Technical assistance

Elizabeth Manual of Use

Elizabeth

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1. Ceramic tiles

Besides customizing environments and adding aesthetic value to the property, ceramic tiles make cleaning and maintaining the space practical and efficient, preventing rising damp. As part of the final finish of the development, ceramic tiles are one of the components that will become distinct. The choice of model and its specification are key to achieving maximum performance from the ceramic tile system, which is why knowledge and care in handling, laying and maintenance are so important.

The production and marketing of Elizabeth Revestimentos ceramic tiles comply with the specifications of national and international standards, establishing the requirements for the products to offer feature 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 appropriate guarantee to the consumer, since they set minimum and/or maximum limits for the dimensional, visual, physical and chemical characteristics of all classes of ceramic products.

Elizabeth Revestimentos is committed to its customers and products, which is its production is fully compliant with the technical standards in force on the national and international market - ABNT NBR ISO 13006 and 10545, ensuring the quality and high performance of the products produced.

Furthermore, Elizabeth Revestimentos operates effectively in the search for cleaner and more efficient production processes. The company is concerned with practicing environmentally responsible attitudes in the production 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 - the correct choice of ceramic tile, respecting the guidelines and recommendations provided by the place of use;

2. Receiving, handling and storing pieces;

3. Quality of construction and laying;

4. Carrying out corrective and preventive maintenance.

1.2 Specification and characteristics of ceramic tiles

When choosing a product, it is important to know all its specifications. This manual aims to help you choose the best tiles for your project.

2. Planning: choosing the right ceramic tile

2.1 Criteria for classifying the surface quality of ceramic tiles

Quality A
According to ABNT NBR ISO 13006:2020, these are products with at least 95% of the pieces free from visible defects when viewed from a standard distance of 1.0 meters, under controlled lighting.

Quality C
All the pieces have visible defects of medium intensity. There may be a broken tip, chips, a difference in tone, a difference in size and/or planarity above the maximum tolerance established by the standard for Quality A, among others, such as: pinholes, cracks, black spots, dimples, bubbles, a difference in texture, a difference in shine, a flaw in the decoration, a flaw in the polishing, without these detracting from the product.

In the event of a visible defect in Quality A products above the limit allowed by law, contact Elizabeth Technical Assistance before laying (laying means acceptance).
Telephone numbers: 4004 2971 (Capitals), 0300 789 7771 (Other locations) and (48) 3447 7777 (Whatsapp).
E-mail: sac@ceramicaelizabeth.com

Before laying, check that the reference, size, shade and quality of the product match all the boxes and correspond to what was specified in the purchase document.

2.2 Classification

According to ABNT NBR ISO 13006:2020, ceramic tiles can be classified follows:

2.2.1 In regard to the manufacturing process: Extruded (A), Pressed (B).
2.2.2 In regard to Surface Type: Enamelled (GL) and Non-enamelled (UGL).
2.2.3 In regard to 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 water absorption, which has a direct influence on other product properties. The mechanical strength of the product, for example, is greater the lower the water absorption.

Surface treatment after firing

BIIa absorption group: No treatment after firing.
BIIb absorption group: No treatment after firing. They have resin applied after firing.
Non-enamelled polished BIa absorption group: These have resin applied after firing.
Natural non-enamelled BIa absorption group: No treatment after firing.
Polished enameled BIa absorption group: They have resin applied after firing.
Natural BIa absorption group: No treatment after firing.

Specific group of ceramic tiles

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

2.3 Regarding the finish side

Rectified: has straight, polished edges with minimal size variation between the pieces, ensuring smaller joints and greater continuity to the floor.
Bold (Non-Rectified): has slightly rounded edges and greater variation in size between the pieces, so larger joints are used so that the continuity of the floor is not compromised.

Rectified

Bold (Not Rectified)

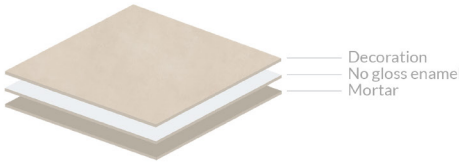
2.4 Regarding the surface finishing

Elizabeth Revestimentos classifies its ceramic tiles according to table 02.

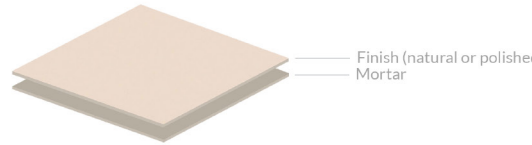
SURFACE FINISHING		
FINISHING	ACRONYM	DESCRIPTION
Satin	AC	Matte finish with a soft touch, bringing versatility and warmth to environments. Can have COF I and COF II for internal use.
Natural	NA	Lightly textured finish with no gloss, simulating the closest thing to nature. Ideal for indoor and outdoor covered areas.
Outdoors	EXT	Rough, slip-resistant texture ensuring greater safety and comfort.
Glossy	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	Special semi-gloss finish with matte and polished points, giving the environment style and versatility.

Table 02: Classification according to surface finishing

SATIN
No gloss piece

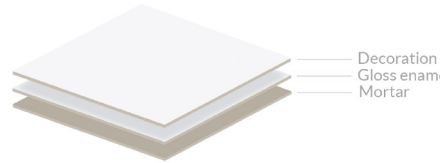


NATURAL



OUTDOORS
Rough piece for outdoors

GLOSS
Gloss piece



POLISHED
Deep polishing of the piece that generates high gloss

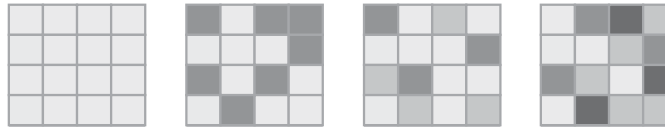
3. Regarding the Variation of Tone

Tone variation is a characteristic that can be intrinsic to the ceramic tile manufacturing process or caused intentionally for a particular aesthetic effect in order to reproduce natural conditions or to create a unique aesthetic effect. The variation in tone can occur from one production to another, so all packaging has the product's shade coding identified, as well as the characteristic in relation to the variation from one piece to another within the same packaging.

The Tone Variation classification is carried out according to table 03.

TONE VARIATION CLASS		
VARIATION	**APPEARANCE**	**DESCRIPTION**
V1	Uniform	Minimum difference between pieces.
V2	Slight variation	Noticeable differences in texture and pattern of similar colors.
V3	Moderate variation	Significant difference in tones of the same colors from one piece to the next.
V4	Random	Random and different colors from one ceramic to another.

Table 03: Classification according to Tone Variation



V1 V2 V3 V4

For a better view of the tone variation, we recommend evaluating a panel with at least nine pieces, taking pieces from different boxes. Before laying, check that the shade number is the same on all the packages. Do not lay products with different shade numbers in the same environment.

4. Site of Use

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

The classification of use is an aid tool that clarifies the questions of users, architects, designers and specifiers, facilitating the specification of products. Where it should follow the project drawn up by engineers, architects and qualified professionals, always observing what the Manual of Use Site allows or indicates.

The main purpose of the **MANUAL OF THE USE SITE** is to relate the ceramic tile to the appropriate site of use for its performance.

SITE OF USE TABLE

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

The acronyms beginning with the letter F (from the word Floor) refer to the tiles that should preferably be used on floors.

All ceramic tiles used on floors can also be applied to walls, as these are less critical than floors.

The acronyms beginning with the letter W (from the word Wall) refer to the tiles that should be used exclusively on walls. The two letters that complement the acronyms for the new sites of use, Elizabeth Revestimentos refers the preferred applications for tiles, and its origin also comes from the English language:

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 make communication and market language easier, the table of the new Elizabeth Revestimentos Site of Use presents the acronyms and a short, objective text indicating their meaning. In addition, a series of illustrative icons complement the communication to facilitate understanding:

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. Resistance to slipping

Resistance to slipping is an important characteristic for flooring products. The safety of an environment in terms of slipping does not depend solely on the characteristics of the chosen flooring. Slipping or not slipping on a surface is a condition of the environment itself and depends on several factors: the coefficient of friction of the flooring, the slope of the floor, the presence of water, sand, grease, oil, the type of footwear being worn and the speed of movement.

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

5.1 Coefficient of friction

This is the index that measures slip resistance in relation to ceramic tiles. The higher the coefficient of friction, the greater slip resistance. Based on the method defined by ABNT NBR 16919 - Determination of the Coefficient of Friction and in accordance with ABNT NBR 15575, we classify our products according to the table below, according to their recommendations for use.

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

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

Table 04: Classification according to COF

Wet areas - areas of the building whose condition of use and exposure may result in the formation of a layer of water due to the normal use for which the environment is intended (e.g. bathroom with shower, service area and uncovered areas).
Wettable areas - areas of the building that receive splashes of water resulting from their condition of use and exposure and that do not result in the formation of a water layer due to the normal use for which the environment is intended (e.g. bathroom without shower, toilet, 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, buckets of water, etc.) is not envisaged even during cleaning operation.

To correctly specify the ceramic tile for a particular environment, always consider the Site Use Table and the Coefficient of Friction.

6. Size

Size variation is inherent in the ceramic tile manufacturing process. The ABNT NBR ISO 13006:2022 standard defines that:

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

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

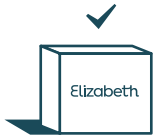
Do not lay products of different sizes. If the layout of the project specifies unequal products in the same environment, such as a checkered layout, for example, the nominal and manufacturing size of the products must still be the same.

7. Receiving, handling and storing ceramic tiles

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

7.1 Receiving the tiles ceramics

When receiving the product on site, it is important to check a few points unloading the coatings:



Packaging: make sure that the packaging is suitable and free from damage. Observe whether the products have suffered any damage during transportation, such as broken corners, cracks and chipping.

Invoices: check that the products being delivered correspond to those on the invoice, looking at: reference, shade, size and class. This information can be found on the front of the package or on one of its sides. Keep the purchase invoice, the guarantee is only valid on submission of this document. Also keep the product batch information on the packaging in case you need to supplement it or call technical assistance.

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

Quantity: count the number of boxes.

⚠ ATTENTION

If the product being delivered is different from what is described on the invoice, do not receive the goods and contact Elizabeth Technical Assistance.

If you notice any damaged pieces, inform Elizabeth Technical Assistance immediately.

Don't forget to record your comment on the carrier's bill of lading.

Elizabeth Technical Assistance

4004-2971 ou 0300 789 7771
(48) 3447 7777 (Whatsapp)
sac@ceramicaelizabeth.com

7.2 Delivery and unloading:

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

Whenever possible, unload products with machines or equipment that maintain the original palletization. The manual process can lead to damage and breakage of ceramics.

If manual unloading is necessary, the product must be stacked in the same configuration as when it left the factory. In other words, if the pieces are delivered in an upright position, for example, this should be the position adopted for manual stacking. Always place packaging (boxes) vertically, except for shrink-wrapped products.

Whenever vertical or inclined storage is necessary, the base should be protected with cardboard, Styrofoam, wood or materials that prevent the pieces from chipping. Note: Never place boxes in direct contact with the ground.

When it is necessary for the pieces to be supported at an angle, make sure that all the boxes are placed with the back of the parts facing the supporting wall, thus avoiding damage to the finished surface of the product.

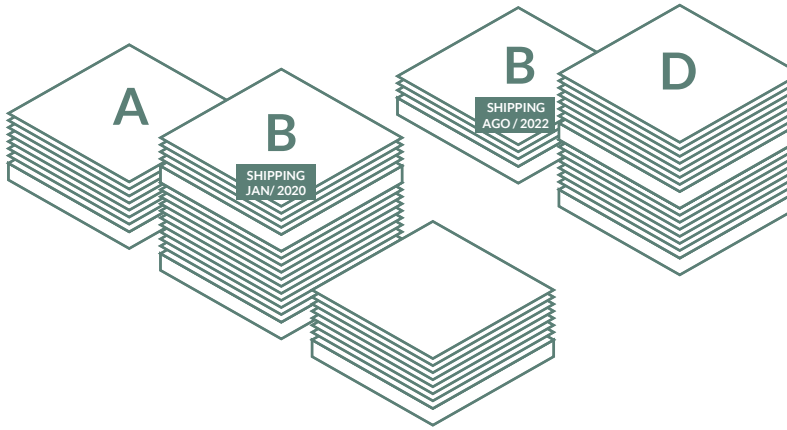
The storage area must be covered, flat, leveled floor, protected from moisture, strong enough to withstand the load of the pallets to be packed and close to the area where the material will be used or vertical transportation, reducing handling and the risk of breakages. In the case of an uncovered area, keep the products on pallets and plasticized or covered with plastic sheeting.

Note: Carriers are instructed to deliver the product within a maximum distance of 30 meters from the vehicle and in a straight line. Delivery situations other than this are the responsibility of the customer.

7.3 Storage:

During storage, products must be separated so that only items of the same reference, shade, size and class are in each pile. The products must be properly identified and separated so that there is no possibility of errors in the use of the goods or even the mixing of batches. Ideally, materials from different batches should be separated into different environments, and if this is not possible, the different batches should be identified with signs. This will make it easier to remove the pieces when they are laid down. Storage areas should ideally have controlled access.

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



In the case of storage on slabs, check in advance that the site is capable of withstanding the load to avoid overloading and possible breakage of the structure. If necessary, distribute the load so as not to risk damage or accidents.

7.4 Stacking:

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

When stacking boxes or pallets, it is important that the packages are stacked correctly to avoid damaging the product, such as breaking corners or even the piece.

If you have to stack the tiles on a wall, avoid contact between the enamel and the floor. Contact can damage the finish layer and compromise the aesthetics of the product. In this way, the back of the tiles should always face the supporting wall.

For special cases or conditions such as decorative/finishing pieces, cementitious products or special types, Elizabeth Revestimentos should always be consulted to verify the most suitable form for storage.

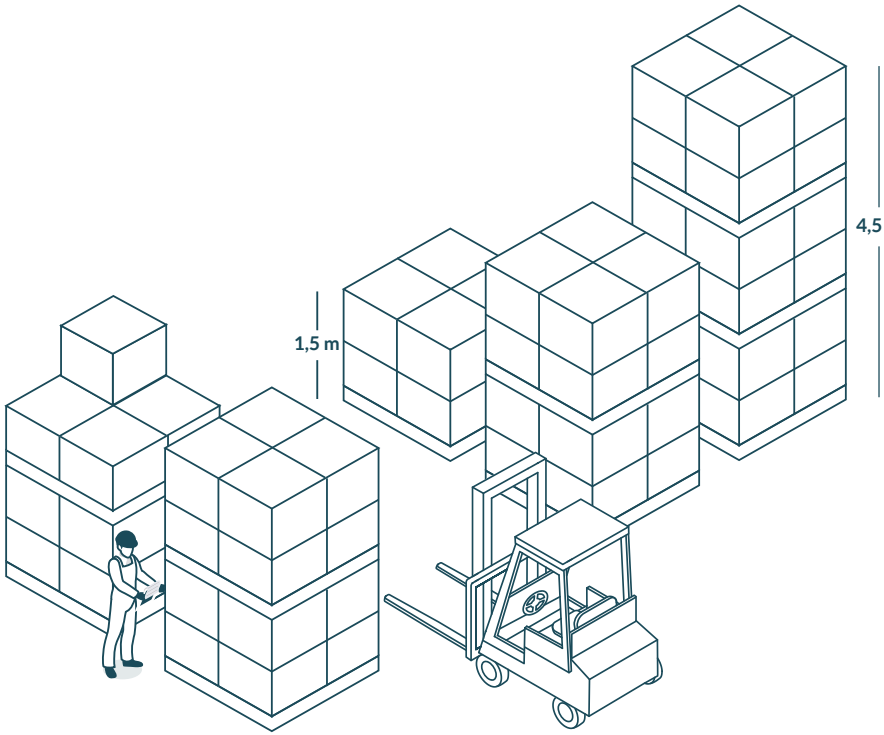
7.5 Stacking in the store or warehouse:

It is important to stack the pallets correctly so that the stacks are aligned vertically, avoiding falls and guaranteeing the safety of users and the integrity of the products.

Fractional pallets should always be stacked on pallet racks or at the top of the stack, for safety reasons and to avoid damaging the product.

In the case of large format pieces (over 120x120cm), stacking must be done in the original crates, never exceeding the maximum limit set by Elizabeth Revestimentos.

Shrink-wrapped products, on the other hand, should be stored on pallet racks with the boxes placed horizontally on top of them.



7.6 Stock in store or warehouse:

Storing products requires minimum spacing between pallets to allow people to move around and make it easier to see the information on the packaging.

Maintaining adequate space in the aisles makes it easier for forklift trucks to access/maneuver, thus avoiding product damage due to stock movement.

In order to move products in the warehouse, especially horizontally, forklift trucks need to be suitable for these dimensions.

7.7 Transport of piece/handling:

Despite their resistance, because they are rigid, ceramic tiles must be handled carefully, especially rectified products, because they have 'sharp edges' and are more susceptible to chipping in the event of impacts, which is why professionals need to be instructed to exercise caution when transporting and handling tiles, as the packaging is unable to absorb and protect against major impacts.

We recommend that large format tiles are transported using handling equipment such as suction cups, or by at least two people properly equipped with protective equipment such as gloves, arm sleeves and goggles. This reduces the risk of damage to the product, such as breakage, chipping or cracking, as well as damage to the carrier's physical integrity.

If necessary, large pieces can be placed directly on the floor or supported by walls. In the case of wall support, make sure that the wall is strong enough to support the weight of the pieces and always ensure that the back of the piece faces the wall to protect the finish layer. In both situations (stacked on the floor or on the wall), contact with the floor must be protected by wood or Styrofoam to avoid chipping the edges of the material.

8. End-of-life guidelines for the product

Ceramic tiles are classified as inert waste, class A - reusable or recyclable as aggregate, according to CONAMA Resolution 307. According to this same resolution, generators should have as their priority objective the non-generation of waste and, secondarily, the reduction, reuse, recycling, treatment of solid waste and the environmentally appropriate final disposal of wastes.

In accordance with CONAMA Resolution 307 and Law 12305/2010, the National Solid Waste Policy, and out of concern for sustainable development and the environment, Elizabeth Revestimentos recommends that ceramic tile waste first undergoes a sorting process, which should preferably be carried out by the generator at the source or be carried out in licensed disposal areas for this purpose, respecting the established waste classes. Afterwards, this waste must be reused or recycled as aggregates or sent to a class A waste landfill where it will be reserved for future use.

It is important to point out that the reuse of any material generated by the construction industry requires compliance with technical requirements that ensure the safety of such materials, such as those set out in NBR No. 15115/2004 (Recycled aggregates from solid construction waste - Execution of paving layers - Procedures) and NBR No. 15116/2004 (Recycled aggregates from construction waste - Use in paving and preparation of concrete without structural function - Requirements), which forces producers of recycled material to seek technologies and certifications that guarantee compliance with current legislation.

9. Quality of construction and laying

9.1 Planning

9.2 Hiring the ceramic installer

It is essential to hire professional layers to carry out this type of service, as this is a key stage in avoiding future problems on site. Before hiring an installer, it is important to check the quality of their previous work, making that the professional is familiar with the rules and regulations for carrying out the following services:

> **a)** If they use sealing joints for laying correctly;
>
> **b)** If they lay ceramic tiles with good alignment and leveling;
>
> **c)** If they are organized, keeping the environment clean during and after the laying;
>
> **d)** If they have appropriate tools in good condition: plumb, line, ruler, square, grouting trowel, paintbrush, cutters, notched trowel, level, marble saw, rubber hammer, measuring tape etc.

9.3 Inspection of the product

In the process of manufacturing ceramic tiles, variations in size and tone can occur. According to Brazilian and international standards, 95% of the tiles must be free of visible defects. If the number of defective tiles is within this

permitted limit (5% of the batch purchased), separate them and use them for trimming. If the number exceeds this limit, please contact Elizabeth Technical Assistance before starting to lay down the tiles.

Before laying, we recommend checking that the reference, size, tone and quality of the product match all the boxes and correspond to what was specified in the purchase document. Some references intentionally show differences in tone between the pieces; this variation is an aesthetic element that gives the product greater artistic value.

Then open two or three random boxes, use the pieces to assemble the panel and check that the aesthetic effect is as expected. Mixing the pieces can help you to better understand the condition of the product. If there are spots of paraffin, you can remove them using a rubber spatula. The purpose of the paraffin is to protect the ceramic from possible scratches during transportation.

When laying using an adhesive mortar, it is not necessary to soak the tiles or even moisten them. Always use the right mortar and grout for each type of ceramic product.

⚠ ATTENTION

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

Remember, when calculating the quantity to be purchased, about 10% should be added so that it remains in technical reserve and can be used for replacement, more difficult cuts or future maintenance.

In cases where the products are larger than 120x120cm, it is recommended to plan the area to be laid in order to estimate the approximate number of tiles that will be installed and thus purchase the necessary amount of material,

making provision for at least 3 tiles to be left over, as a technical reserve or to replace losses caused by cuts during laying

9.4 Standards for laying

We recommend following these rules when preparing the base, laying etc.:
NBR 13753 - Internal or external floor covering with ceramic tiles and using adhesive mortar - Procedure.
NBR 13754 - Internal wall cladding with ceramic tiles and using adhesive mortar - Procedure.
NBR 13755 - External wall and façade cladding with ceramic tiles and using adhesive mortar - Procedure.

Regulating and leveling the base
After the subfloor has been laid, if irregularities are found in the base, apply a layer of regularization, following the Technical Standards.

Base cure
- 14 days for subfloor and mortar;
- 28 days for concrete.

Before laying, check that the base is:
- Fully cured, dry and resistant;
- Clean, ensuring adherence of ceramic tiles;
- Leveled, plumbed and troweled for the best fit between ceramic tiles;
- With adequate slope for drains and/or draining points;
- Provision for joint spacing or expansion where appropriate.
- Flatness with a maximum unevenness of 3mm when assessed with a 2m ruler;
- In the event of overlap, assess the integrity of the existing old floor (fixing, unevenness between the tiles) and in the event of faults, make the necessary

corrections before laying the new tiles.

9.5 Mortars

The adhesive mortar and grouting mortar must be chosen according to the type of ceramic tile to be laid, as well as the environment to be tiled, in order to guarantee a high-quality laying system.

Grout makes a significant contribution to the final aesthetic effect of an environment. Choose the right product for your job, always observing the manufacturer's instructions as described on the product packaging.

9.6 Precautions in the work

9.6.1 Planning the joints

Laying joints are the joints between the ceramic tiles, separating them. The minimum width to be observed depends on the finishing of the tiles and the recommendation given by Elizabeth Revestimentos on the product packaging.

Ceramics differ from other types of tiles in that they form mosaics according to the style of the project. The joints are part of the quality of the applications and help with the aesthetics of the ceramic tiles.

In addition to their aesthetic importance, joints play an important role because they provide flexibility for the surface when accommodating pieces.

9.6.2 Importance of joints

- They facilitate a better alignment of the tiles when laying;
- They prevent detachment when there is work and masonry expand contract;
- They improve hygiene by making it easier to clean between tiles; with dry joints it is very difficult to clean between tiles;
- They make it easy to change ceramic tiles when a one-off change is required;
- They improve aesthetics, as they are the "frame" of a job well done;
- They prevent infiltration because the grout protects the joints and therefore the ceramic tiles system;

Structural joints
These joints exist in the concrete structure of buildings and are used to relieve tensions caused by the movement of the structure. They are usually identified by gaps that cut across the entire building. Their position and width must be respected throughout the entire thickness of the ceramic tiles.

Movement joints
These are all the regular spaces whose function is to subdivide the coated cloth to certain dimensions in order to relieve tensions caused by the movement of the ceramic tiles and/or substrate.

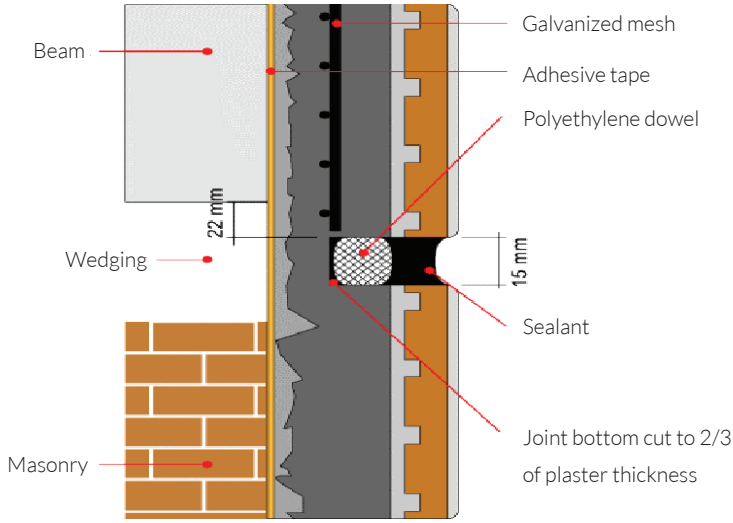
Note: These are calculated joints for which the civil engineer or designer is fully responsible.

The movement joint should be used in:
I - Indoor and Outdoor Floors (NBR 13753): Always when indoors the floor area is equal to or greater than 32m² or linear dimension greater than 8m, and always when outdoors the floor area is equal to or greater than 20m² or linear dimension greater than 4m;

II - Indoor walls (NBR 13754): Whenever the area is equal to or greater 32m² or the linear dimension is greater than 8m, on walls exposed to insolation and/or humidity with an area greater than or equal to 24m² or whenever one of the dimensions is greater than or equal to 6m, at vertical corners, changes

of direction, where the covered area meets floors and ceilings, columns, beams and where different types of materials meet.

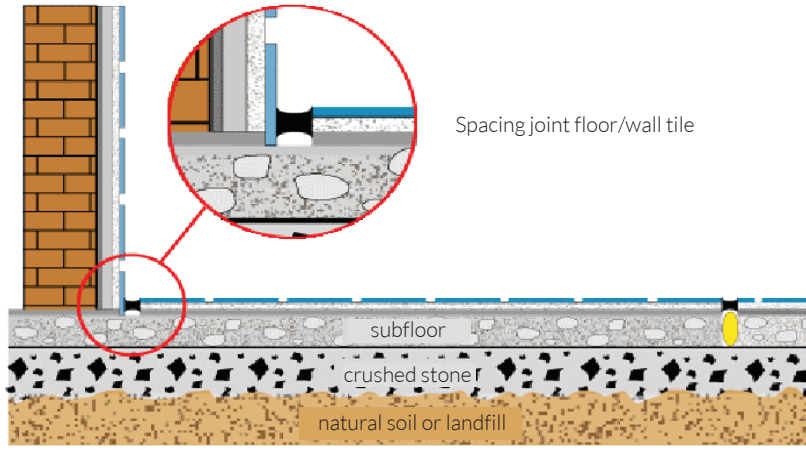
III – Outdoor Walls and Façades (NBR 13755): Horizontally every 3m or every ceiling height, vertically every 6m, at vertical corners, changes of direction, meeting of the ceramic tiles area with floors and ceilings, columns, beams and meetings of different types of materials.



Joint spacing

These are the spaces that separate the area with the ceramic tile from other areas (walls, ceilings, floors, pillars and slabs), relieving the stresses caused by the tile and/or the substrate.

The joint filling material must be highly deformable in order to absorb stress, such as honeycomb rubber, polyurethane foam, absorbent cotton, cork and other materials found in the building materials trade



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

Laying joints

These are the regular spaces between two adjacent ceramic tiles, whose main function is to absorb some of the stress caused by the tiles and the base. Their depth is the thickness of the tile, and their width varies according to the type of ceramic tile used.

The filling material is the grout chosen to finish the ceramic tiles (cement base, aggregates, latex, epoxy resin etc.).

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

The material used to fill the joints must be highly deformable in order to absorb stresses, such as honeycomb rubber, polyurethane foam, absorbent cotton, cork and other materials found in the building materials trade.

9.7 Execution of laying

9.7.1 Preparing the mortar

Before you start laying, make sure that the adhesive mortar you have chosen is the right one for your application.

- Prepare the mortar in a clean, non-stick container, preferably one that is not made of wood, according to the manufacturer's instructions.
- As a rule, pour the amount of water or additive indicated on the product's packaging into a container, then add the powder, stirring constantly until a firm, lump-free consistency is obtained.
- Let the mortar stand for 5 to 10 minutes according to the manufacturer's instructions.
- Throughout the mortar consumption process, stir again without adding any more powder or liquid.
- It is important during the consumption of the mortar to occasionally repeat the mixing process to keep the mortar workable.
- To speed up preparation and improve mixing, use the electric mixer.

9.7.2 Application of the adhesive mortar

- Apply a layer of adhesive mortar to the base (subfloor, mortar) with the smooth side of the notched trowel for better adhesion, then use the toothed side of the grouting trowel at an angle of approximately 60° to form ridges.
- Whenever the tiles have an area equal to or greater than 900cm^2, the mortar should also be applied to the back of the tiles (Double Bonding), carrying out the same procedure on the tiles as on the base carry out the procedure on the tiles in the same way as on the base, making sure that the strands run along the width of the tile in order to obtain the shortest

possible length of the strands. The mortar strands of the pieces should be parallel to the base mortar strands, making it easier to expel air.

Image: grouting trowel

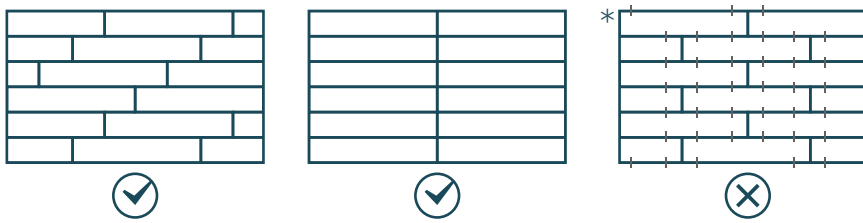
9.7.3 Application of ceramic tiles

Apply the ceramic tiles by sliding them about 1 cm over the mortar strands so that they can be crushed. Press the pieces with your hands and tap them with a rubber hammer to remove air from the back of the tiles and ensure better adhesion by aligning and leveling the tiles with each other.

For porcelain tiles with a polished finish, use a white rubber hammer or wrap a conventional rubber hammer in a clean, dry cloth to avoid rubber marks on the tiles.

For ease and quality of laying, we recommend that all tiles are positioned following the direction of the arrows on the back of the tiles. The use of the floor leveler system also guarantees better alignment and leveling between the pieces.

In layouts where the products are laid in a mismatched manner, the maximum transposition of the pieces must not exceed 25% in relation to the length, as this will provide a better aesthetic effect in the final result.



**For the 19x90cm and 20x120cm gauges, installation with a 50% mismatch is authorized, provided that floor levelers are used, respecting manufacturer's guidelines which recommend using a leveler at each end, as well as levelers every 40cm. This procedure will give the final result a better aesthetic effect.*

9.8 Inspection of laying

9.8.1 Control of adherence

Remove and observe a freshly laid tile every 30m². The back of the tile should have at least 90% of its area filled with adhesive mortar, with the strands kneaded and joined to close the gaps.

9.8.2 Open time

Check the open time of the adhesive mortar by pressing one of your fingers against the layer applied to the base. The mortar is in good condition for use if, when touching the beads, your finger comes back dirty, otherwise the mortar's open time will have expired. Do not apply the ceramic tiles to areas where the mortar is already dry or has expired, in which case it should be removed and discarded.

9.8.3 Detachment test

Before grouting, tap each tile with the handle of a hammer (or a piece of wood). If you hear a "hollow" sound, it's because the tile has been poorly grouted due to a fault in the application of the mortar, which may peel off over time; in this case, remove the tile and grout it again, correcting the application of the mortar.

9.9 Grouting

After laying the ceramic tiles, remove the spacers or levelers, when these are used, at least 48 hours after laying. Clean all the joints and the surface the tiles before applying the grouting mortar so that the aesthetic condition is achieved. The excess mortar that rises from the joints must be removed with the mortar still fresh before the cement crystallizes. You can use the spacer itself to remove this excess.

Prepare and apply the grout according to the manufacturer's recommendations, using the appropriate tools for the type of product selected. Remove excess grout while it is still fresh. Cleaning immediately after grouting may result in partial removal of the product; if it is done too late, a more aggressive cleaning procedure (mechanical or chemical) will be required, risking deterioration of the ceramic tile surface.

In the case of tiles with a rustic texture or expressive relief, apply a layer of liquid wax to the edge of the tiles or protect them with low-adhesion tape before grouting. This action is intended to make it easier to remove excess grout and consequently clean the tiles.

After the tiles have been laid, it is important to protect the floor, as every construction site contains materials that can scratch the tiles (sand, cement, scaffolding, ladders etc.). We recommend using materials from a scratch protection system on the market that can protect the integrity of the ceramic tiles. We recommend releasing the area to traffic after seven days.

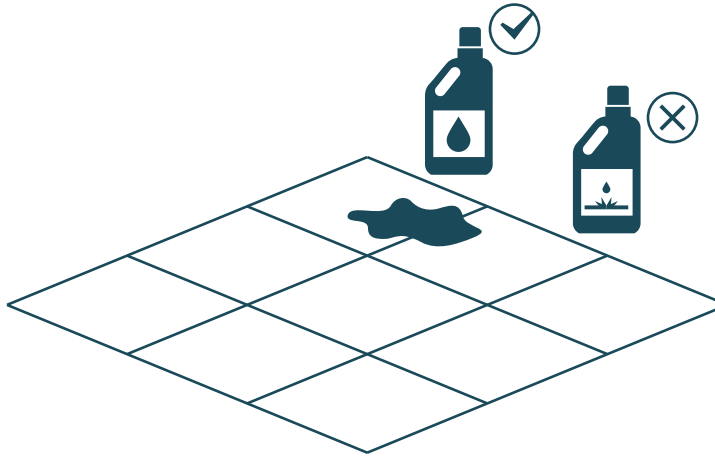
Read the instructions on the grout packaging carefully

10. Cleaning and Maintenance

10.1 Cleaning up after work

The first post-work cleaning must be carried out carefully and in such a way as to ensure the complete removal of all residues, especially those of grout and mortar, which can stick to the surface of the ceramic tile, making it look grimy or whitish. This cleaning must be carried out with care, as abrasive materials such as cement and sand may be present on the tile.

During construction, it is important to avoid the accumulation of these residues from laying and grouting. If more aggressive cleaning is required, check with the manufacturer for the most suitable products. The use of acids that are unsuitable for the surface of the ceramic tiles could cause irreversible damage.



Initial cleaning should be carried out seven days after the final grouting application, as follows:

- Sweep the environment with a soft-bristled broom;
- Use water and detergent after work on ceramic tiles with the aid of: Soft Bristle Brooms, Mop's, LT (Suporte Limpa Tudo) with Fibra Branca, among others, when scrubbing;
- Always rinse thoroughly with clean water until no detergent can be seen on the coating;
- If there are still stains, you can repeat the cleaning process or use Creamy Saponaceous and warm water;
- After cleaning, dry the floor using a clean cloth and, in the case of EXT products, leave to dry naturally.

10.2 Daily Cleaning

10.2.1 Dry cleaning

Depending on the environment and whenever necessary, dry clean (remove dust and/or loose dirt) using a soft broom, vacuum cleaner or suitable brush.

10.2.2 Cleaning with water and neutral detergent

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

For daily cleaning of porcelain tiles, use neutral detergents (Ph= 7.0). There are products on the market with high alkalinity and products with high acidity for heavy-duty cleaning, but these attack the surface of the coating and produce irreversible stains. We therefore recommend using neutral detergent and clean water.

Powdered soap and dishwashing detergent should not be used on any type of ceramic tiles, as they create a film on the floor and make it easier for dirt to adhere.

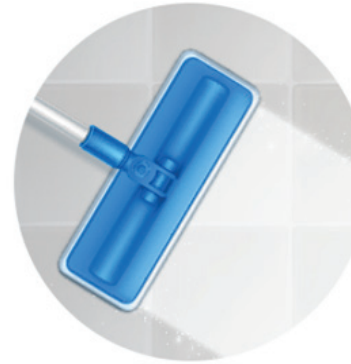
For cleaning, we recommend the two-bucket technique:

> **a)** Put clean water and neutral detergent in the first bucket. Do not use this water to wet the cloth and then wring it out, as the water will be contaminated;
>
> **b)** In the second bucket, add clean water. This is where the cloth will be cleaned and wrung out and the water should be changed whenever it gets dirty.

To clean with the two-bucket technique, you must:

- Remove loose dirt with a soft broom and/or vacuum cleaner;
- Apply the diluted detergent from the 1st bucket to the floor with a clean cloth and leave to act for 3 to 5 minutes;
- Scrub using the best tools available on the market;
- Rinse with clean water and squeegee if possible or dip the cloth in the 2nd bucket (bucket with clean water only) and wring out the cloth over the

- bucket and use it on the ceramic tiles to remove excess detergent. Repeat the process until there is no more detergent on the pieces;
- Wipe with a clean cloth.



10.3 Removing specific stains

Special products may be required to remove specific stains from the ceramic tiles. It is important to note that, before starting the cleaning process, a test must be carried out on an unset or less apparent piece. In this test, observe whether or not the product damages the surface of the ceramic tiles. If you are using specific products to remove certain types of stains, read and follow the manufacturer's recommendations on the product packaging.

10.4 Periodic maintenance

Ceramic tiles stand out for their 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 with just a damp cloth with water and a specific floor cleaner. When stains persist, use creamy soap or diluted bleach. For polished porcelain tiles (glossy surface) and other types of ceramic tiles, we recommend specific products according to your needs with the type of stain, as can be seen in the table below, which lists some types of stain and the recommended product for removing them.

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

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

⚠ ATTENTION

Attention: To remove the protective wax from polished/gloss porcelain tiles, we recommend using creamy saponaceous, 70° alcohol or special protective wax-removing talc available on the market.

Note: Never use unsuitable acids for cleaning. Cleaning products may contain acids that damage the finish. Read labels carefully.

10.5 How to avoid scratches on the surface of ceramic tiles

Ceramic tiles, especially those with a glossy surface, are susceptible to scratches. Therefore, during use, cleaning devices for removing and/or retaining sand residue from the soles of shoes should be used (such as mats) at the entrances to buildings. In addition, the feet of furniture should be protected, even if they are protected from being dragged across the floor. These procedures are essential to avoid scratches and increase the useful life of the product.

10.6 Special pieces maintenance

The aesthetic appearance of ceramic tiles will be guaranteed if they are cleaned daily with water and neutral floor detergent. Cleaning materials containing acids, chlorine or solvents can attack and change the surface of the tiles. Never use abrasive cleaning materials such as sandpaper, abrasive cleaner powder or steel sponges.

Special pieces can be made up of delicate products. Whenever necessary, details decorated in gold, platinum or noble metals should be protected with low-adhesion adhesive tape or tape for painting. Once the tape has been removed, the pieces should only be cleaned with alcohol, using a damp cloth or a soft sponge, free of any residue that could scratch the decorated surface. In particular, cementitious products also require special attention for protection and cleaning and/or stain treatment. Check the specific manual

and use alkaline detergent for post-work cleaning and/or neutral detergent for cleaning.

In addition to daily cleaning, in order for all components, elements and the ceramic tiles system itself to maintain its functional capacity throughout 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 faults from progressing, leading to major pathological manifestations.

Table 06 shows a suggestion for drawing up a preventive maintenance program for ceramic tiles applicable to a residential building, as recommended by Elizabeth Revestimentos.

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

Elizabeth Revestimentos products classified as "A" quality fully comply with ABNT NBR ISO 13006 and 10545 standards.

The products are exclusively guaranteed against defects or manufacturing defects, provided that the terms and conditions are complied with:

I - The warranty does not cover defects or damage caused by abnormal use of the product, such as those resulting from improper installation, installation on unsuitable surfaces or in unsuitable places, user negligence, accidents, abuse, poor packaging, transportation or any other that does not comply with the instructions on the packaging and/or current regulations.

II - For the guarantee to be valid, laying and grouting must comply with the technical standards in force and the information widely disseminated by Elizabeth Revestimentos on packaging, folders and all other communication vehicles.

III - The guarantee 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 warranty period stipulated herein runs from the date of issue of the sales invoice, the presentation of which is indispensable for its validity. V - The adhesive mortar to be used must comply with the standards established by NBR 14081, using the double bonding process (mortar on the back of the piece and on the subfloor) when required by the standard.

VI - The laying of the product and the sizing of structural joints, joint space and expansion joints must be carried out in accordance with the requirements of standards NBR 13753, NBR 13754 and NBR 13755, under the guidance of the architect, engineer or designer responsible.

Elizabeth Revestimentos offers an after-sales service consisting of a Technical Assistance team that can be called upon:

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

Elizabeth Revestimentos is at your disposal for advice, service, technical assistance or further information.

JUNE/2025

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