helps to better assess product conditions. If the product has protective paraffin on the surface, it can be removed with a plastic spatula.

For laying with the use of adhesive mortar, there is no need to let the pieces soak, or to even moisten them. Always use the proper mortar and grout for each type of ceramic product.

⚠ WARNING

Never mix ceramic tiles of different shades and sizes in the same space.

Remember, when calculating the quantity to be purchased, our recommendation is to increase your initial necessity in about 10%, so that an additional material allowance is created, for replacement, difficult cuts or future maintenance.

In cases where the products have dimensions greater than 120x120 cm, it is recommended to plan the laid area to survey the approximate amount of parts that will be installed and, thus, make the purchase in the necessary amount of

material, providing for leftovers of at least 3 parts, technical reserve or to replace losses from cuts in the laying process.

9.4 Laying standards

We recommend following the standards listed below for substrate preparation, during installation, etc.:

ABNT NBR 13753 – Internal or external floor coating with ceramic sheets and using adhesive mortar – Procedure.
ABNT NBR 13754 – Internal wall coating with ceramic sheets and using adhesive mortar – Procedure.
ABNT NBR 13755 – Coating of external wall and façades with ceramic sheets and using adhesive mortar – Procedure.

Base regulation and leveling
The surface on which the laying will occur must be well leveled (a maximum deviation of 3 mm is recommended when analyzed with a 2 m straightedge). The surface must also be free of residues, loose pieces or with low resistance.

Laying should be performed according the recommendations of standards referred to in item 9.4, in particular with regard to the expansion, desolidation and structural joints.

Irregularities must be corrected in advance using a suitable leveling mortar.

Base curing
- 7 days per centimeter thick for slabs;
- 28 days for plaster and concrete.

Before laying, it must be verified that the base is:
- Fully cured, dry, and resistant;

- Clean, ensuring the adhesion of tiles;
- Flush, plumb, and straightened for the best fit between the tiles;
- With suitable trim for drains and/or drainage points;
- Forecast of desolidation or expansion joints, accordingly.
- Flatness with a maximum unevenness of 3 mm when assessed with a 2 m straightedge;
- In the case of overlapping, assess the integrity of the old floor (fixation, unevenness between the pieces), and in the case of failures, apply the necessary corrections before the new pieces are laid.

9.5 Mortars

The adhesive mortar and grouting mortar must be chosen according to the type of ceramic sheet to be laid, as well as the space to be coated, in order to guarantee a high quality laying system.

Grouting mortar significantly contributes to the final aesthetic effect of a space. Choose the correct product for your work, always observing the manufacturer's indications as described on the product packaging.

9.6 Precautions on site

9.6.1 Joint planning

The laying joints are the ones that are between the ceramic pieces separating them. The minimum width to be observed depends on the finish of sheets and the manufacturer's recommendations stated on the product packaging.

Ceramics differ from other types of tiles in that they make up mosaics according to the style of the project. The joints are part of the quality of applications, and help create the coating aesthetics.

In addition to the aesthetic importance, joints play an important role because they provide flexibility for the surface in the accommodation of pieces.

9.6.2 Importance of joints

- Providing the best alignment of the tiles laid;
- Preventing detachments when expansions and contractions of the work and masonry occur;
- Improving sanitation by facilitating cleaning between tiles, taking into account that dry joints make it difficult to clean between pieces;
- Facilitating the exchange of tiles when necessary to make specific replacements;
- Improving aesthetics, as they are the "frame" of a job well done;
- Avoiding infiltration, as the grout protects the joints and consequently the coating system.

Structural joints
They are joints existing in the concrete structure of projects, serving to relieve stresses caused by the structural movement. They are usually identified by gaps that cut through the entire building. They must have their position and width observed throughout the thickness of coating.

Movement joints
They are all regular spaces aimed to subdivide the coated cloth with certain dimensions to relieve stresses caused by the movement of tiles and/or substrate.

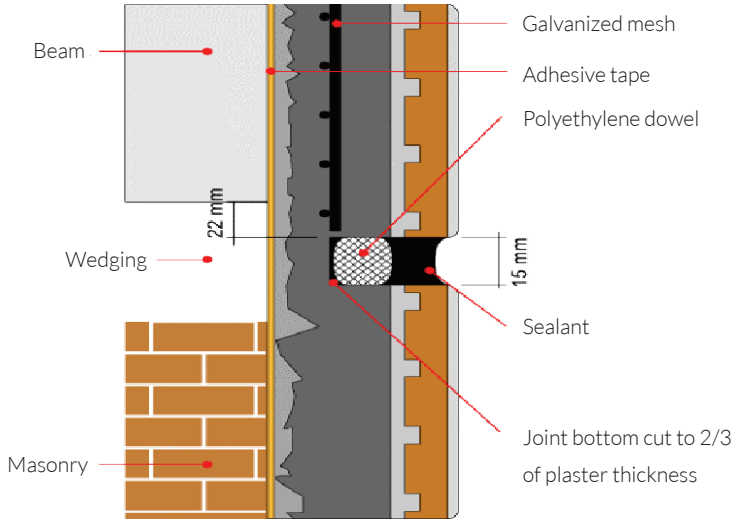
Note: They are previously calculated joints, under the full responsibility of the civil engineer or designer in charge of the work.

Movement joints must be used in:
I – Internal and External Floors (ABNT NBR 13753): Always when indoors where the floor area is equal to or greater than 32 m^2 or with a linear dimension greater than 8 m, and always when outdoors the floor area is equal to or greater than 20 m^2 or with a linear dimension greater than 4 m;

II – Internal Walls (ABNT NBR 13754): Whenever the area is equal to or greater than 32 m^2 or with a linear dimension greater than 8 m, in walls

exposed to sunlight and/or humidity with an area greater than or equal to 24 m^2 or whenever one of the dimensions is greater than or equal to 6 m, in the vertical corners, changes of direction, junction between the tiled area and floors and ceilings, columns, beams, and junctions of different types of materials.

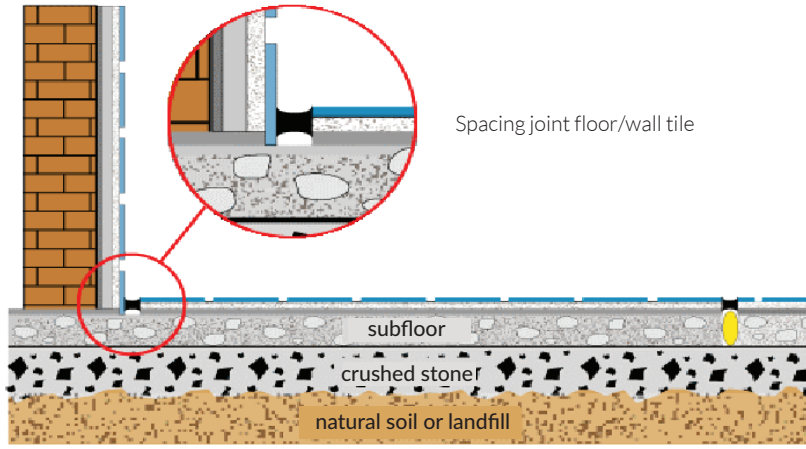
III – External Walls and Façades (ABNT NBR 13755): Horizontally every 3 m or every ceiling height, vertically every 6 m, at the vertical corners, changes in direction, junction between the tiled area and floors and ceilings, columns, beams, and junctions of different types of materials.



Desolidation joints

They are all regular spaces aimed to subdivide the coating cloth in the dimensions foreseen in the project with the purposes of relieving stresses caused by the structural movement of tiles and/or substrate.

The filler material of the joints must be highly deformable in order to absorb stresses, such as cellular rubber, polyurethane adhesive, cotton blanket, cork, and other materials found in the construction materials trade.



Fonte: Revista - Técnica e Arte, n. 1, ano 1.

Laying joints

The filler material is the grout chosen for finishing the laying of tiles (cement base, aggregates, latex, epoxy resin, etc.).

For meshes laid on the inside of the pool, the use epoxy grout is mandatory, ensuring greater efficiency of the system.

Note: The minimum width of the laying joints is defined on the packages.

The filler material of the joints must be highly deformable in order to absorb stresses, such as cellular rubber, polyurethane foam, cotton blanket, cork, and other materials found in the construction materials trade.

9.7 Performance of laying

9.7.1 Preparation of adhesive mortar

Before starting laying, make sure that the adhesive mortar chosen is the correct one for your application.

- In a clean container, without holes and preferably not made of wood,

prepare the mortar, according to the manufacturer's guidelines.

- As a rule, in a container pour the amount of water or additive indicated on the product packaging, then add the powder always stirring until a firm and lump-free consistency.
- Allow the mortar to stand for 5 to 10 minutes as directed by the manufacturer.
- Throughout the mortar consumption process, stir again without adding more powder or liquid.
- It is important during consumption of the mortar to occasionally repeat the mixing process to keep the mortar workable.
- To speed up the preparation and improve the mixing operation, use the electric mixer.

9.7.2 Application of the adhesive mortar

- Apply a layer of adhesive mortar to the base (slab, plaster) with the smooth side of the trowel thus providing a better grip and then use the toothed side of the trowel at an approximate angle of 60° to form ridges.
- Whenever the sheets have an area equal to or greater than 900 cm^2, mortar must also be applied to the back of sheets (Double Bonding), with the procedure being performed on the pieces as performed at the base, and the ridges must be in the direction of the piece width to obtain the smallest possible extension of the ridges. In turn, mortar ridges of the pieces must be in parallel with the base mortar ridges, facilitating the expulsion of air.

Image: grouting trowel

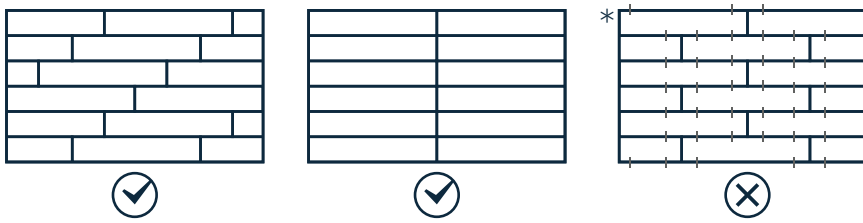
9.7.3 Application of ceramic tiles

Apply the ceramic pieces by sliding them about 1 cm over the grout ridges so that they can be crushed. Press the pieces with your hands and tap with a rubber mallet or vibrating suction cup so that air can be eliminated from the back of sheets, ensuring better grip by aligning and leveling the pieces with each other.

For porcelain tiles with polished finish, a white rubber hammer should be used or wrap the conventional rubber mallet in a dry and clean cloth, thus avoiding rubber marks on the pieces.

To facilitate and have a quality laying, we recommend that all pieces be positioned following the direction of the arrows on the back of sheets. The use of floor leveler system also ensures better alignment and leveling between the pieces.

In floor designs where the products are installed in a staggered pattern, the maximum offset between pieces cannot exceed 25% in relation to the length, this procedure will provide a better aesthetic effect on the final result.



**For the 19x90 cm and 20x120 cm gauges, installation with a 50% mismatch is authorized, provided that floor levelers are used, respecting the manufacturer's guidelines for use, which recommend the use of the leveler at each end, in addition to levelers every 40 cm. This procedure will provide a better aesthetic effect to the final result.*

9.7.4. Cutting and finishing

The surface where the piece will be processed must be flat and clean. Straightedges should be used to aid in cutting.

Using traditional cutting tools – Tile scoring tools.

This equipment is suitable for straight cuts.

In order to make a proper cutout, it is necessary that the tungsten carbide tip is in good condition of use (not toothed, loose or vibrating). To perform the cutting, it is necessary to press the piece with the scoring tool while moving the tool continuously through the entire length of the cutout, without removing the cutter from the cutting point. If it is necessary to interrupt the cut to improve positioning, resume the cut 1 cm before the point where it left off. After scratching the entire piece, the tile coating must be pressed so that the pieces are separated, preferably at the end of the cut.

Using Electric Cutting Machines – Diamond Blade

Ceramic tiles can be cut with diamond cutting blades suitable for each type of product, on power tools (angle grinder, grinder, diamond hole saw) or on cutting benches. Always use tools approved by the manufacturer to ensure safety and efficiency. Cooling with water or additive is always necessary. A diamond blade grinder can also be used. Its main advantage is the ease of manual processing.

Cuts at 90º

Whenever it is necessary to make cuts with sharp corners, that is, 90º angles (for outlet box, column base, cutouts, base of doors...), it is necessary that before cutting, holes are made in the corners using 1/2" hole saw or similar, in order to relieve the internal stress of the piece. If this hole is not drilled, the structural movement and internal stress of the material cause these sharp-cornered cuts to be prone to cracking after laying.

Edge finishing

Diamond polishing pads, wet polishing pads, and diamond grinding wheels attached to a grinder can be used.

Manual finishes of the edges can be made with diamond polishing pads. A light pass on the side of the piece is enough to achieve less sharp edges. To achieve chamfering, it is necessary to repeat the previous procedure several times.

9.8 Inspection of laying

9.8.1 Adherence control

Every 30 m^2 remove and observe a newly laid piece. The back of the piece must have at least 90% of its area filled with adhesive mortar, with the ridges crumpled and joined closing the spaces.

9.8.2 Open time

Control the open time of the adhesive mortar by pressing one of the fingers against the layer applied on the base. The mortar will be in good condition for use if, when touching the cords, your finger returns dirty, otherwise the open time of the mortar will have expired. Do not apply the tiles in areas where the mortar is already dry or with an open time expired, under these conditions it must be removed and discarded.

9.8.3 Detachment test

Before grouting, tap the mallet handle (or piece of wood) on each tile laid, if you hear a "hollow" sound, it is because the piece is poorly laid due to failure in the application of the mortar, without proper filling, and is prone to detach over time. In this case, remove the piece and lay it again, correcting the application of the mortar.

9.9 Grouting

After the tile coating is laid, remove the spacers or levelers, when they are used, at least 48 hours after the laying is finished. Clean all joints and the surface of the laid pieces before application of grouting mortar so that the aesthetic condition is reached. The excess setting mortar that rises through the joints must be removed with the mortar still fresh before cement crystallization, and can be used from the spacer itself to remove this excess.

Prepare and apply the grout following the manufacturer's recommendations

using the appropriate tools for the type of product selected. Remove excess grout while still fresh.

In the case of tile coating with rustic texture or with expressive embossment, apply a layer of liquid wax on the edge of the pieces or protect them with low adhesion tape before grouting, this action aims to facilitate the removal of excess grouting and consequently the cleaning of the pieces.

After laying the tile coatings, it is important to protect the floor, as every work has materials that can scratch the tile coating (sand, cement, scaffolding, stairs, etc.). We recommend using scratch protection system materials supplied on the market that can protect the integrity of tiles. We recommend that the area be cleared for circulation after seven days.

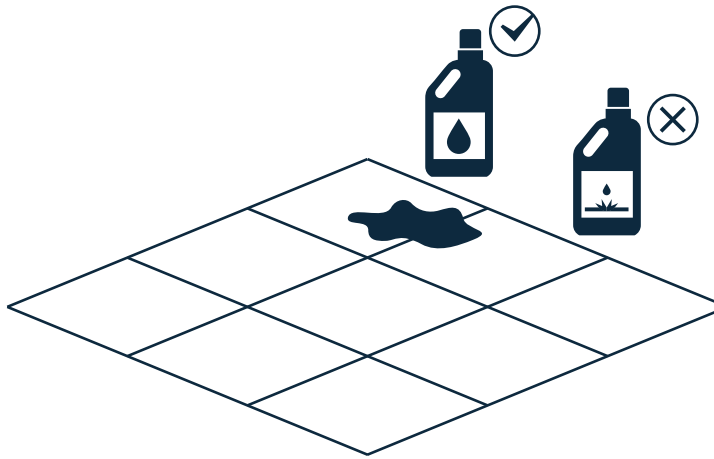
Read the instructions on the grout mortar package carefully.

10. Cleaning and maintenance

10.1 Post-job cleaning

The first post-job cleaning must be carried out carefully and in order to ensure the total removal of all residues, especially those of grout and mortar, which can be adhered to the surface of the ceramic tiles, causing it to look grimy or whitish. This cleaning should be carried out with care as there may be abrasive materials on the tile coating such as cement and sand.

During the work it is important to avoid the accumulation of these settling and grouting residues. If more aggressive cleaning is required, check with the manufacturer for the most suitable products. The use of unsuitable acids on the tile surface may cause irreversible damage.



The initial cleaning must be performed seven days after the final application of the grout, as follows:

- Sweep the environment with soft bristle brooms;
- Use water and post-job detergent for ceramic tiles with the aid of: Soft Bristle Brooms, Mops, LT (All-Purpose Cleaner Support) with White Fiber among others, in the scrubbing;
- Always rinse thoroughly with clean water until no detergent is noticed on the tiles;
- If you still have stains, the cleaning process can be repeated or Creamy Soap and warm water can be used;
- After completing the cleaning, dry the floor using a clean cloth and in case of EXT product let it dry naturally.

10.2 Daily cleaning

10.2.1 Dry cleaning

Depending on the space and whenever necessary, perform a dry cleaning (removal of dust and/or loose dirt) using a soft broom, vacuum cleaner or suitable brush.

10.2.2 Cleaning with water and mild detergent

Depending on the space and at least once a week, cleaning should be carried out using neutral detergent, for ceramic tiles, as well as clean water.

For daily cleaning of porcelain tiles, use neutral detergents (pH = 7.0). On the market there are products with great alkalinity and products with great acidity for carrying out heavy cleaning, these, however, damage the coating surface producing irreversible stains. Therefore, we recommend the use of neutral detergent and clean water.

In any type of tile coating, soap powder and dishwasher detergent should not be used, as it creates a film on the floor and facilitates the adherence of dirt.

For cleaning we recommend the two-bucket method:

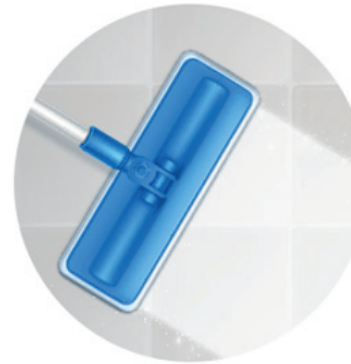
> **a)** In the first bucket, put clean water and neutral detergent. Do not use this water to wet the cloth and then twist, as the water will be contaminated;
>
> **b)** In the second bucket put clean water, this is where the cloth will be cleaned and twisted, and this water should be changed whenever it gets dirty.

To carry out the cleaning with the two-bucket method, you must:

- Remove loose residues with the aid of a soft broom and/or vacuum cleaner;
- Apply on the floor, with the aid of a clean cloth, the diluted detergent from the 1st bucket and let it act for 3 to 5 minutes;
- Scrub using the best tools available on the market;
- Rinse by applying clean water and pulling with a squeegee, if possible, or dip the cloth in the 2nd bucket (bucket only with clean water), twisting the

cloth over this bucket and using it on the tile coating to remove excess detergent. Repeat the process until no more detergent is noticed on the pieces;

- Wipe with clean cloth.



10.3 Removing specific stains

For the removal of specific stains on the tiles, it may be necessary to use special products. It is important to note that before starting cleaning, it is necessary to perform a test on an unsettled or less apparent piece. In this test, observe whether or not the product damages the coating surface. In the case of use of specific products to remove certain types of stains, the recommendations described on the product packaging by the manufacturers must be read and followed. Table 05 shows some types of stains and the recommended product for their removal.

TYPES OF STAINS	PRODUCT SUITABLE FOR REMOVING STAINS
Grease, oil, glue, fats	Hot water and neutral detergent.
Paints	Paint remover applied with a cloth, never pour directly onto the product.
Coffee, beer, wine	Bleach diluted in water in a ratio of 3 to 1. Apply to the morning and leave on for 15 minutes, plus localized scrubbing with creamy soap.
Pen ink, graphite	Acetone.
Pencil scratches	Eraser and/or creamy abrasive cleaner.
Tire treads, rubber	Turpentine and/or creamy saponaceous.
Aluminum risk	Bleach diluted in water. Apply to the morning and leave on for 15 minutes, plus localized scrubbing with creamy saponaceous.
Red earth in anti-slip products	Bleach diluted in water in a ratio of 3 to 1. Apply to the morning and leave on for 15 minutes, plus localized scrubbing with soap powder using stiff bristle brushes.
Red earth in polished products	Bleach diluted in water in a ratio of 3 to 1. Apply to the morning and leave on for 15 minutes, plus localized scrubbing with creamy saponaceous with the soft side of a sponge.
Red earth in enameled and/or satin products	Bleach diluted in water in a ratio of 3 to 1. Apply to the morning and leave to act for 15 minutes, plus localized scrubbing with creamy saponaceous with the rough side of the sponge.
Excessive grouting with cement and mortar	Apply alcohol vinegar to excess grout and/or mortar and leave it to act for 15 minutes. Finish cleaning with creamy saponaceous.
Excess epoxy grout	Epoxy paint remover and/or automotive paste.
Excess waterproofing	Glass cleaner and/or neutral detergent.
Lipstick	Acetone, benzine.
Body fat (bathroom stall)	Alcohol vinegar+ creamy saponaceous+ scrubbing.

Table 05: Stain cleaning instructions

10.4 Periodic maintenance

Ceramic tiles stands out for its ease of cleaning, but the ideal, in any case, is to avoid the accumulation of dirt. Any stains or dirt can be easily removed, most of the time, only with a damp cloth with water and specific detergent for floors. If stains are difficult to remove, use creamy soap or diluted bleach. For polished porcelain tile (shiny surface) and other types of ceramic tiles we recommend specific products according to the type of stain.

Repeat the process when necessary or if the stain is not completely removed on the first attempt.

⚠ WARNING

To remove the protective wax from polished porcelain tiles/gloss, we recommend using creamy soap, 70° alcohol or special talcs to remove protective waxes available on the market.

Note: Never use unsuitable acids for cleaning. Cleaning products may have, in their composition, acids that damage the finishing layer. Read labels carefully.

10.5 Avoiding coating surface scratching

Ceramic tiles, especially those with a shiny surface, are susceptible to scratching. Therefore, during use, cleaning devices for removal and/or retention of sand residues from the shoe sole must be used (as doormats) at the entrances to the projects. In addition, furniture feet should be protected, and even if protected, floor dragging must be avoided. These procedures are essential to avoid risks and increase the shelf life of products.

10.6 Maintenance of special pieces

Ceramic tiles will have its aesthetic aspect protected if there is a daily cleaning, with water and neutral detergent specific for floors. Cleaning materials that contain acids, chlorine or solvent in their composition can damage and alter the surface of pieces. Never use abrasive materials for cleaning, such as sandpaper, scouring powder or metal scourers.

Special pieces can be made of delicate products. Whenever necessary, details decorated in gold, platinum or noble metals should be protected with low adhesive tape or paint tape. After removing the tape, the pieces must be cleaned only with alcohol, using a damp cloth or a soft sponge, free of any residue that may scratch the decorated surface. During wall painting, baseboards must be protected with low adhesive tape or paint tape for a maximum of 1 day. Solvents, such as thinners, should not be used in the painted area of the baseboard.

Besides, we also have cement-based products that require special attention regarding the protection and handling while cleaning and/or removing stains. Please check specific manual. Alkaline detergent should be used in post-job cleaning and/or neutral detergent for daily cleaning for routine purposes.

In addition to daily cleaning, in order for all components, elements and the coating system itself to maintain its functional capacity during its useful life, it is necessary to adopt a preventive maintenance program and, whenever necessary, corrective maintenance must be carried out, in order to prevent small failures from progressing leading to major pathological manifestations.

Table 06 shows a suggestion for the preparation of a preventive maintenance program for ceramic sheets applicable to a residential building as recommended by the manufacturer.

MINIMUM PERIODICITY	SYSTEMS	ACTIVITY	DESCRIPTION
Weekly	Floors and internal sealings	Cleaning ceramic tiles	Cleaning with neutral products, including accessories such as doormats and protective mats.
Annual	Floors and internal sealings	Grouting inspection	Check the integrity and rebuild the grouting when necessary.
		Fault inspection	Check the surface of the slab for cavities, cracks and chipping. Replace them when necessary.
		Inspection for the presence of moisture	Check for damp spots (darkening of the tiles). Detect the location of the infiltration and correct the problem.
Every 2 years	External walls (facades)	Cleaning the facade	Clean the facade with neutral products.
		Grouting inspection	Check the integrity and rebuild the grouting when necessary.
		Fault inspection	Check the surface of the slab for cavities, cracks and chipping. Replace them when necessary.
		Inspection for the presence of moisture	Check for damp spots (darkening of the tiles). Detect the location of the infiltration and correct the problem.

Table 06: Preventive maintenance program
SOURCE: ANFACER - SECTOR PERFORMANCE MANUAL: 2016

11. Warranty

The manufacturer's products classified as "A" quality fully comply with ABNT NBR ISO 13006 and ABNT NBR ISO 10545 standards.

The products are warranted against defects or manufacturing defects, on an exclusive basis, provided that the following terms and conditions are met:

I - The warranty does not cover defects or damages caused by abnormal use of the product, such as those arising from improper laying, installation on inappropriate surfaces or places, negligence of users, accidents, abuse, poor packaging, transportation, and any others that do not comply with the instructions stated in the packaging and/or current standards.

II - For the effectiveness of the warranty, the laying and grouting must comply with the technical standards in force and the information widely disclosed by the manufacturer in packaging, folders, and all other communication outlets.

III - The warranty is limited only to the customer in possession of the Purchase Invoice, and is non-transferable and inapplicable to subsequent purchasers and users.

IV - The term of warranty, established herein, counts from the date of issuance of the sales invoice, and has its submission necessary for its effectiveness.

V - The adhesive mortar to be used must comply with the standards established by ABNT NBR 14081, using the double bonding process (mortar on the back of the piece and on the slab) when required by standard.

VI - The laying of the product and the dimensioning of structural, desolidation, and expansion joints must be carried out in accordance with the requirements of ABNT NBR 13753, ABNT NBR 13754 and ABNT NBR 13755, under the guidance of an architect, engineer or designer in charge.

The manufacturer provides after-sales service consisting of a Technical Support team that can be reached through the following contacts:

Manufacturer's Technical Assistance	4004-2971 ou 0300 789 7771 (48) 3447 7777 (Whatsapp) sac@ceramicaelizabeth.com

The manufacturer is available to the consumer for advice, service, technical support or for further information.

MARCH/2026

Elizabeth

Technical Assistance (SAC)
E-mail: sac@ceramicaelizabeth.com
Tel.: + 55 48 4004-2971 / 0300-789-7771

DETEC
Department of Ceramic Technology

LCPA
Finished Product Characterization Laboratory