

FRANCINI
FORTE

2023

LARGE FORMAT PORCELAIN
TECHNICAL GUIDE

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INTRODUCTION TO FRANCCINI FORTE

Our Large Format Porcelain slab collection presents a design solution with no limitations. Francini FORTE is inspired by Forte Dei Marmi, Italy, where our company's history begins and features unparalleled designs by the world's foremost marble experts, whose passion for stone runs deep.

Innovation is our FORTE.

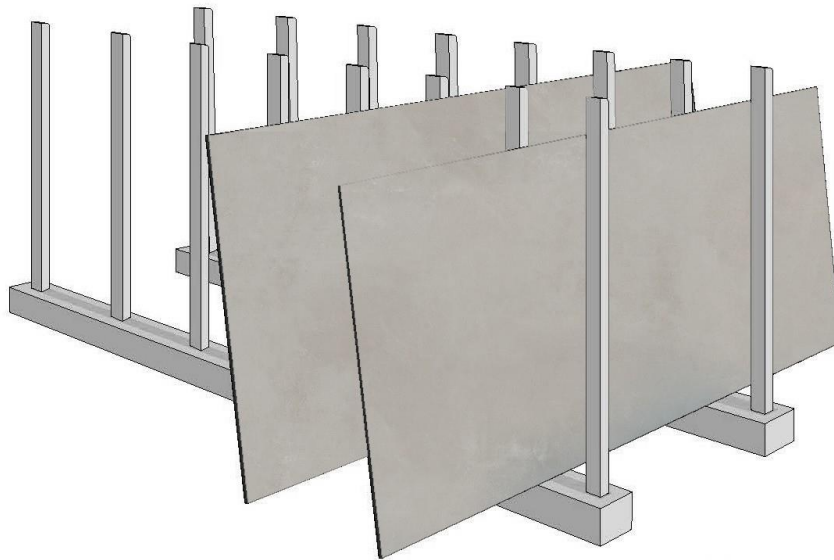
WHAT IT MEANS TO BE "FORTE" STRONG

Forte translates to strong in Italian and is the perfect definition of our porcelain collection. Strength without sacrificing the finished design medium. Our FORTE Collection is made with high-quality materials combined with state-of-the-art technology. What does this mean? We can provide a building material with a low carbon footprint that is 100% natural. Sustainability is important to us at Francini, and our porcelain collection is manufactured under strict environmental guidelines that ensure low emission levels, water recycling, and reuse of processing residues and a reduction in energy consumption.

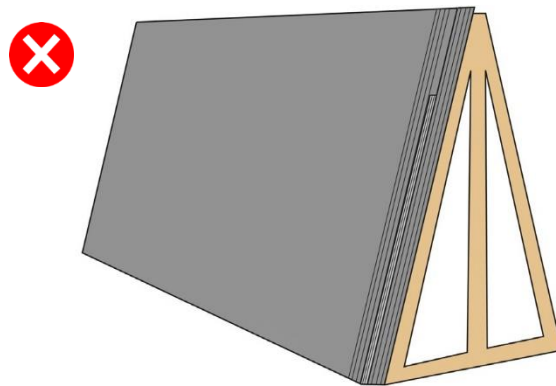
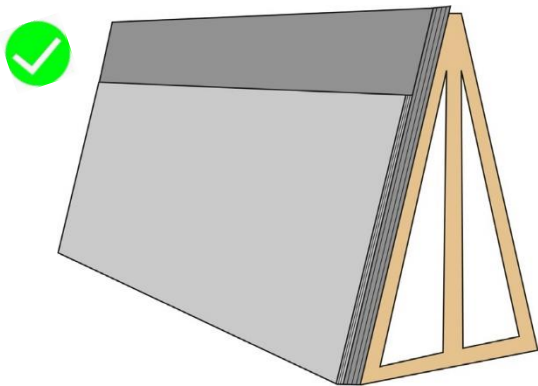
SLABS STORAGE

The slabs can be stored on A-frames or traditional racks for stone and engineered material, secured by straps. It is recommended to apply wooden, rubber, or plastic protections to the racks to avoid breakages and chipping.

Sometimes the racks have support columns towards the inside of the slab; for this reason, the most extreme parts of the slab do not find support on the columns, and this leads to a natural curvature that generally disappears when positioning the slab on the workbench. In order to avoid an accentuated curvature, which could become hard to return to planarity, it is recommended to use racks for slabs that allow a complete support of the slab; an alternative is to use a granite or marble slab (do not use wooden ones) with larger dimensions on which to place the porcelain slabs so as to guarantee the tightness even for a prolonged time, facilitating the workability of the slab.



We also want to remind you to place the cutout pieces in front of the entire slabs in order to avoid imbalances in the support both vertically and horizontally: larger dimensions behind and lower ones in front.



CUTTING SUGGESTIONS

Francini FORTE Porcelain can be cut and machined on traditional cutting machines for natural stone such as bridge milling and CNC machines, CNC contouring machines and waterjet machines.

In the case of machining using a tool, it must be suitable for cutting 6-12-20 mm porcelain stoneware. Information and parameters are provided in this manual for cutting on: Waterjet machine-Bridge and CNC milling machines- CNC Contouring machines.

In order to achieve optimum machining, it is good standard practice to verify the perfect flatness of the work table/grid plate on which the slab will be placed, as well as the absence of scraps and debris from previous operations.

The flatness of the work table/grid plate, combined with that of the slab, is important for the quality of the cut because it reduces vibrations.

Before carrying out any type of machining on the slab, it is recommended to do a trimming cut. The trimming cut consists of cutting 1 cm more than the thickness of the material being machined on a long side and a short side; cutting on all 4 sides is recommended.

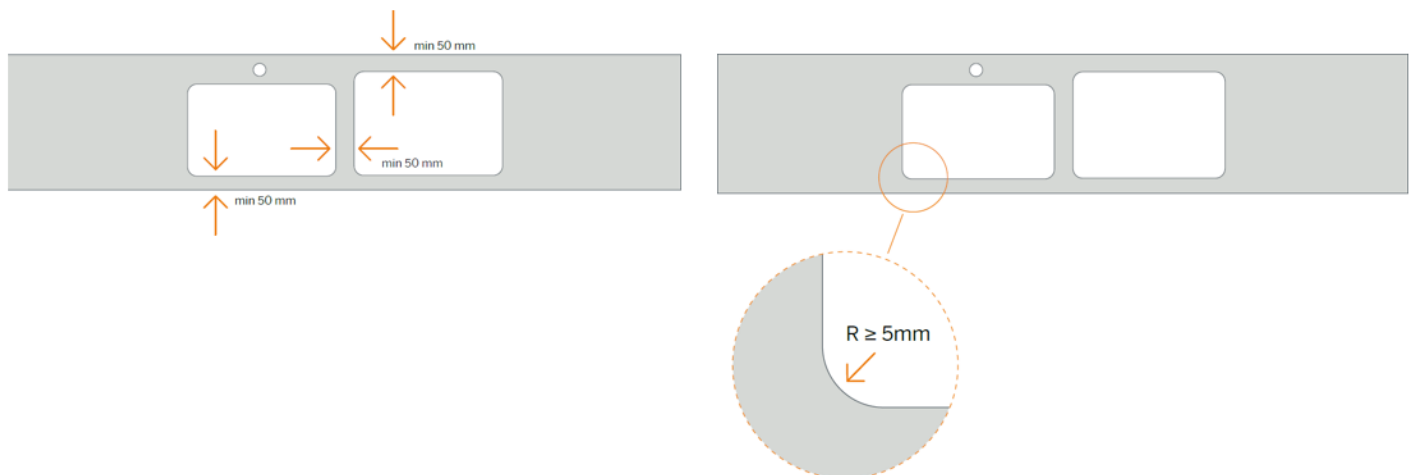
DRILLING HOLES

When drilling holes and making internal cuts, it is recommended to leave no less than 5 cm between two adjacent cuts/holes and between a cut/hole and the edge of the slab itself.

When carrying out quadrangular holes, we advise against carrying out 90° angles.

Set out a radius in correspondence to these corners, with a radius of curvature greater than or equal to 5 mm. If the geometry of the hole allows, use wider radii (8-10 mm). In any case, as a general rule, you should remember that the sturdiness of the finished surface increases with the increase in the internal radius of curvature of the holes and with the increase in the distance between two adjacent cuts.

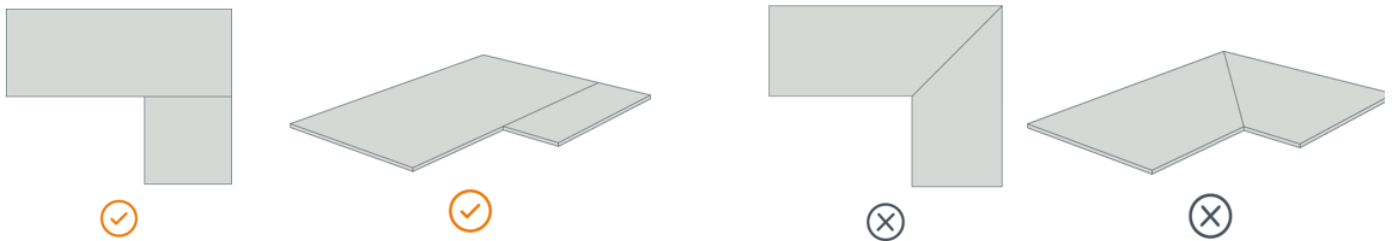
Surfaces with large holes are intrinsically more delicate.



If possible, carry out the holes on the surface in the portion of material closest to the center of the original slab.



In the event of “L” shaped kitchen countertops, provide a wide radius on the internal corner. For greater sturdiness of the surface, we recommend dividing the piece into two parts. We recommend studying the most suitable cutting scheme for the aesthetics of the composition.



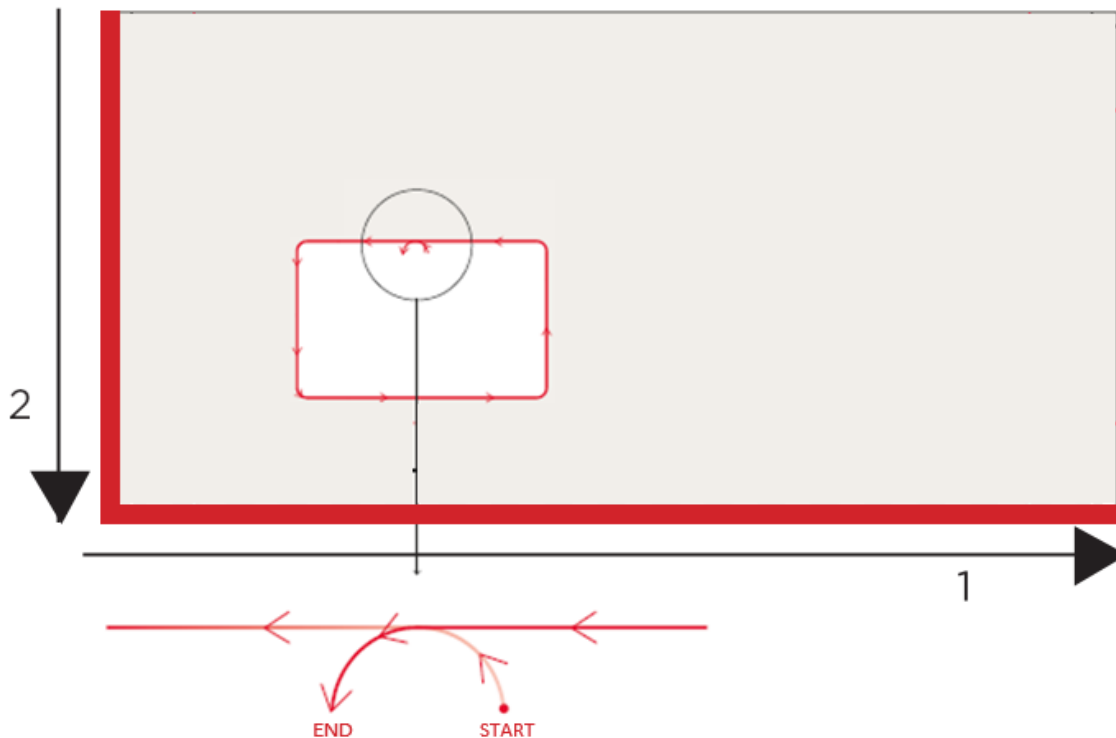
At the end of each cutting operation, it is advisable to rinse the slab with abundant water jets in order to remove debris, dust, or abrasives consumed during the machining.

CUTTING WITH A WATER JET

When operating a waterjet machines, we recommend carrying out the operations in the following sequence:

- ✓ Trimming cuts
- ✓ Any internal holes

In carrying out internal holes, we recommend beginning the cut from a point inside the perimeter of the hole (at least 2 cm, if possible) and then proceed toward the perimeter with a curved trajectory (curled). Once the cut is complete, we also recommend removing the nozzle with a curved trajectory, toward the inside of the hole.



Francini recommends a nozzle feed rate of 1000-1500 mm/min for straight perimeter cuts and a feed rate of 500-800 mm/min to carry out internal holes. The pressure of the jet must be between 3000 and 3500 bar and the abrasive consumption about 0.35 kg/min.

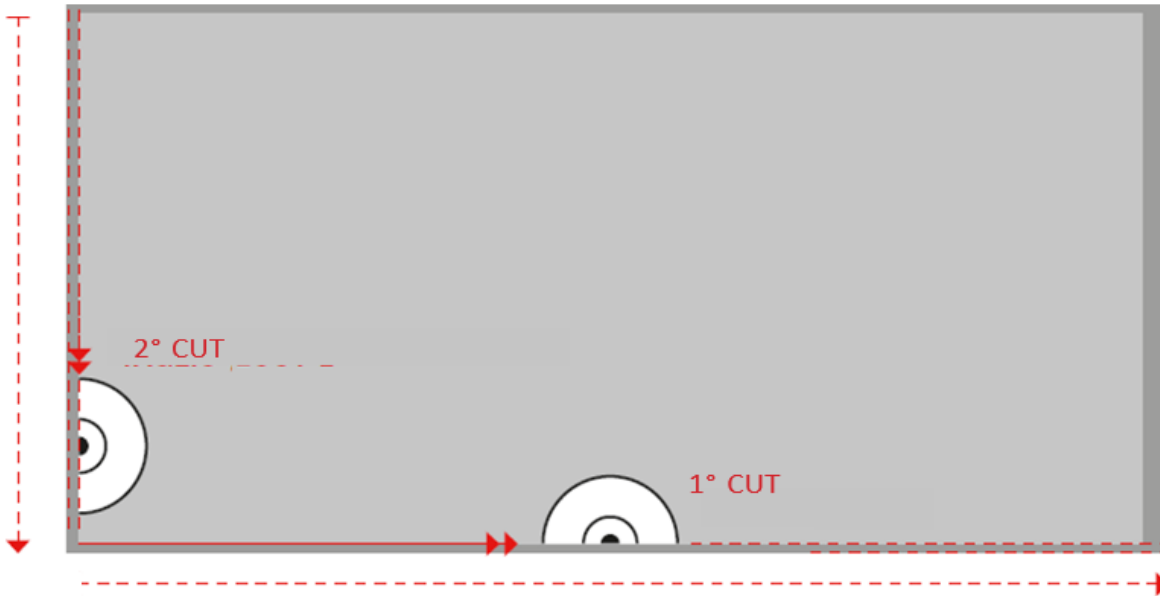
For internal holes, we recommend reducing the jet entrance pressure to 600-800 bar, to then increase to 3000-3500 when the jet has completely penetrated inside the thickness.

If the machine allows a 45° waterjet cutting, we recommend a feed rate equal to half of the feed rate used for straight cuts.

DISK CUTTING WITH BRIDGE MILLING MACHINE

When operating a bridge milling cutter, we recommend carrying out the operations in the following sequence:

- ✓ Trimming cuts



Francini recommends using specific diamond disks for porcelain and 6-12-20 mm thickness. Diamond disks for granite (soft, hard), marble and quartz agglomerations are not suitable for cutting porcelain. We recommend using sectored or resin diamond disks.

Disk cutting on bridge milling machines must be carried out damp, ensuring an abundant jet of water directed precisely at the cutting area, from both the front and the side. The rotation direction of the disk must be consistent with the feed direction of the same. We recommend using diamond disks with 30- 35- 40 cm diameter depending on the machine used, ideal for cutting a thickness of 6- 12- 20 mm. The rotation speed depends on the diameter of the disk. The ideal tangential speed of the crown is generally about 40-45 m/s.

Diameter (MM)	Rotation Speed (RPM)
300	2100-2300
350	1600-1800
400	1400-1600

For the optimum parameters calibrated on the single disk, please see the manufacturer's technical data sheet. The optimum feed rate of the sectored disk is 1200-1600 mm/min (6-12-20mm) for linear straight cuts. In the event of a 45° cut, it must be reduced by 40%. For linear cuts using a resin disk, the speed of 2500 mm/ min is reached. In the case of a 45° cut, it is important to reduce the feed rate of the disk because it is subject to greater vibrations.

To reduce the vibrations in the cutting phase (linear and inclined), it is important that the optimum feed rate is reached when the entire disk is completely inside the material, not just entering but also, and above all, when exiting. For this purpose, should the machine allow it, we recommend reducing the feed rate by 50% until the disk is completely inside the material. This distance depends on the diameter of the disk. It is important that the disk descend below the level of the slab by 1-2 mm so that the cooling water can also evacuate from below.



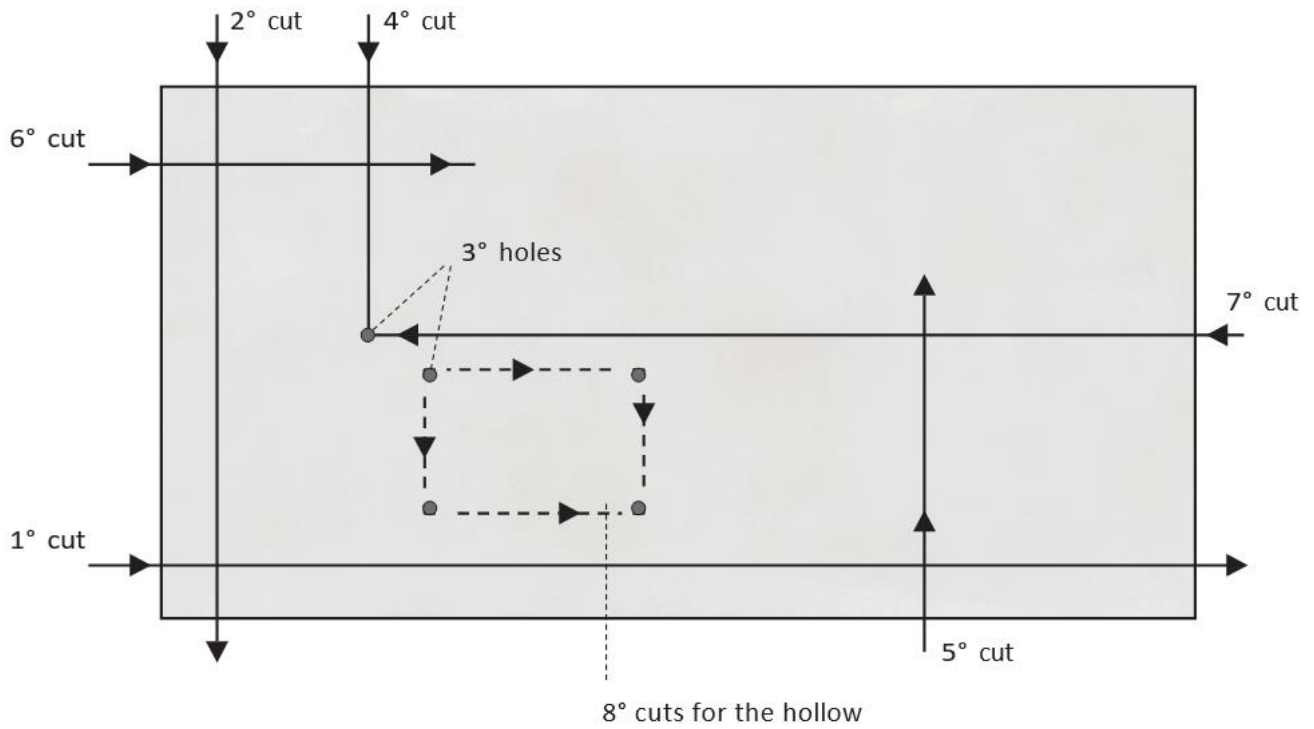
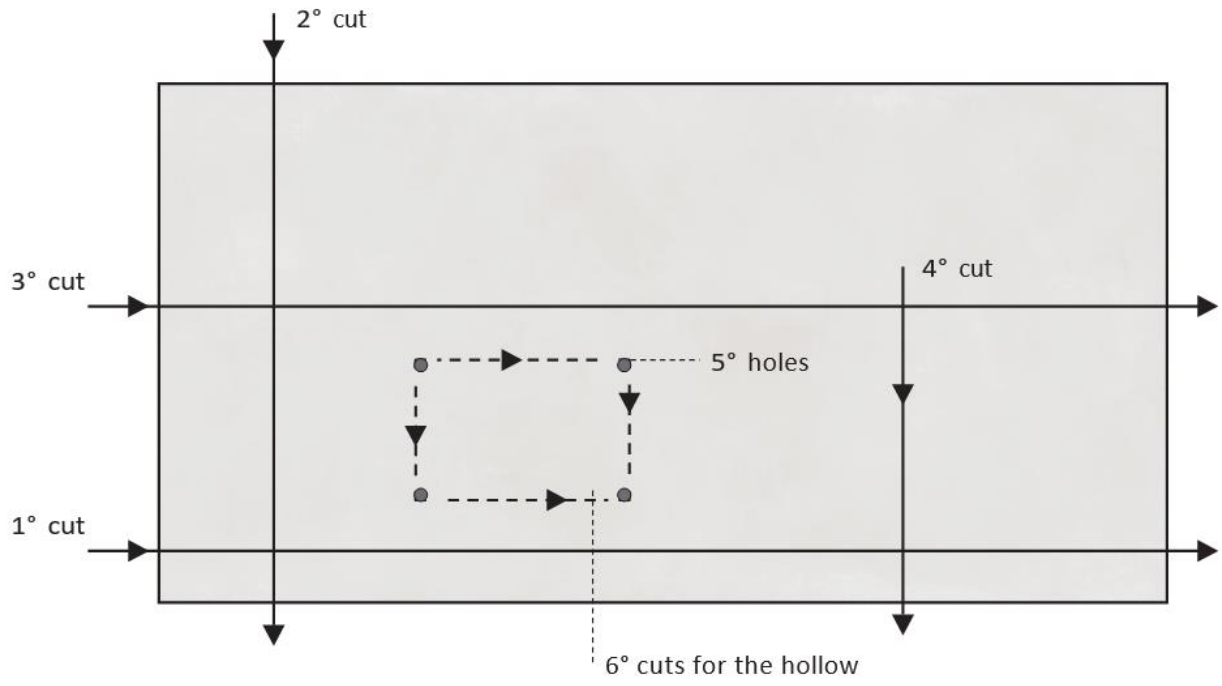
To provide support to the slab during the cut, it is recommended to use specifically designed vulcanized rubber sheets, expanded polymer material (XPS), slabs of granite, or engineered quartz. We recommend against using marine plywood sheets because they absorb water and can be deformed.

If the work table allows, a strip of abrasive material can be provided up against the slab being cut so that the disk follows its path post-cut, cutting into the abrasive material and sharpening itself.

HOLE DRILLING

Once the perimeter cut in the bridge milling machine has been carried out, we recommend against using the bridge milling machine to carry out the internal rectangular holes as well. To carry out the holes, a waterjet or CNC contouring machine must be used.

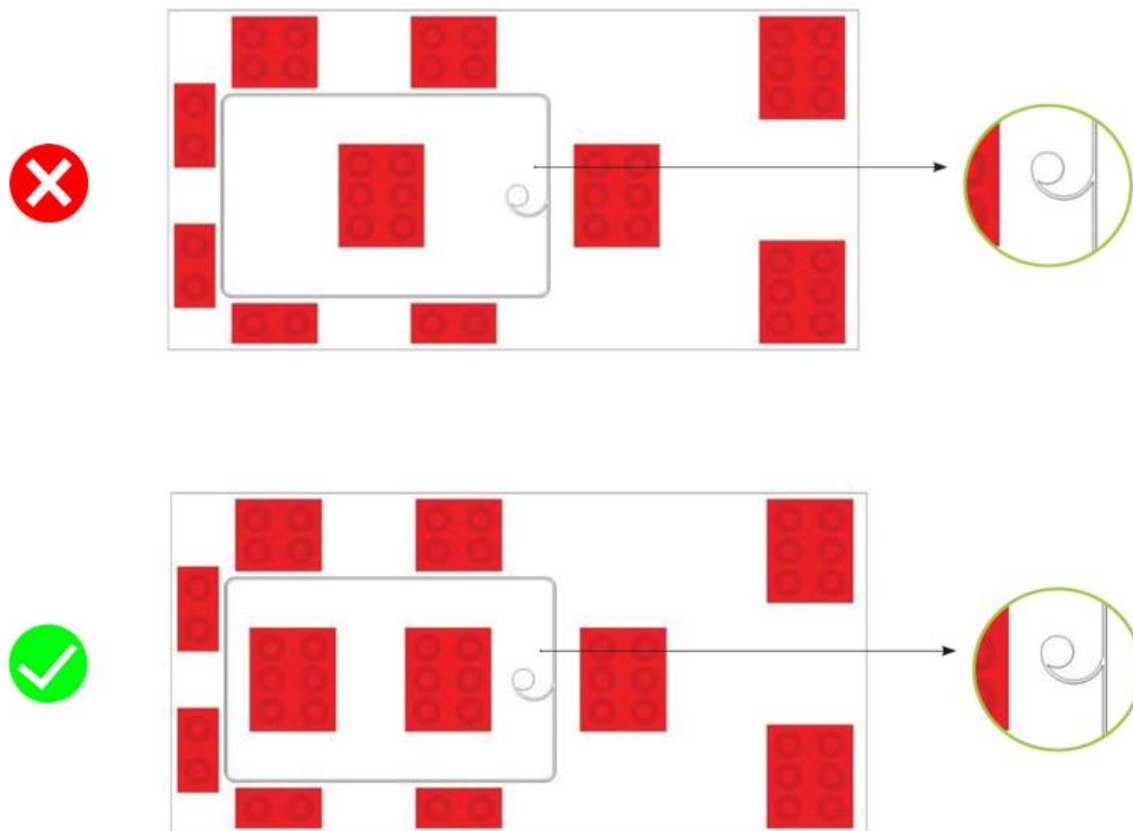
CUTTING SCHEME



CUTTING AND MACHINING WITH CNC MACHINE (CONTOURING MACHINE)

When operating a CNC contouring machine to carry out cuts and holes, arrange suction cups on the bottom part of the slab. The suction cups must be distributed evenly under the slab to reduce vibration and bending during the cutting operations.

To carry out holes and cuts on portions of material, the suction cup(s) must be positioned on the area of the cut material so that it is supported and does not fall at the end of the cut. Ensure that the suction cups have a perfect grip on the back of the slab.



CIRCULAR HOLES

For circular holes, both those that will house the mixer tap and those made ahead of time in the corners of the quadrangular holes are carried out damp using diamond drill bits. Provide abundant water flow both inside and outside the cutting circumference.

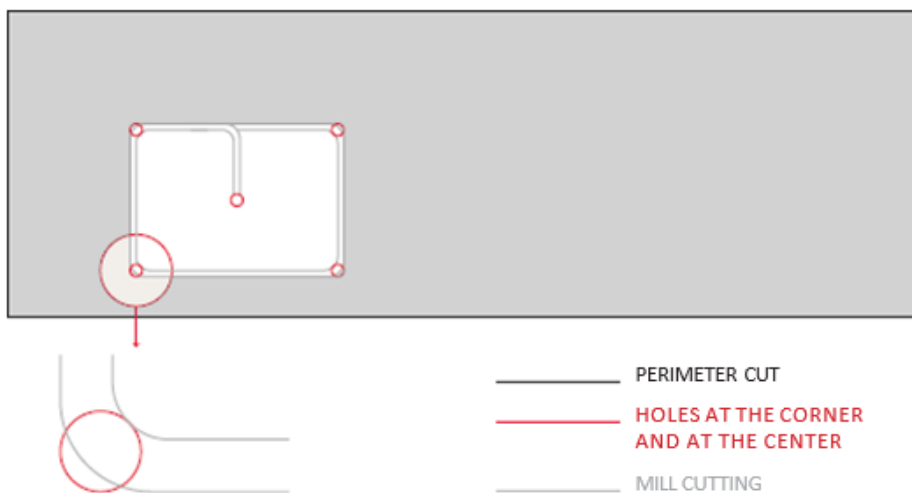
The recommended rotation speeds range from 1800 to 3000 RPM, depending on the diameter of the router bit, with a feed rate in the thickness range of 20-30 mm/min. If the machine allows, for the 2 mm entering and 2 mm exiting, it is good practice for the router to have a lower feed rate of about 5 mm/min*. This lowers the risk of chipping on the lower part of the slab.

QUADRANGULAR HOLES

Using a CNC machine, it is possible to carry out the quadrangular holes by means of the technique of boring in the corners using a diamond router bit (remembering the general radius indications) and then carrying out the cut using a diamond mill cutter.

In this case, a circular hole is drilled ahead of time using a diamond router bit inside the perimeter of the quadrangular hole. If possible, this circular hole must be carried out at the center of the quadrangular hole at the greatest possible distance from the perimeter of the hole.

The diamond mill cutter, smaller in diameter than the circular hole, enters the hole that has just been bored and moves toward the perimeter of the quadrangular hole with a broad circular trajectory, proceeding with the cut. The typical feed rate for this type of operation is 200-300 mm/min, with a rotation speed of 4500-5000 RPM.



It is preferable for the mill cutter to move in such a way as to not touch the corners of the hole, where the circular holes have been made; applying pressure on the corner is avoided.

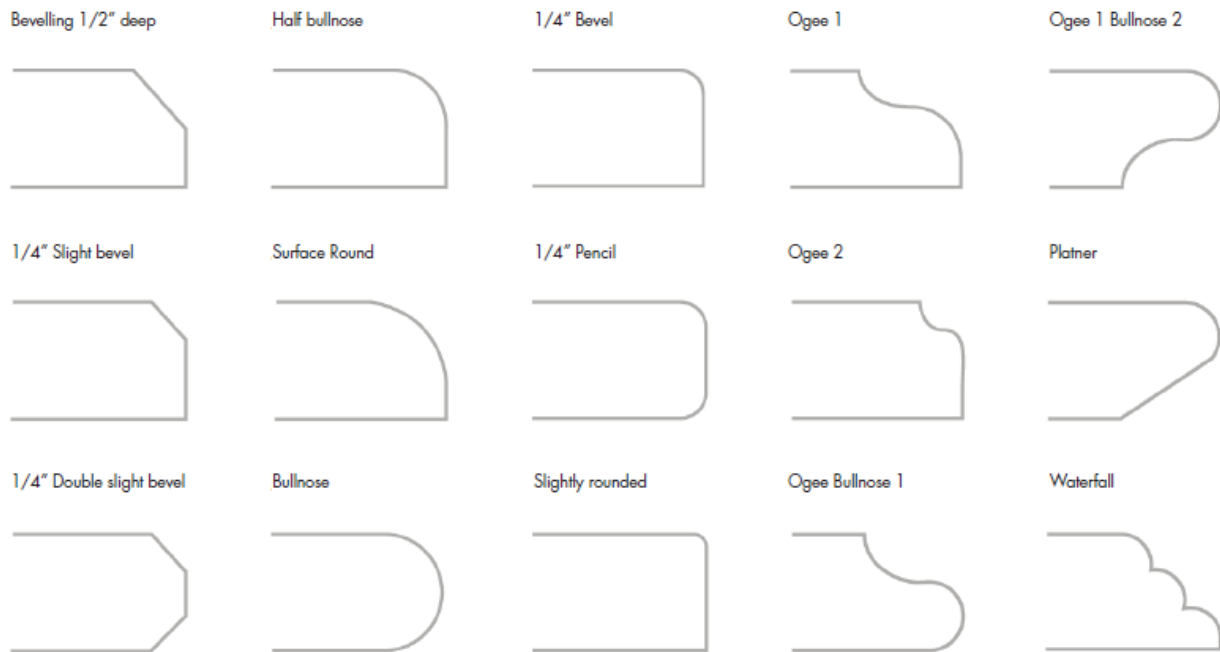
FLUSH HOLE

In the case of carrying out a hole with flush hole recessing, we recommend carrying out the recess before the actual hole. The recess is carried out using a mill cutter capable of removing material from the lower surface as well. Generally, the mill cutter is unable to remove all the material in a single pass. Repeat the passes until reaching the desired recess. We recommend against using recesses greater than half the thickness of the slab.



MACHINING THE EDGE DETAIL

The edges of the FORTE porcelain slabs can be machined on a CNC contouring machine in such a way so as to obtain various profiles. We recommend against leaving the slabs with a sharp edge and instead carry out a 1 mm minimum chamfer or a rounded profile with a 1 mm minimum radius of curvature. The edge of the slab can subsequently be subjected to grinding, including by polishing grinders. Below are a few examples that can be obtained using a CNC contouring machine.



The perimeter profile of the slabs can also be contoured using straight-line contouring machines like the ones used in the glass industry. In this case, without a CNC contouring machine, the edge of the hole must be machined with a manual diamond backing pad. The straight-line contouring machine is also able to carry out the 45° cut of the edge on the perimeter of the surface.

INSTALLATION OF COUNTERTOPS

We suggest handling the cut surface in a vertical position. In the event that the holes are arranged closer to one side, it is advisable to keep that side upward.

ADEQUATE SUPPORT

FORTE slabs can be glued to full support as well as to reinforcements. In both cases, using elastic and deformable adhesives capable of overcoming the different thermal expansions of slab and support is advisable. Spreadable adhesives are also available on the market that guarantee adhesion on any type of support and good deformability. Gluing the slabs onto quartz agglomeration reinforcements is not recommended.

In the case of gluing on reinforcements, ensure the optimal arrangement of the reinforcements in the most delicate points of the surface, such as the internal perimeter of the holes (sink, cooking surface, water mixing tap) and along the entire external perimeter.

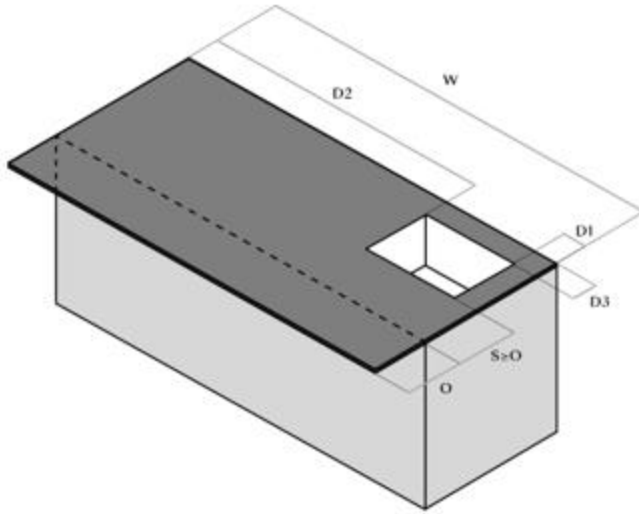


The following is a list of the main types of existing supports.

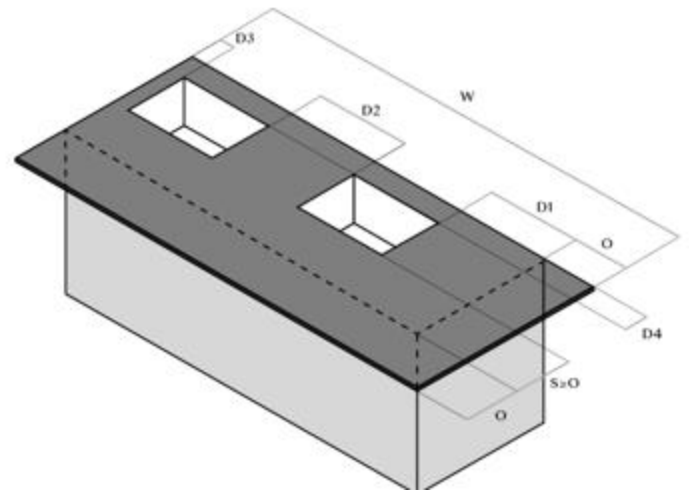
- ✓ Wood.
- ✓ Glass and crystal.
- ✓ High density polystyrene.
- ✓ Extruded polystyrene.
- ✓ Marine plywood panels.
- ✓ Honeycomb aluminum sandwich panels.
- ✓ Stone.

OVERHANG PARAMETERS

The maximum overhang the surface can sustain without having to provide adequate support is 15 cm. The entity of static capacity (sustainable weight) is subordinate to whether or not there are holes in the immediate vicinity. We always recommend a specific assessment for excessive weight near the holes that can cause the surface to break. For overhangs greater than 15 cm, up to a maximum of 30 cm, an adequate support must be provided.

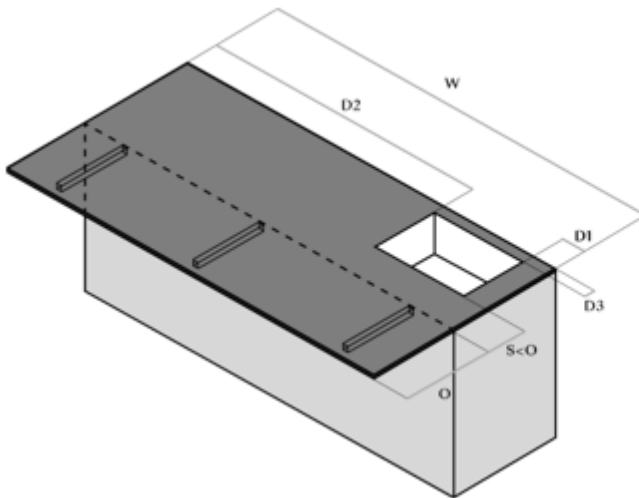


$W \geq 600 \text{ mm}$
 $O = \text{Protruding wall}$
 $S = \text{Area with substrate } D1 \geq 100 \text{ mm}$
 $D2 \geq 100 \text{ mm } D3 \geq 100 \text{ mm } D1+D2 \geq O$



$W \geq 600 \text{ mm}$
 $O = \text{Protruding wall}$
 $S = \text{Area with substrate } D1 \geq 600 \text{ mm}$
 $D2 \geq 600 \text{ mm } D3 \geq 100 \text{ mm } D4 \geq 100 \text{ mm}$

For standard lengths that exceed an overhang of 30 cm, adequate support must be provided from the bases, at least every 60-62 cm.



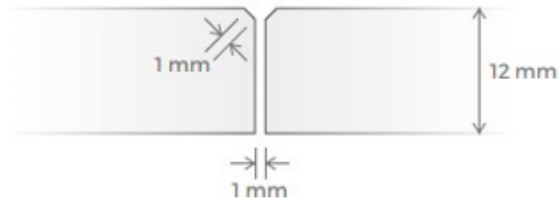
$W \geq 600 \text{ mm}$
 $O = \text{Protruding wall}$
 $S = \text{Area with substrate}$
 $D1 \geq 100 \text{ mm}$
 $D2 \geq 100 \text{ mm}$
 $D3 \geq 50 \text{ mm}$
 $D1+D2 \geq O$

COPLANAR SLABS

If two or more coplanar slabs are to be placed next to one another such as in the case of “L” shaped or “U” shaped kitchens, we recommend making a 1 mm chamfer on the coupled edges in order to avoid possible chipping when placing them next to one another. In any case, leveling the support is indispensable to guarantee the flatness of the upper surface of the two slabs.

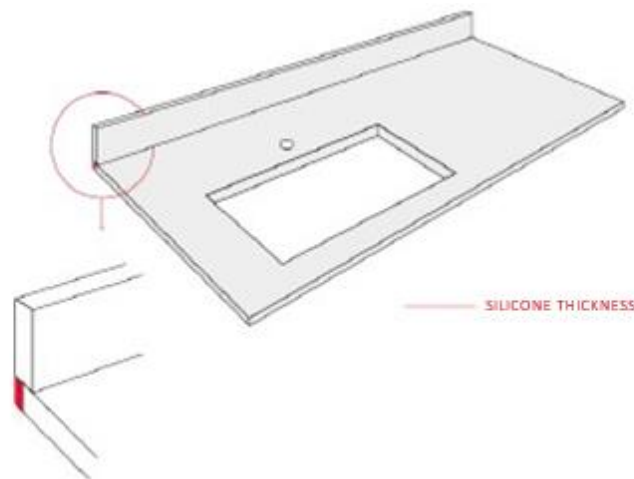
Always provide a minimum joint (1 mm) in silicone or epoxy grout in a color to match the slab, taking care to adequately clean the two surfaces that will come into contact with one another before applying adhesive.

We recommend making a slight bevel on the edge and on the side that goes to the wall because it allows a better elasticity of the material in cases of thermal expansion.



We recommend always leaving a margin of at least 2 mm between the slab of the countertop and the wall in order to avoid any problems with the flatness of the wall and thermal expansion of the countertop. This margin can be covered with a riser.

In the case of a cooking surface or flush mounted sink, we recommend leaving 2 mm between the cooking surface/sink and the recess. We recommend filling the gap with silicone suitable for use or gaskets provided by the cooking surface or sink manufacturer.



SLAB HANDLING

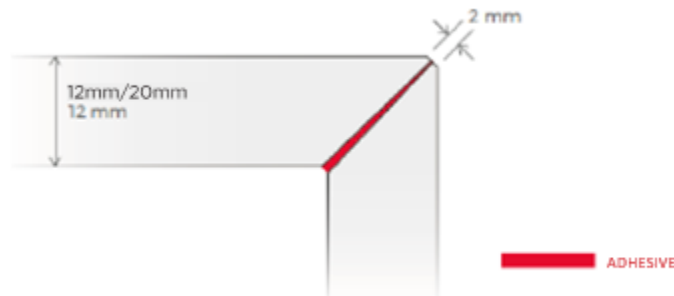
During transport, it is fundamental to avoid shocks to the slabs, especially on the edges of the top. We suggest moving the slab vertically without using the holes as support points in order to avoid cracks or breakages in these more delicate points.

We recommend covering the slab during transport with wooden boxes or special tarpaulins, paying attention to properly protect edges and corners. If the top includes the pre-assembled bathtub, it will have to be provided with a wooden box that has a support able to sustain the weight of the washbasin so that it does not generate a torsion of the top.



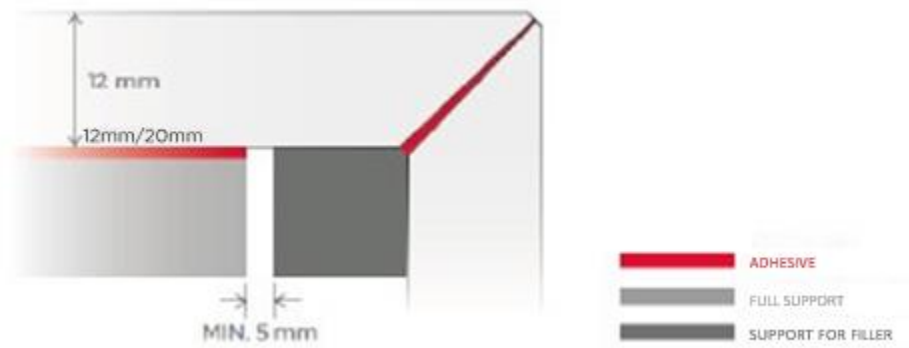
45° JOINT

If the project requires a filler or side, the slabs machined with a 45° cut are glued using a specific adhesive, after which, the joint must be chamfered in order to reduce the sharp profile of the edge. However, it is also possible to carry out a slight chamfer on the two edges before gluing.



Before applying the adhesive, it is advisable to clean the edges and possibly treat them with acetone. The ideal adhesives for 45° gluing are the two-component epoxy types. The catalysis of these adhesives is the chemical type and requires a certain hardening time. The atmospheric temperature, as well as the temperature of the slab, has an impact on the hardening time. It is advisable to carry out gluing at a temperature above 10°C. In any case, we suggest that you read the recommendations of the specific adhesive manufacturer carefully. It is important to remove excess adhesive before it hardens. Please see the cleaning and maintenance manual for cleaning tips.

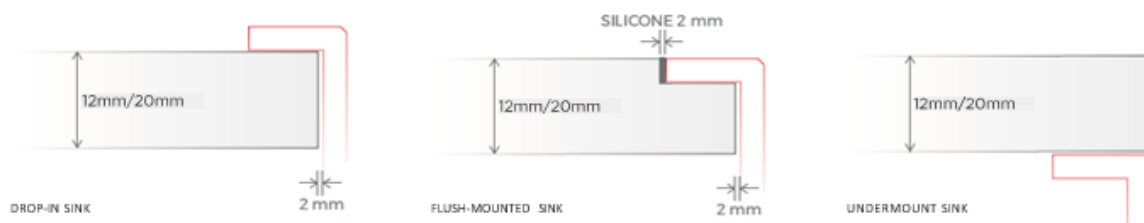
To create invisible joints, we recommend cutting each edge at an angle slightly greater than 45° in order to leave more space for the glue in the rear part of the joint. In the case of a 45° joint between slabs intended for outdoor use, subject to a different thermal expansion between the porcelain slab and the support, we highly recommend using a support for the filler separated from the horizontal support by at least 5 mm. This cavity allows differential expansion between surface and support. Use suitable adhesive for outdoor applications, resistant to thermal shock, water, and yellowing.



SINKS

Francini FORTE slabs can be combined with different types of sinks, such as drop-in sinks, undermount sinks and flush-mounted sinks. We recommend following the sink manufacturer's installation suggestions.

In the case of an undermount sink with a basin larger than the countertop hole, to reduce the risk of chipping, we recommend carrying out a 1 mm minimum chamfer or radius on the lower edge as well. In the case of a flush-mounted sink, follow the cutting suggestions and provide a margin of at least 2 mm between the sink and the recess. In the case of medium and large sinks, we recommend always using support brackets under the sink.



CARE AND MAINTENANCE

CLEANING AFTER INSTALLATION

Francini FORTE porcelain slabs are resistant to stains and easy to maintain. After installation is complete, it is important to immediately remove any residues on the surface of the slab. Insufficient or late removal of grout, silicone, and/or adhesive residues may leave stains that are difficult to remove.

Initial cleaning must take place immediately after installation, using acid-based products, rubbing hard, and rinsing well with water. All detergents on the market may be used, with the sole exception of hydrofluoric acid (compounds and derivatives) as per EN 14411 standard. It is always best to test the cleaning agent first on a sample of the material which has not been installed prior to use.

ROUTINE CLEANING

For routine cleaning, here are a few tips to follow:

- ✓ Avoid waxes, oily soaps and impregnating (water and oil-repellent) products.
- ✓ Clean water may be sufficient for frequent washes.
- ✓ Do not use acidic products or abrasive tools.

TECHNICAL CHARACTERISTICS

TECHNICAL CHARACTERISTICS	STANDARD	DESCRIPTION OF TEST METHOD	TEST RESULTS
Breaking strength in n (thk ≥ 7,5 mm: 1300 N thk. < 7,5 mm: 700 N)	ISO 10545-4	Application of a load to the midline of the panel until breakage is obtained	✓ Average value 6 mm: 1300 N
N/mm ² flexural strength test (≥ 35 N/mm ²)			✓ Average value 12 mm: 12000 N ✓ Average value 20 mm: 20000 N
			✓ Average value 6 mm ≥ 40 N/mm ² ✓ Average value 12 mm ≥ 47 N/mm ² ✓ Average value 20 mm ≥ 50 N/mm ²
Fire reaction	UNI EN 13501-1	Floor radiant panel test UNI EN ISO 9293-1	Class A1 _{fl} +A1
Impact resistance	UNI EN ISO 14617-9	Resistance to dropping a 1 kg steel ball on a sample placed on a bed of sand.	Compliant
Coefficient of return	UNI EN ISO 10545-5	Measurement of 28 g steel ball rebound height.	Compliant
Volatile organic compound emission tests	UNI EN ISO 16000-9	28 days length-test	Compliant
Compression strength	ASTM C170M-16	Breaking load on 12x12x12 mm samples	Compliant
Static load for raised floors	UNI EN ISO 12825	Application of increasing load until sample until breakage is obtained	Compliant
Cadmium and lead release in mg/dm ²	ISO 10545-15	Request for GL surfaces for work tops	None
Resistance to damp heat	UNI EN 12721:2013	55° to 100° cycles	Compliant
Resistance to dry heat	UNI EN 12722:2013	55° to 100° cycles	Compliant

Resistance to cold liquids	UNI EN 12720:2013	Period of contact 10s to 24 h	Compliant
Tendency to retain dirt	UNI 9300:2015	Carbon black staining agent	No visible change
Scratch resistance	UNI EN 15186:2012 met.B	Load > 10N	Compliant (Nat. + Soft Surface)
Fungi resistance	ASTM G 21-15	Contact for 28 days with a variety of fungal strains	Compliant
Light reflectance value lrv	In-house test method	Illuminant D65 Illuminant A Spectrophotometer at 10°	Based on the color: Available on request
Colors' resistance to fading	DIN 51094	Evaluation of the color changes following a 28 day exposure to ultra violet light.	Compliant

TECHNICAL CHARACTERISTICS	STANDARD	STANDARD REQUIREMENTS		TEST RESULTS
		(%)	(mm)	
Admitted deviation, in %, of the average thickness of each tile from the production dimensions	ISO 10545-2	± 5%		± 5%
Flatness (curving in the middle, corner and warping)	ISO 10545-2	±0,5% ±2 mm		±0,5% mm
Surface quality	ISO 10545-2	At least 95% of the tiles must be free from visible flaws.		Compliant
% Water absorption	ISO 10545-3	< 0,5%		< 0,5%
resistance to deep abrasion of unglazed tiles	ISO 10545-6	<175 mm ³		Compliant
Thermal shocks resistant	ISO 10545-9	available testing method		Resistant
Resistance to staining	ISO 10545-14	see manufacturer's certificate		Class 5 (Nat. + Soft) Class 3-4 (Lux)
Resistance to low concentrations of acids and alkalis	ISO 10545-13	see manufacturer's certificate		ULA-ULB (Nat + Soft) UB (Lux)
Resistance to domestic chemical products and additives for swimming pools		MIN B		UA
Frost resistance	ISO 10545-12	required		Resistant