



INSTALLATION MANUAL

CERAMIC TILE INSTALLATION GUIDELINES



RUBI GROUP

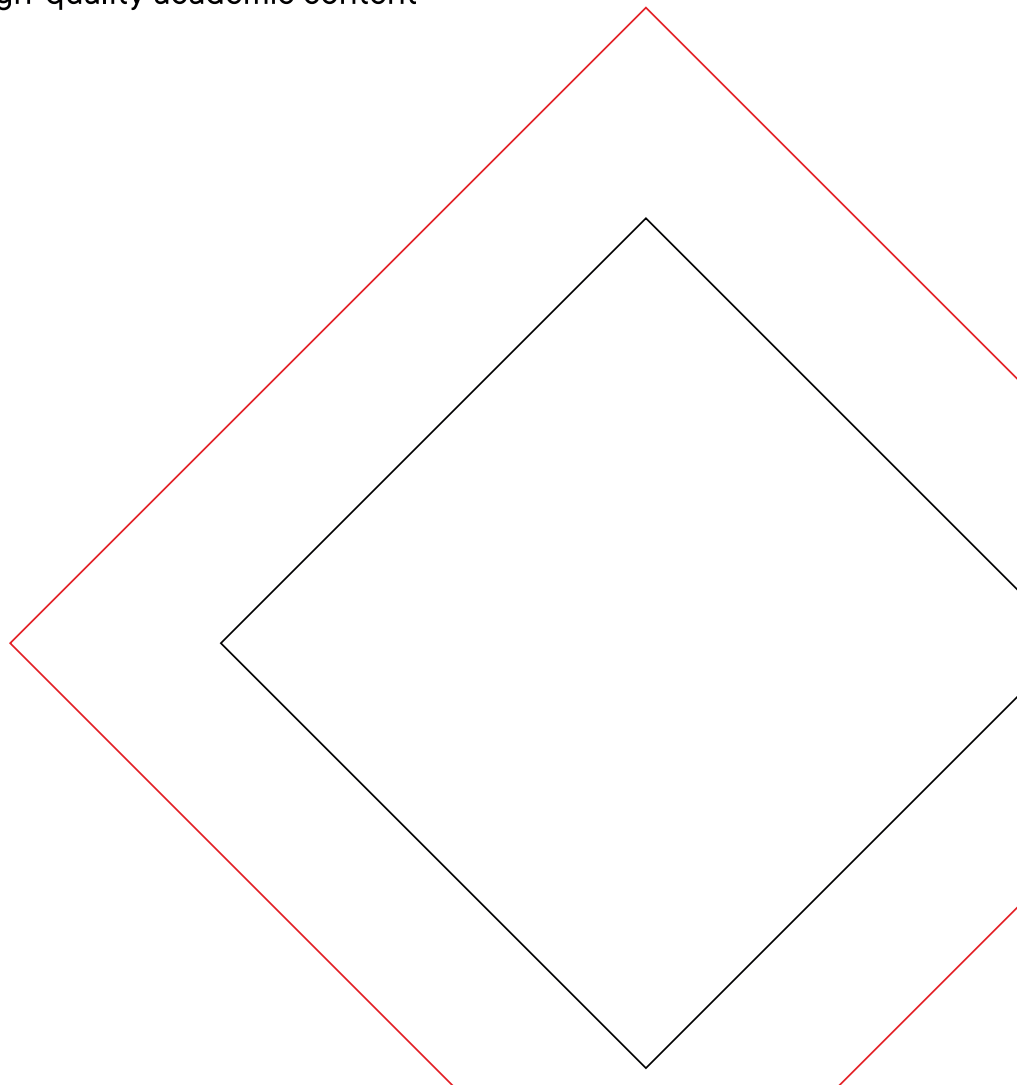


RUBI Academy is an inclusive and accessible space that continuously trains present and future ceramic tile installation professionals, with the aim of professionalising and specialising this sector, so that they can build better places.

The RUBI Academy covers the entire RUBI Group's training pursuits, offering high-quality academic content in different formats:

- ◇ WEBINARS
- ◇ TUTORIALS
- ◇ TRAINING EVENTS

**LET'S BUILD BETTER
PLACES TOGETHER!**



01

SUBSTRATE PREPARATION



4

02

CHARACTERISTICS OF PROFESSIONAL ADHESIVES

- Nomenclature
- Specifications
- Type of adhesive



5

03

USES OF PROFESSIONAL ADHESIVES

- Thick-Bed.
- Thin-Bed.
- Recommended Adhesives
- Outdoor Placement


6
7

04

TYPES OF JOINTS

- Structural
- Perimeter.
- Expansion.
- Placement.



8

05

GROUTING

- Application.



8

06

CLEANING



9

07

MAINTENANCE



10

08

CUTS AND DRILLS

- Basic aspects of cutting tiles with a manual cutter.
- Maintenance of our manual cutter.
- Special Cuts.
- Electric cutting.
- Orthogonal cuts (right angle).
- Diagonal cuts (45°).
- Narrow strips.
- Round holes.
- Fits for frames and similar.
- Mitres.
- Cutting of volumetric parts.
- Diamond Drill Bits.


10
15

01 SUBSTRATE PREPARATION



The substrate must be dimensionally stable, having completed any deformations due to shrinkage, and it must have adequate mechanical strength for the intended use. It shall be suitably plumb or level and shall not show defects in flatness greater than 2mm, as established by a 2m rule.

If major deviations are found, it would be advisable to apply a levelling layer to correct them, as the flooring will only reproduce each and every one of the irregularities manifested by the substrate.

The fixing screeds and rendering that present a weak crystalline structure in their first millimetres of thickness, and that wear easily, must be consolidated by means of the application of the depth consolidant.

For installation on compact but highly absorbent screeds and rendering, in hot climates and in the presence of direct ventilation, it is advisable to apply a professional surface insulator beforehand.

When working on thermal or acoustic insulation, we need to know what behaviour is expected of these materials with respect to the ceramic tile installation system since, in general, tile installation substrates with intermediate layers exhibit unstable behaviour, and it is advisable to prepare a compression

layer that allows the distribution of loads.

To achieve good adhesion to the fixing surface it is necessary to determine its genuine and firm surface, for which it will be necessary to carry out thorough cleaning.

The existence of residues in the form of dust, grease, paints, efflorescence, grout, plaster residues, etc. weakens adhesion.

The roughness of the surfaces to be fixed contributes to enhancing the adhesion by mechanical anchoring. For this reason, it is advisable to mechanically alter excessively smooth substrates such as vibrated concrete, precast concrete, or the levelling layer itself. Depending on the surface, however, this is not entirely necessary.

When high stresses are anticipated in the slab layer, due to high stresses caused by temperature changes or movements in the structure, it is advisable to interpose a sliding or decoupling layer (plastic sheet or similar) between the regularisation layer and the base substrate.

In areas with frequent rainfall, it is recommended to place an impermeable layer with asphalt cloth or similar between the sliding layer and the base substrate, or there must at least be an adequate drainage layer under the flooring.

The installation of ceramic material should always be carried out in mild and benign atmospheric conditions. Application temperatures between +5 and +30 °C. Do not apply with risk of frost, rain or sunshine, or in periods of high heat.

In hot conditions, the substrate should be moistened. The wind decreases the open time of the bonding material.

02 CHARACTERISTICS OF PROFESSIONAL ADHESIVES

Nomenclature

SYMBOLS		DESCRIPTION
TYPE	CLASS	
C	1	Normal cementitious adhesive
C	1F	Fast cementitious adhesive
C	1T	Normal cementitious adhesive with reduced slip
C	1FT	Fast cementitious adhesive with reduced slip
C	2	Improved cementitious adhesive with additional features
C	2E	Cementitious adhesive with extended open time
C	2F	Improved fast cementitious adhesive with additional features
C	2T	Improved cementitious adhesive with additional features and reduced slip
C	2TE	Improved cementitious adhesive with additional features, reduced slip and extended open time
C	2FT	Fast cementitious adhesive with additional features and reduced slip

Specifications

CHARACTERISTICS	NORMAL C1 ADHESIVE	IMPROVED C2 ADHESIVE
Initial Adhesion	≥ 0.5N/mm ²	≥ 1N/mm ²
Water Adhesion	≥ 0.5N/mm ²	≥ 1N/mm ²
Heat Adhesion	≥ 0.5N/mm ²	≥ 1N/mm ²
Ice/Defrost Adhesion	≥ 0.5N/mm ²	≥ 1N/mm ²
Open Time	≥ 0.5N/mm ² at 20 min.	≥ 0.5N/mm ² at 20 min.

Type of adhesive

Cementitious (C) Dispersion (D) Reactive Resins (R).

As a general rule, the use of Type C2/C1 Cementitious Adhesives according to the specifications of European Standard EN 12004 is recommended.

03 USES OF PROFESSIONAL ADHESIVES

Traditionally, fresh mortar is used for the installation of ceramic products.

Thick-Bed

This is the traditional system, by which the ceramic is placed directly on the load-bearing structure, although a type-1 sand base or other decoupling system must be provided for the floors.

For thick-bed tile installation, industrial mortars, semi-finished mortars and mortars made on site are used.

The advantages of this system are that it is more economical and enables major flatness defects to be compensated. This application is direct onto the substrate and there is extensive experience among tilers. In general, previous preparation of the substrate is not required.

The thick-bed tile installation technique does not guarantee good adhesion and is completely advised against in outdoor environments with a risk of frost and in products whose dimensions exceed 31.6 x 31.6, as well for tiles with low or very low water absorption (porcelain).

RUBI recommends the use of professional adhesives, guaranteeing higher safety levels in the installation of the ceramic material.



Thin-Bed

This is a more recently developed and used system than thick-bed, adapted to current ceramic materials and to the diversity of substrates. Tile installation is generally carried out on a substrate regularisation pre-coat, whether plastered onto the walls or mortar bases on the floors.

The advantage of this system is that it is suitable for any type of tile and compatible with any substrate. There are suitable adhesives for every installation and it is easy to use. It avoids on-site dosages and the alignment time is high. Allows greater deformability and better adhesion.



The following factors should be taken into account to achieve good bonding and longevity:

- Strictly follow the manufacturer's recommendations when preparing adhesives.
- Prepare the mixture by means of mechanical whipping elements, so as to obtain a homogeneous, lump-free product.

The product shall be applied with a suitable notched trowel, depending on the format and the characteristics of the tile backing. It is standard practice to apply a thin first layer of adhesive using the smooth part of the trowel, pressing vigorously on the substrate, in order to obtain maximum adhesion to it and regulate water absorption, then adjust the thickness with a suitable inclination of the toothed part of the trowel.

The adhesive must be spread over a surface that allows the covering to be applied for the specified open time, frequently checking the suitability of the adhesive as it can vary considerably during the application depending on various factors, such as exposure to the sun or air currents, the absorption of the substrate, the temperature and the relative humidity of the air.



Once placed, vigorous tile-by-tile beating should be applied to ensure proper and complete laying is obtained with the adhesive. Placed tiles should be lifted from time to time to ensure the perfect solidity of the adhesive.

The required trafficking times should also be respected in each case before walking on the floor.

Possible adhesive remnants should be cleaned from all the joints in order to achieve correct grouting later on.

Recommended Adhesives

MATERIAL	OUTDOOR	INDOOR
Porcelain	C2, R	C1, R
Clay	C2, R	C1, R
Glass	C2, R	C1, R
Extruded	C2, R	C1, R

Outdoor Placement

On outdoor floors or those where the presence of water is foreseen, the substrate must have a slope equal to or greater than 1% to enable the water that accumulates on the flooring to be drained.

It is essential to install using ceramic adhesive to achieve an adhesion without gaps, and for this we can resort to the back buttering technique. This technique involves applying the adhesive both on the substrate, by pressing and combing with the trowel, and on the back of the tile, where a light layer of adhesive is applied with the smooth part of the trowel.

The back buttering technique is also essential when laying tiles in environments which are subject to intense traffic in order to obtain a minimum coverage of 95% of the tile backing.



04 TYPES OF JOINTS

Structural

Fixed by the architect or technical engineer.

Perimeter

Insulation function between floor/wall or with other constructive elements, to avoid the accumulation of tension. On surfaces larger than 7m², a joint width of 5 to 10mm is always recommended, concealed by the skirting board or adjacent surface.

Expansion



The function of this is to allow the differential deformations caused by thermal and hygroscopic variations between the tiles, the adhesive layer and the substrate, its design usually being carried out on site. This joint is mandatory every 25m.

Placement

Aesthetic function and compensation for small dimensional variations. These contribute to absorbing the deformations produced by the substrate, moderating the stresses generated when subjected to load and helping to set the ceramic adhesive.

05 GROUTING



It should be borne in mind that the base substrate is usually a continuous surface subjected to contractions and expansions caused by thermal changes, structural movements, effects of water or humidity, chemical reactions, or the shrinkage of the cement itself. For this reason, perfect execution of the joints guarantees that these natural movements of the base substrate are not transferred to the tiled surface.

Application of the mortar will be carried out using a hard rubber, sharp-edged trowel, passing repeatedly, diagonally, over the joints. The same trowel will be used to collect the joint excesses.

There is a wide range of grouts available on the market which can be adapted to various types of tiles and environments.

In the case of porcelain stoneware, products coloured with "carbon black" (micronised carbon) should not be chosen, as their use could prevent the cleaning of the coated surface, especially in the case of light-coloured and polished product models.

Seamless tile installation is not recommended from any technical point of view due to the risks involved in producing pathological states in the coverings. It is recommended that the joints should never be less than 1.5mm.

Application

Different types of grouts can be defined according to the chemical nature of their binders and the specific characteristics of the cementitious grout.

Acronyms defining the type of material for ceramic grouting:

- Cementitious grout (CG)
- Reactive resin grouting material (RG)

Type of grout according to suitable characteristics (CG only)

- Normal grout (1)
- Improved grout (2)



In any event, it is necessary to check its effect on the material beforehand since, in most cases, the appearance of damage to the covering is usually due to the use of strong descalers that are unsuitable for the type of surface.

When non-enamelled porous products are installed (e.g. clay), it is advisable to apply a non-stick product to the cement prior to grouting operations in order to avoid its retention and hardening on the surface of the covering.

The following precautions should always be observed:

- Acid cleaning should never be carried out on newly installed coverings, because the acid reacts with the uncured cement and may deteriorate the joints or deposit insoluble compounds on the surface of the covering.
- It is advisable to wet the surface with water before applying the descaling detergent, in order to prevent the possible absorption of the agents used by the grout and ceramic support, and then a thorough rinse with clean water is essential to eliminate any product residue.
- Metal spatulas and abrasive scouring pads should not be used.
- This type of operation must be carried out by experienced personnel, taking into account the characteristics of the covering and the manufacturer's recommendations.

06 CLEANING

Once the tile installation and grouting operations have been completed, the surface of the ceramic material usually shows traces of cement in the form of a film or small amount of build-up.

For the perfect removal of these residues and, in general, of dirt from the construction site, the use of specific, slightly acidic descaling detergents is recommended.

It is advisable to avoid the use of acid descalers that are excessively energetic and aggressive for the material.

07 MAINTENANCE

In the case of porous coverings (e.g. clay), a waterproofing protection is recommended in order to improve the behaviour of the covering against stains and to avoid the unsightly appearance of efflorescence and humidity.

These treatments, which may be applied before or after installation, depend on the conditions of use of the material and are sometimes also used to modify the aesthetic properties of the product, since they enable the finish (tone and colour) and the desired surface texture (matt or gloss) to be chosen.



In general, treatment is carried out with the application of a deep, anti-stain waterproofing agent that does not alter the tone of the material, or even enhances its tone and colour.

In each case, it is advisable to consult the manufacturer as to which products and waterproofing treatments will be most suitable, depending on whether they are indoor or outdoor coverings.

Maintenance operations, in usual cases, consist of periodic cleaning by washing with a solution of water and neutral detergent (ordinary maintenance); in the event that the floor requires deeper cleaning (e.g. a large build up of grease and dirt, removal of stains, etc.) it is necessary to use a degreasing detergent or spot remover using pure or diluted in water, rinsing well at the end (extraordinary maintenance).

08 CUTS AND DRILLS

Basic aspects of cutting tiles with a manual cutter.

Scoring wheels are the tools that facilitate the correct scoring of the ceramic tile, one of the two most important points of the cutting process.

RUBI scoring wheels are made of high-strength, durable Tungsten Carbide, which enables the scoring of ceramics.

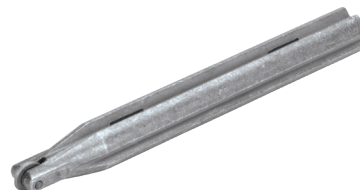
The number of metres that can be scored depends on the quality of the wheel, together with the correct use of the operator (there are different diameters for different types of tiles).

In terms of wheel choice, it is very important not only to know the type of tile that needs to be cut, but also the type of enamel, if present, of the ceramic.

In most cases, it will be the type of enamel that defines which diameter of scoring wheel we should choose, since it always acts on the surface of the ceramic and, once scored, separation will be carried out using the breaker assembly. RUBI® presents five different diameters of scoring wheel in its range:

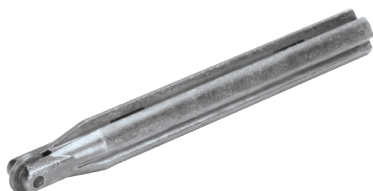
6 mm scoring wheel

Particularly recommended for smooth glazed ceramic tiles, essentially covering ceramics. This wheel, the smallest in the range, is the one that enables us to make a thinner score although the roller wears out faster.



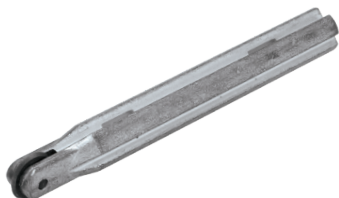
8 mm scoring wheel

This scoring wheel is the one to be used for cutting porcelain stoneware. As in the case of the 6mm wheel, its small diameter allows scoring will be very fine. The 8mm wheel can also be used for cutting ceramic coverings, especially if they are longer than 40cm.



10 mm scoring wheel

This scoring wheel is specific for ceramics with semi-smooth or slightly rough enamels, i.e. for flooring ceramics. This wheel has a medium diameter and although the scoring quality is inferior to those of 6 and 8mm wheels, this scoring quality is still superior to that required by the operator.



18 mm scoring wheel

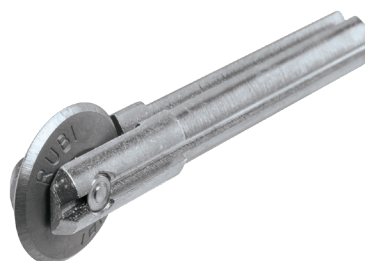
This scoring wheel is one of the largest, and is especially intended for scoring rough enamels. Due to its strength and hardness, it will allow more pressure on the enamel, as well as several strokes.



22 mm scoring wheel

This scoring wheel is a very special case because, with the development of ceramic materials, we are coming across tiles that are increasingly difficult to cut. The 22mm wheel is the sharpest of all, and is intended for scoring ceramics that are difficult to cut and have smooth surfaces.

Due to its sharp roller, this scoring wheel penetrates deeply into the ceramic and facilitates cutting, but it is also the most delicate and blows can damage this edge and shorten the life of the tool.



22 mm extreme roller (exclusive for X-ONE, SLIM CUTTER)

This roller has been specially developed for porcelain stoneware tiles with rough and/or lightly structured finishes. The fact that it has a larger incision angle and is mounted on bearings facilitates a smoother and more precise incision.

The scoring of the ceramic tile is a delicate phase. The force used with this tool must be light, since we should not try to separate the ceramic tile during this imply score it to mark the path of separation. What is very important is that the scoring is complete and uniform along the entire length of the tile, and try to make it in one single stroke, so as not to produce different parallel stripes.

In order to guarantee the correct separation of the ceramic tile, it is very important that the scoring wheel roller is in perfect condition since, if not, the scoring will be defective and the separation will run the risk of being incorrect.



08 CUTS AND DRILLS

Maintenance of our manual cutter

After all this work has been carried out, the ceramic cutter will be covered with dust and dirt. This is the perfect time to spend ten minutes cleaning and maintaining it.

Cutter maintenance is a very important point when choosing which cutter to buy. Its parts must be of the highest quality so that there is no premature deterioration of the tiles, since the ceramic dust that is produced during tile cutting is very abrasive. In addition, the higher the quality of the components, the less attention we need to give to the machine.

Normally, with professional quality machines, it will simply be necessary to remove ceramic remains from the guides at the end of each workday. It is also advisable to lightly grease the guides with maintenance oil during long periods of time of machine inactivity.

The parts that suffer the most wear, albeit in the very long-term, are those that make up the breaker assembly, as well as the logical depletion of the scoring wheels after hundreds and hundreds of metres of scored ceramic. For this reason, when buying a machine we must be sure that we can find spare parts for subsequent servicing.

Special Cuts

During installation, it is normal to find objects for which we need to make special cuts, such as square light boxes, holes for water and drainage, square cuts for corners, etc.

Special cuts in ceramic tiles could be grouped into:

- Round holes
- Square holes
- Square cuts
- U-shaped cuts.
- Mitres

For all these works to be carried out, especially with stoneware and porcelain, other types of tools are required such as electric cutters and mitre saws with diamond-rim blades or diamond drill bits.

Electric cutting

Manual tile cutters can make straight and angular cuts with high precision.

However, all these cuts are even easier to make with the use of an electric mitre saw, which allows us to make all kinds of cuts in any ceramic material.

Among the electric mitre saws we can differentiate the portable cutters, which are lightweight and compact, from the larger, more robust mitre saws, which are usually equipped with chassis and feet.

Within this last group, we can differentiate mobile head cutters, in which the motor and the blade perform the cutting movement, and mobile table cutters, in which the cutting head is fixed and it is the table and the piece that move to make the cut.

Together with the features of each cutter, such as height and length of cut, precision in mitre cuts and safety elements (thermal and over-intensity protectors), the type and quality of diamond blade used is one of the most important aspects for optimal results from the cutters.



The need for good blade cooling should also be emphasised.

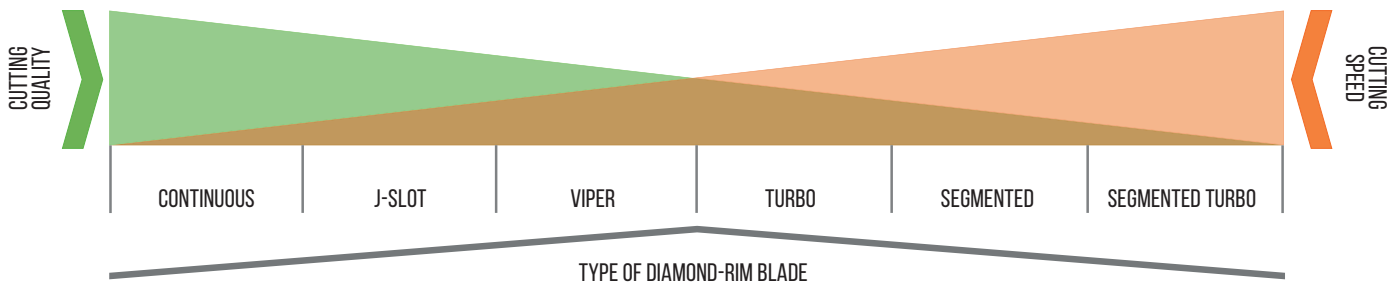
The selection of the diamond blade to be used with the cutter will fundamentally depend on the material to be cut.

Due to the great diversity of ceramic and construction materials, there is a wide variety of blades for different materials and with a variety of characteristics, depending on the precision, the durability of the blade or the speed of the blade.

The type and quality of the diamond blade, together with the precision of the cutter, will determine the quality of the cut.

Depending on the rim, different qualities and cutting speeds can be achieved.

These two characteristics are opposed, so the better the cutting quality, the slower the speed is.



The classification of rim types according to the cut quality obtained would be: continuous, J-slot, viper, turbo, segmented and segmented turbo. On the other hand, the classification according to cutting speed would be: segmented turbo, segmented, turbo, viper, J-slot and continuous.

In addition, within each rim range there are different types of blade, normally differentiated by colours, with blades for hard materials (flooring), blades for abrasive materials (coverings) and mixed blades, for all types of material, but with lower performance.

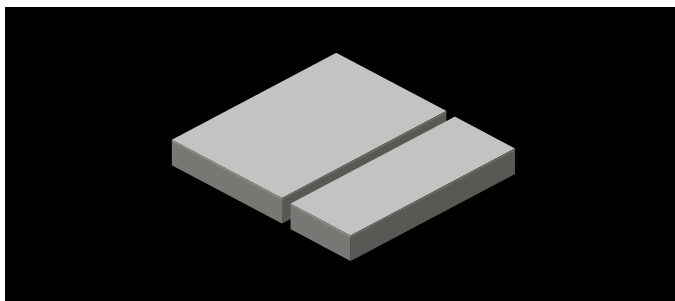
Diamond blades are precision and fragile tools. Diamonds require special care and attention, such as refrigeration.

On most continuous rim blades and on some turbo and segmented blades, a continuous cooling source (water) is required.

08 CUTS AND DRILLS

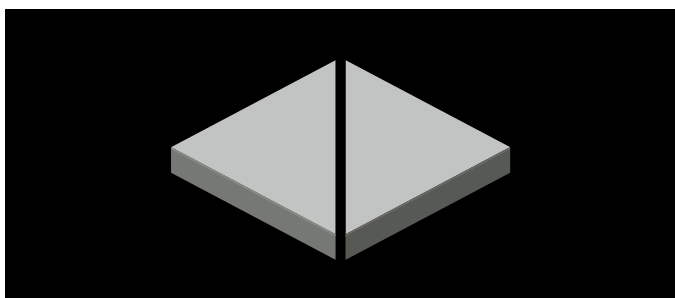
Among the innumerable types of cuts that an electric mitre saw allows us to make, we will highlight:

Orthogonal cuts (right angle)



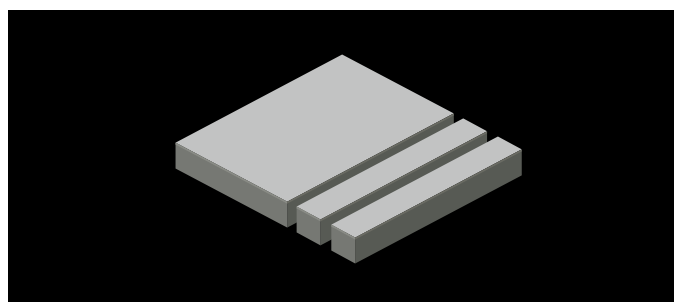
In order to make this type of cut, it will be necessary to set the stop to the precise size for the cut and make the cut according to the type of electric cutter available.

Diagonal cuts (45°)



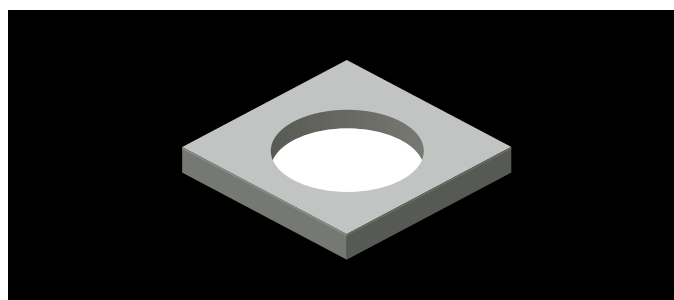
The procedure to be performed is the same as with orthogonal cuts, the only difference being that we will need a tool, available in most electric cutters, which, adapted to the side stop, allows us to position the tile at 45°.

Narrow strips



We will proceed as in the case of a normal straight cut, as the electric cutter allows us to make strips as narrow as desired.

Round holes

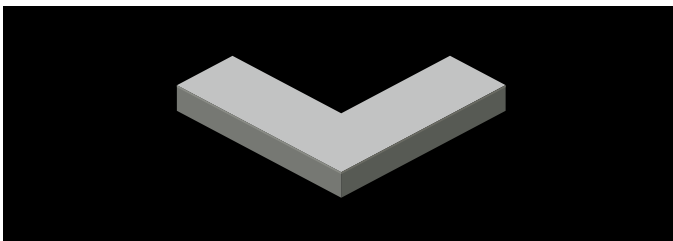


Holes with diameters of less than 120mm are easily drilled using diamond drill bits.

However, if we have to make holes with larger diameters (for kitchen or bathroom extractors, or at the feet of columns) we can use electric cutters following a simple procedure.

First, mark the hole with a scoring wheel on the enamel side of the ceramic tile and then make straight cuts that match the diameter of the hole, identical to those made to make square holes. As such, we will place the ceramic tile in the upper part of the blade to cut the biscuit until the blade emerges through the enamel. We will repeat these cuts several times in the shape of a star and up to the perimeter of the circumference (pie shape). Normally 6 or 8 cuts is enough to make a round hole.

Fits for frames and similar

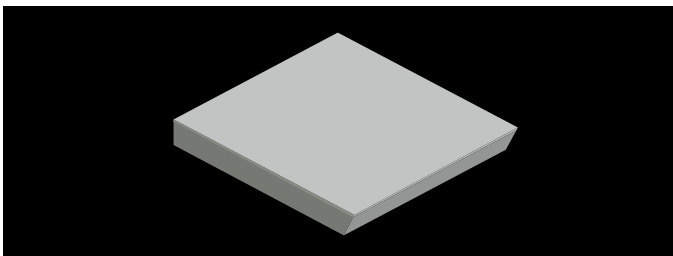


This type of cut is a combination of straight cuts and square holes.

After marking the shape of the cut we will make the three cuts with exit to the edge of the ceramic tile, as if it were a normal straight cut.

The two interior cuts will be made on the biscuit side, always using continuous rim blades.

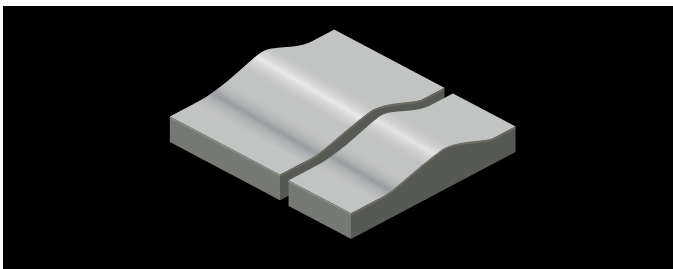
Mitres



The mitre is the right finish for columns, bath corners or ceramic tile-covered cabinets.

To make this type of cut, it will be necessary to place the table (or head) of the electric cutter in a mitre position with an inclination of 45°, fixing the side stop of the cutter at the precise distance to avoid undesired movements of the tile.

Cutting of volumetric part



In order to guarantee the cut in tiles that by design are not regular, such as mouldings, adornments, etc., it is necessary to make the cut with an electric machine. The cut, which will always be higher in height than the cut we normally make with normal ceramics, must be made with machines that have a cutting height equal to or higher than that of the tile at its highest point. In addition, whenever the tile so requires, it will be necessary to wedge the tile in the area of least height in order to ensure that the cut is perpendicular to the position of placement of the tile.

Diamond Drill Bits



Diamond drill bits are capable of drilling holes in all types of ceramic tiles, from tiles to porcelain stoneware and even stone materials. Making holes directly on the enamel face. Holes should be made with the help of an electric drill or grinder (depending on the type and connection of the drill bit), to which the drill bit will be attached.

A drill guidance system will also be required, as diamond drills do not have a centring drill bit.

Place the drill bit together with the guide in the place where the hole is required and, using water as a coolant, drill the hole directly on the face. Care should be taken not to force the drill bit, since diamond is a very delicate material and it could be destroyed if excessive force is exerted for a prolonged period of time.

All of the diamond drill bit diameters correspond to the different measurements of copper pipes, water intakes, electricity, gas, siphon vessels and other very common installations.

**LET'S BUILD BETTER
PLACES TOGETHER!**

RUBI GROUP

RUBI UK LTD.

Units 16 & 17, Easter Park,
Ferry Lane
Rainham, Essex
RM13 9BP - UNITED KINGDOM
P. 44 (O) 1708559609
F. 44 (O) 1708553813
rubiuk@rubi.com

