

APE & Carmen

Technical Manual

APE & CARMEN – Technical Manual.

Índice

1. Presentation of the Group and purpose of the manual

2. APE and CARMEN

2.1 Presentation.

- 2.1.1 Product description by brands
- 2.1.2 Variety of formats and finishes
- 2.1.3 Uses
- 2.1.4 Generic Properties
 - 2.1.4.1 Porcelain Tiles
 - 2.1.4.2 White body stoneware
 - 2.1.4.3 Red body stoneware
 - 2.1.4.4 White-body ceramic coating
 - 2.1.4.5 Red body ceramic coating
 - 2.1.4.6 Extruded stoneware

2.2 Installation

- 2.2.1 Cutting and drilling. Cutting types and tools
 - 2.2.1.1 Porcelain tiles
 - 2.2.1.2 White body stoneware
 - 2.2.1.3 Red body stoneware
 - 2.2.1.4 White-body ceramic coating
 - 2.2.1.5 Red body ceramic coating
 - 2.2.1.6 Extruded stoneware
- 2.2.2 Placement
 - 2.2.2.1 Porcelain Tiles
 - 2.2.2.2 White body and red body ceramic tiling
 - 2.2.2.3 White-paste stoneware and red-paste stoneware
 - 2.2.2.4 Extruded stoneware (also stairs)
- 2.2.3 Recommended adhesives

3. Warranty

1. Presentation of the group and purpose of the manual

Ape Grupo is a leader in creating differentiated spaces by offering a wide range of designer ceramics, advanced technical products and services that help our clients reach their maximum potential.

Thanks to the effort and work carried out in each of our brands, the result of an expansive strategy and the great diversity of products, we are present in 120 countries, where our nearly 200 collections are distributed.

We group our product offering under four brands, Ape best for you; Carmen True Tiles; XLINING and Ilbago that offer global solutions for the habitat, this manual includes all the information necessary for the installation and maintenance of each of our solutions, framed in each of their brands.

The purpose of this manual is to provide detailed and technical instructions for the correct handling, installation and maintenance of all the company's products, thus ensuring an efficient and long-lasting application of the material.

2. Presentation APE & Carmen

2.1.1 Product description by brands

APE is our flagship brand, with the longest experience in the market. It includes a wide portfolio of products, from ceramic classics to the latest trends in the sector in a wide variety of formats, collections and finishes, as well as specific technical solutions such as special pieces and swimming pools.

Carmen is a careful selection of products thought down to the last detail. It is a brand that arises from the experience and tradition associated with our Mediterranean roots. In it we have recovered ceramic classics from our history. A stylish brand, which offers a series of delicate and technically evolved products.

With the products of both brands we offer endless solutions that can adapt to any type of project.

2.1.2 Variety of formats and finishes

APE has a wide range of formats, from the traditional 30x60 to the large formats that are now trending such as 120x120, 90x90 and 60x120 among others. Most of these products are coordinated with ceramic plates from our Xlining brand and those that are larger than 60x120 also allow the manufacture of some of our sinks that are part of our Ilbago brand.

Carmen focuses on smaller formats and unique shapes. Her purpose is to provide decorative value and this is where the delicacy of the formats she presents lies.

2.1.3 Uses

The pieces of both brands are used generically for coverings and floors. It must be taken into account that APE also has special parts for swimming pools.

2.1.4 Generic Properties

2.1.4.1 Porcelain tiles

Porcelain tiles are one of the most valued cladding materials in construction and decoration due to their exceptional technical and aesthetic properties. The following is a detailed and extensive guide outlining the characteristics and properties of porcelain tiles.

Durability

- High wear resistance: Porcelain tiles are designed to resist wear and tear caused by constant traffic of people and objects. This makes them ideal for use in high traffic areas such as shopping malls, airports and train stations.
- Long service life: Thanks to their robust composition and advanced manufacturing process, porcelain tiles can maintain their appearance and functionality for decades, making them a long-term investment.

Impact Resistance

- High mechanical strength: Porcelain tiles have a very dense structure that gives them high impact resistance. This means they are less likely to break or chip when heavy objects are dropped on them, which is crucial in domestic and commercial environments.
- Ability to withstand heavy loads: They can withstand significant static and dynamic loads without damage, making them suitable for use in industrial and commercial areas.

Low Water Absorption

- Impermeability: Porcelain tiles have extremely low water absorption, generally less than 0.5%. This makes them ideal for use in humid environments such as bathrooms, kitchens, swimming pools and exteriors, where exposure to water is constant.
- Mold and bacteria prevention: Low porosity prevents the proliferation of mold, fungi and bacteria, contributing to a more hygienic and healthy environment.

Chemical Resistance

- Chemical resistance: Porcelain tiles are highly resistant to the action of most household chemicals and acidic and alkaline substances. This makes them easy to clean and ensures that their appearance is not affected by the use of cleaning products.

- Application in industrial environments: Their chemical resistance makes them suitable for use in laboratories, factories and other industrial environments where aggressive chemicals are used.

Aesthetic Versatility

- Variety of finishes: They are available in a wide range of colors, textures and finishes, including matte, glossy, textured, semi-gloss, among others. This allows great flexibility in the design and decoration of spaces.
- Imitation of other materials: Advanced manufacturing techniques allow porcelain tiles to imitate with great precision other materials such as wood, natural stone, marble, cement and metal, offering a desired aesthetic appearance without the drawbacks associated with those materials.

Heat and Cold Resistance

- Thermal stability: Porcelain tiles will not warp or be damaged by sudden changes in temperature. This makes them ideal for use outdoors and in extreme climates where temperatures can vary significantly.
- Use in underfloor heating systems: They are compatible with underfloor heating systems, as they distribute heat evenly and are not affected by high temperatures.

Ease of Maintenance

- Low maintenance: Porcelain tiles are easy to clean and maintain. They do not require special treatments beyond regular cleaning with non-abrasive products.
- Stain resistance: Its non-porous surface prevents the penetration of stains, facilitating cleaning and maintaining its original appearance for a longer period of time.

Security

- Non-slip properties: Versions with slip-resistant finishes are available, which is crucial for wet areas or where increased walking safety is required, such as bathrooms, kitchens, swimming pools and outdoor areas.
- Fire resistance: Porcelain tiles are non-combustible and do not emit toxic gases in case of fire, which contributes to building safety.

Ecology and Sustainability

- Low VOC emissions: They do not emit volatile organic compounds (VOCs), which improves indoor air quality and contributes to a healthier environment.

Dimensions and Formats

- Diversity in sizes and shapes: Porcelain tiles are available in a wide range of sizes and formats, from small mosaic tiles to large slabs that minimize joints. This allows for greater design creativity and the ability to tailor the tile to the specific needs of each project.

- Variable thickness: They can also be found in different thicknesses, which facilitates their adaptation to different applications, whether in floors, walls, countertops or other uses.

Applications

- Residential use: In homes, porcelain tiles are used on floors, walls, countertops, bathrooms, kitchens and exteriors. Their resistance and easy maintenance make them ideal for any space in the home.
- Commercial use: In commercial environments, they are used in stores, restaurants, offices and public buildings due to their durability and resistance to heavy traffic.
- Industrial use: In factories, laboratories and hospitals, their chemical and mechanical resistance makes them suitable for demanding conditions.
- Infrastructure projects: In transportation stations, airports and convention centers, durability and ease of maintenance are essential.

Conclusion

Porcelain tiles offer a unique combination of strength, durability, aesthetic versatility and ease of maintenance, making them a superior choice for a wide range of indoor and outdoor applications. Their ability to mimic other materials and their wide range of finishes and formats make it possible to create attractive and functional designs in any environment. In addition, their water, impact and chemical resistant properties ensure that they will maintain their appearance and functionality for many years, making porcelain tiles a smart and sustainable investment.

2.1.4.2 White body stoneware

White body stoneware tiles are a popular choice in ceramic tile, recognized for their refined aesthetics and technical properties. Below is a detailed guide outlining the properties and characteristics of white body stoneware tiles.

Composition and Manufacture

- Raw material: White body stoneware tiles are composed mainly of white clays, which are combined with other minerals to form a homogeneous paste.
- Manufacturing process: The mixture is pressed and fired at high temperatures (around 1200 °C) to achieve a compact and resistant structure. This process also contributes to its characteristic white color and fine finish.

Aesthetics and Appearance

- Design versatility: They are available in a wide range of colors, patterns and textures, allowing great flexibility in interior design. They can mimic other materials such as natural stone, marble and wood.

- Surface finishes: Finishes can be matte, glossy, textured or semi-gloss, adapting to different decorative styles.

Durability and Resistance

- Wear resistance: White body stoneware tiles are highly resistant to surface wear, making them suitable for medium to medium/high traffic areas.
- Impact resistance: Although they are not as impact resistant as porcelain stoneware, they present a good mechanical resistance that makes them suitable for use on floors and walls.

Low Water Absorption

- Moderate water absorption: White body stoneware tiles have relatively low water absorption (generally between 3% and 6%), which makes them suitable for use in interiors, including bathrooms and kitchens.
- Relative impermeability: Although not as completely impermeable as porcelain tiles, they offer good resistance to moisture, reducing the risk of mold and mildew. It is recommended in humid environments as long as the tile is not exposed and is sealed with grout.

Ease of Maintenance

- Easy cleaning: White body stoneware tiles are easy to clean with common non-abrasive cleaning products. Their smooth, non-porous surface prevents the accumulation of dirt.
- Stain resistance: They offer good resistance to common stains, which facilitates daily maintenance.

Chemical Resistance

- Resistance to cleaning products: They are resistant to most household cleaning products, which allows them to maintain their appearance over time without risk of discoloration or deterioration.
- Resistance to mild acids and alkalis: Although they are not as resistant as porcelain stoneware, they can resist contact with mild acids and alkalis used in household cleaning.

Applications and Uses

- Residential use: In the home, they are used on floors and walls of bathrooms, kitchens, living rooms and bedrooms. Their aesthetic appearance and ease of cleaning make them ideal for any interior space.
- Commercial use: They are suitable for commercial areas with moderate traffic such as stores, offices and restaurants. Their visual appeal contributes to create cozy and elegant environments.
- Outdoor use: Although they are not the most recommended option for exteriors due to their higher water absorption compared to porcelain stoneware, they can be used in covered and protected outdoor areas.

Security

- Non-slip properties: There are versions with anti-slip finishes, specially designed for wet areas such as bathrooms and kitchens, improving walking safety.
- Fire resistance: They are non-combustible and do not emit toxic gases in case of fire, contributing to the safety of the environment.

Ecology and Sustainability

- Low VOC emissions: They do not emit volatile organic compounds (VOCs), improving indoor air quality.

Dimensions and Formats

- Diversity in sizes: They are available in a variety of sizes and shapes, from small tiles to large slabs, allowing great flexibility in design.
- Innovative formats: In addition to traditional formats, there are options with innovative and customized shapes that allow the creation of unique patterns and designs.

Aesthetic Impact

- Creating ambience: Its refined finishes can visually expand spaces, create a luminous ambience and convey a clean, modern feel.
- Compatibility with other materials: They combine well with other construction and decoration materials, allowing the creation of harmonious and balanced spaces.

Conclusion

White body stoneware tiles are a versatile and attractive choice for floor and wall coverings. Their combination of elegant aesthetics, good strength and ease of maintenance makes them a popular choice for a wide range of residential and commercial applications. Although they do not offer the same waterproofing and extreme strength as porcelain stoneware, their ability to offer custom design solutions and affordable pricing make them an excellent choice for many construction and renovation projects.

2.1.4.3 Red body stoneware

Red body stoneware tiles are a common choice in ceramic tile, known for their strength, durability and aesthetic versatility. Below is a detailed guide outlining the properties and characteristics of red body stoneware tiles.

Composition and Manufacture

- Raw material: They are composed mainly of red clays, which are rich in iron. This component gives the tiles their distinctive reddish color.
- Manufacturing process: The mixture of clays and other minerals is pressed and fired at high temperatures (around 1000-1200 °C), resulting in a compact and resistant material.

Aesthetics and Appearance

- Characteristic red color: The natural color of red clay provides a warm, earthy base that can vary in tones depending on the region and the quality of the clay used.
- Design versatility: Available in a wide range of colors and finishes, from natural tones to glossy and matte glazes. They can imitate other materials such as stone and wood.
- Surface finishes: Finishes can be matte, glossy, textured, and enameled, adapting to different decorative styles.

Durability and Resistance

- Wear resistance: Red body stoneware tiles are highly resistant to surface wear, suitable for moderate traffic areas.
- Impact resistance: They exhibit good mechanical resistance, making them suitable for use on floors and walls in residential and commercial areas.
- Scratch resistance: They generally have an acceptable resistance to scratching, especially if they are enameled.

Water Absorption

- Moderate absorption: They have moderate water absorption (generally between 3% and 6%), making them suitable for indoor use and some protected outdoor environments.
- Not waterproof: Although they resist moisture well, they are not completely waterproof like porcelain stoneware, so they are recommended for use in interiors or exteriors with less direct exposure to moisture as long as the bisque is not exposed by sealing with grout.

Ease of Maintenance

- Easy cleaning: They are easy to clean with common non-abrasive cleaning products. The enameled versions are particularly resistant to stains and dirt.
- Stain resistance: Glazed tiles offer good resistance to common stains, making them easy to maintain on a daily basis.

Chemical Resistance

- Resistance to cleaning products: Resistant to most household cleaning products, which allows them to maintain their appearance over time without risk of discoloration or deterioration.
- Resistance to mild acids and alkalis: They can resist contact with mild acids and alkalis used in household cleaning.

Applications and Uses

- Residential use: Used in floors and walls of bathrooms, kitchens, living rooms and bedrooms. Their aesthetic

appearance and ease of cleaning make them ideal for any interior space.

- Commercial use: Suitable for commercial areas with moderate traffic such as stores, offices and restaurants. Its visual appeal contributes to create cozy and elegant environments.
- Outdoor use: They can be used in protected outdoor areas, such as terraces and patios, as long as they are not exposed to extreme humidity or frequent frosts.

Security

- Non-slip properties: There are versions with anti-slip finishes, specially designed for wet areas such as bathrooms and kitchens, improving walking safety.
- Fire resistance: They are non-combustible and do not emit toxic gases in case of fire, contributing to the safety of the environment.

Ecology and Sustainability

- Low VOC emissions: They do not emit volatile organic compounds (VOCs), improving indoor air quality.

Cost and Accessibility

- Price range: Red body stoneware tiles are available in a wide range of prices, from economical options to high-end products with unique designs.
- Accessibility: They are widely available and widely available in most building material markets and interior design stores.

Dimensions and Formats

- Diversity in sizes: They are available in a variety of sizes and shapes, from small tiles to large slabs, allowing great flexibility in design.
- Innovative formats: In addition to traditional formats, there are options with innovative and customized shapes that allow the creation of unique patterns and designs.

Aesthetic Impact

- Compatibility with other materials: They combine well with other construction and decoration materials, allowing the creation of harmonious and balanced spaces.

Conclusion

Red body stoneware tiles are a versatile and attractive choice for floor and wall coverings. Their combination of warm aesthetics, good strength and ease of maintenance makes them a popular choice for a wide range of residential and commercial applications. While they do not offer the same waterproofing and extreme strength as porcelain stoneware, their ability to offer custom design solutions and their affordable price point make them an excellent choice for many construction and renovation projects.

2.1.4.4 White-body ceramic coating

White body ceramic tiles are widely used in construction and decoration due to their excellent aesthetic and technical properties. This guide details the most relevant characteristics and properties of this type of tile.

Composition and Manufacture

- **Main Materials:** White body coatings are composed mainly of white clays, feldspar, silica and kaolin. These materials are selected and processed to obtain a white base color that serves as a canvas for different finishes.
- **Manufacturing Process:** The process includes mixing and grinding of raw materials, forming (usually by pressing), drying, glazing and firing at high temperatures (between 1100 and 1200°C). This process ensures a dense and resistant structure.

Aesthetic Properties

- **Color and Finish:** The white base allows a wide range of colors and designs. Finishes can be matte, glossy, satin, or textured.
- **Uniformity:** White paste coatings tend to have high uniformity in color and finish, which is crucial for aesthetic applications where consistency is key.

Physical and Mechanical Properties

- **Hardness and Resistance:** These coatings are known for their hardness (measured on the Mohs scale) and wear resistance, making them suitable for high traffic areas.
- **Flexural Strength:** Typical flexural strength values are high, ensuring that tiles do not break easily under load.
- **Porosity and Water Absorption:** The white paste has low porosity, which results in low water absorption (generally less than 0.5%). This makes them ideal for wet areas such as bathrooms and kitchens.
- **Impact Resistance:** The ability to resist impact without cracking is an important property, especially in floors and walls exposed to shocks.

Chemical Properties

- **Stain and Chemical Resistance:** White paste coatings have a high resistance to stains and common household chemicals, making them easy to clean and maintain.
- **Resistance to Acid and Alkali Attack:** Although not completely inert, these coatings offer good resistance to most acids and alkalis, which prolongs their service life in aggressive environments.

Thermal Properties

- **Thermal conductivity:** They are good thermal conductors, which makes them suitable for underfloor heating systems.

- **Thermal Shock Resistance:** They have good resistance to sudden changes in temperature, avoiding cracking or damage due to thermal expansion.

Acoustic Properties

- **Acoustic Insulation:** Although they are not the best acoustic insulators, they can improve this property when combined with other building materials designed to absorb sound.

Ecological Properties

- **Sustainability:** Most white paste coatings are sustainable, as they are made from natural materials and their production generates relatively low CO2 emissions compared to other building materials.
- **Recyclability:** Production waste and leftovers can be recycled into new production batches, minimizing environmental impact.

Installation and Maintenance

- **Ease of Installation:** They can be easily cut and handled during installation, and adhere well with different types of mortars and adhesives.
- **Maintenance:** They are easy to clean with standard cleaning products and do not require special treatments to maintain their original appearance.

Common Applications

- **Interiors:** Ideal for wall coverings in kitchens, bathrooms, living rooms and commercial areas.
- **Exteriors:** Although they are more common in interiors, they can also be used in exterior coatings in protected areas or areas with low exposure to extreme weather changes.

Conclusion

White body tile offers a combination of aesthetic, mechanical and chemical properties that make it ideal for a variety of construction and decorative applications. Their durability, strength and ease of maintenance make them a preferred choice for architects and designers.

2.1.4.5 Red body ceramic coating

Red body ceramic tile is widely used in the construction industry due to its combination of technical and aesthetic properties, as well as its relatively low cost. This guide details the most relevant characteristics and properties of this type of tile.

Composition and Manufacture

- **Main Materials:** They are composed mainly of red clays and other natural minerals that give them their characteristic

red color. The clays contain iron oxides that give the red color to the paste.

- **Manufacturing Process:** The process includes mixing and grinding of raw materials, shaping (usually by extrusion or pressing), drying, glazing and firing at temperatures slightly lower than those of white pulp (between 1000 and 1150°C).

Aesthetic Properties

- **Color and Finish:** The base color is red due to the iron oxides in the clays used. Finishes can vary from matte to glossy and may include textures or rustic effects.

Physical and Mechanical Properties

- **Hardness and Resistance:** Red paste coatings have good resistance to wear and abrasion, although they are generally less hard than white paste coatings.
- **Flexural Strength:** Acceptable strength, suitable for most residential and commercial applications.
- **Porosity and Water Absorption:** They have a higher porosity and water absorption compared to white paste (generally between 3% and 6%), which limits their use in very humid areas or with direct exposure to water, it is recommended to seal the joints with the appropriate material.
- **Impact Resistance:** They are relatively resistant to impact, but more susceptible to chipping or cracking under extreme stress conditions.

Chemical Properties

- **Stain and Chemical Resistance:** They have good resistance to stains and household chemicals, but not as high as white paste coatings.
- **Resistance to Acid and Alkali Attack:** Moderate resistance to acids and alkalis, sufficient for most residential applications.

Thermal Properties

- **Thermal conductivity:** They have good thermal conductivity, suitable for underfloor heating systems, although not as efficient as white paste.
- **Thermal Shock Resistance:** They can withstand moderate temperature changes, but are more susceptible to thermal shock damage compared to white paste.

Installation and Maintenance

- **Ease of Installation:** They are easy to cut and handle during installation and adhere well with standard mortars and adhesives.
- **Maintenance:** They require relatively simple maintenance and are easily cleaned with standard cleaning products.

Common Applications

- **Interiors:** They are ideal for wall coverings in kitchens,

bathrooms, living rooms and commercial areas.

- **Exteriors:** Can be used in exterior coatings, especially in temperate climates and in areas protected from direct exposure to moisture.

Conclusion

Red body tile offers a combination of technical and aesthetic properties that make it suitable for a variety of construction and decorative applications. Their lower cost compared to white body, along with their good strength and durability, make them a popular choice for residential and commercial applications.

2.1.4.6 Extruded stoneware

Extruded stoneware is a high-strength ceramic material used mainly in construction and architecture for its excellent technical and aesthetic properties. This guide details the most relevant characteristics and properties of this type of stoneware.

Composition and Manufacture

- **Materiales Principales:** Está compuesto principalmente por arcillas, feldespato, sílice y otros minerales. La selección y proporción de estos materiales son esenciales para alcanzar las propiedades finales del producto.
- **Proceso de Fabricación:** El gres se forma mediante un proceso de extrusión, donde la mezcla de arcilla se fuerza a través de una boquilla para crear formas continuas que luego se cortan a la longitud deseada. Posteriormente, las piezas se secan y se cuecen a altas temperaturas (entre 1200 y 1300°C), obteniendo una estructura densa y vitrificada.

Propiedades Estéticas

- **Main Materials:** It is mainly composed of clays, feldspar, silica and other minerals. The selection and proportion of these materials are essential to achieve the final properties of the product.
- **Manufacturing Process:** Stoneware is formed by an extrusion process, where the clay mixture is forced through a nozzle to create continuous shapes that are then cut to the desired length. The pieces are then dried and fired at high temperatures (between 1200 and 1300°C) to obtain a dense, vitrified structure.

Aesthetic Properties

- **Color and Finish:** The colors of extruded stoneware can vary depending on the minerals and pigments used. Finishes can be matte, glossy, satin or textured, and can mimic a wide variety of natural materials such as stone, wood or cement.
- **Variety of Designs:** Extrusion technology allows for a wide variety of shapes and designs, from tiles to specific architectural pieces such as bricks, tiles and decorative elements.

Physical and Mechanical Properties

- **Hardness and Resistance:** Extruded stoneware is extremely hard and abrasion resistant, making it ideal for high traffic areas.
- **Flexural Strength:** It has a high resistance to bending, which reduces the risk of breakage and cracking.
- **Porosity and Water Absorption:** It has a very low porosity and water absorption (generally less than 0.5%), which makes it suitable for humid and outdoor environments.
- **Impact Resistance:** Its dense and vitrified structure gives it a high resistance to impact.

Chemical Properties

- **Stain and Chemical Resistance:** Extruded stoneware is highly resistant to stains and most household chemicals, making it easy to clean and maintain.
- **Resistance to Acid and Alkali Attack:** Offers excellent resistance to acids and alkalis, making it suitable for industrial and laboratory environments.

Thermal Properties

- **Thermal conductivity:** It has a good thermal conductivity, which allows its use in underfloor heating systems.
- **Thermal Shock Resistance:** Its resistance to thermal shock is remarkable, withstanding sudden temperature changes without cracking or damage.

Ecological Properties

- **Sustainability:** Extruded stoneware is a sustainable material, manufactured from natural raw materials and with processes that minimize CO2 emissions.
- **Recyclability:** It is fully recyclable, and production residues can be reused in the manufacturing process.

Installation and Maintenance

- **Ease of Installation:** Although it is denser and heavier than other ceramic materials, it can be cut and handled with the proper tools. Installation requires specific techniques to ensure proper adhesion and alignment.
- **Maintenance:** It is easy to maintain and clean, resistant to most standard cleaning products and does not require special treatments to maintain its appearance and functionality.

8. Common Applications

- **Interiors:** Ideal for floors and wall coverings in high traffic areas such as hallways, kitchens and bathrooms, as well as commercial and public spaces.
- **Exteriors:** Its low water absorption and high resistance make it perfect for facades, exterior pavements, swimming pools and areas exposed to adverse weather conditions.

- **Architectural Elements:** Used in the manufacture of bricks, tiles and other architectural elements, providing durability and aesthetics to constructions.

Conclusion

Extruded stoneware combines a number of technical and aesthetic properties that make it highly versatile and durable. Its strength, low porosity and ability to adapt to various designs make it a preferred choice for both interior and exterior applications in construction and architecture.

2.2 Installation

2.2.1 Cutting and drilling. Cutting types and tools

2.2.1.1 Porcelain tiles

Porcelain tile is a ceramic material of high strength and durability, widely used in wall and floor coverings. This material is distinguished by its hardness and variety of finishes, which requires specific tools and techniques to achieve precise cuts and perforations without damaging the material. The following is a detailed guide covering the different types of cuts and perforations, as well as the tools required, taking into account the different finishes and tile thicknesses.

Classification by Type of Cutting and Tools Required

Straight Cut

Straight cutting is essential for adjusting tiles to the desired size, especially in areas where a precise fit is required.

- Tools:

Manual Tile Cutter:

Description: Uses a tungsten carbide wheel to mark the tile surface and a lever to apply pressure and break the tile along the marked line.

Use: Suitable for tiles up to 10 mm thick. Ideal for fast and precise cuts in small and medium-sized projects.

Advantages: Easy to use, portable and requires no electricity. Ideal for clean, straight cuts in medium thickness tiles.

Disadvantages: Limited to straight cuts and thinner tiles. Not suitable for very thick tiles or curved cuts.

Electric Water Cutter:

Description: Uses a diamond blade and a water cooling system to reduce dust and cool the blade during cutting.

Use: Recommended for tiles up to 20 mm thick. Ideal for long, precise cuts on large projects and for thicker tiles.

Advantages: Provides very precise cuts, significant dust reduction and avoids overheating of the blade.

Disadvantages: Requires electricity, water system maintenance and is less portable than a manual cutter.

Table Saw with Diamond Disc:

Description: Similar to an electric water cutter, but mounted on a table for stability and accuracy.

Use: Suitable for tiles up to 20 mm and precise cuts in large work volumes.

Advantages: Superior stability and accuracy, ideal for large quantity cuts and large size tiles.

Disadvantages: Expensive, requires space and electricity, and is less portable.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Types of Finishes:

Matte: Dull surface that hides scratches and wear. It does not require special care when cutting, but it is important to avoid chipping.

Gloss: Shiny surface that may show chips or imperfections if not cut accurately.

Polished: Extremely smooth and reflective surface, any imperfections in the cut will be highly visible.

Semi Polished: Combines matte and polished characteristics, being less demanding than polished but still requiring precise cuts.

Grinding: Perfectly straight edges, allowing for minimal joints and requiring extremely precise cuts to maintain aesthetics.

Non-Grinding: Irregular edges, tolerates more imperfections in the cut, but it is still important to make the cleanest cuts possible.

Angle Cutting (45°)

The 45-degree cut is used to create beveled edges, ideal for corners and finishing details.

• **Tools:**

Miter Cutter with Diamond Disc:

Description: Specialized adjustable tool for precise angle cutting.

Use: Ideal for creating beveled edges on tiles up to 20 mm thick.

Advantages: High precision in angles, ideal for professional finishing and large volume cutting.

Disadvantages: Costly, requires experience and space for its use.

Angle Grinder with Diamond Disc:

Description: Portable tool equipped with a diamond blade, adjustable for cutting at different angles.

Use: Suitable for angled cuts in smaller tiles and for on-site adjustments.

Advantages: Versatile and portable, allows for fast angled cuts.

Disadvantages: Lower accuracy compared to miter cutter, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Types of Finishes:

Grinding: Requires absolute precision to maintain minimum joints and an impeccable aesthetic finish.

Unground: More tolerant of small imperfections in the bevel, but still requires care in cutting.

Curved or Rounded Cut

Curved cuts are necessary to fit tiles around round objects such as columns, toilets and other elements.

- Tools:

Diamond Blade Jigsaw:

Description: Uses a diamond-coated saw blade for precise, detailed cuts.

Use: Ideal for curved cuts in tiles up to 10 mm thick.

Advantages: High precision in curved cuts and fine details.

Disadvantages: Limited to thinner tiles, requires practice to obtain clean cuts.

Angle Grinder with Segment Disc:

Description: Uses a segmented disc that allows curved cuts to be made.

Use: Suitable for wider curved cuts in tiles up to 20 mm.

Advantages: Versatility and ability to make on-site adjustments.

Disadvantages: Less precision in fine details, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Applicable to all types of finishes: Practicing on leftover tiles is crucial to ensure accuracy and avoid visible errors in the final material.

Porcelain Tile Punching

Drilling is necessary to install items such as pipes, drains, outlets and other accessories in the tiles.

Small drill holes (for fasteners, screws)

- Tools:

Hammerless Drill with Diamond Drill Bit:

Description: Diamond coated drill bit for precise and clean drilling.

Use: Suitable for drilling holes in tiles up to 20 mm thick.

Advantages: High precision and durability, suitable for hard materials.

Disadvantages: Requires continuous water cooling to avoid overheating and damage to the drill bit.

Hammerless drill with tungsten carbide drill bit:

Description: High hardness drill bit, suitable for ceramic materials less hard than porcelain.

Use: Ideal for tiles up to 10 mm thick.

Advantages: Lower cost compared to diamond drills.

Disadvantages: Lower durability and accuracy, also requires cooling to avoid overheating.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Applicable to all finishes: It is essential to keep the drill chilled to avoid chipping and damage to the tile surface.

Large Boreholes (for pipes, drains)

- Tools:

Diamond Coated Crown Saw::

Description: Diamond coated circular tool designed for large diameter drilling.

Use: Ideal for large holes in tiles up to 20 mm thick.

Advantages: High precision and ability to make clean, large cuts.

Disadvantages: Requires constant cooling to avoid overheating, can be expensive.

Angle Grinder with Diamond Cutting Disc:

Description: Uses a cut-off wheel to enlarge and adjust initial perforations.

Use: To adjust the diameter of large bore holes after the initial cut has been made.

Advantages: Flexibility and ability to make on-site adjustments.

Disadvantages: Less precision in the final finish, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Additional Considerations

Tile Thickness:

- **10 mm:** Hand tools and lower power tools are usually adequate. Hand cutters and tungsten carbide drills are sufficient for most cutting and drilling.
- **20 mm:** Robust power tools, discs and high quality drills are necessary. It is preferable to use water-cooled tools to avoid overheating and damage to the material.

Security:

- **Personal Protective Equipment (PPE):** The use of safety goggles, gloves, face masks and hearing protection is essential to avoid accidents and to protect against dust and particles.
- **Cooling:** Using water to cool diamond blades and bits is crucial to avoid overheating and possible fractures in the material.

Practice and Accuracy:

- **Preliminary Testing:** Perform test cuts and drill holes in leftover tiles to adjust techniques and tools prior to final application. This helps to avoid mistakes and ensure a perfect finish.

Conclusion

Cutting and drilling porcelain tile is a process that requires attention to detail, the right tools and specific techniques for each type of cut and finish. With practice and the right equipment, it is possible to achieve professional results that enhance the aesthetics and functionality of the space. It is crucial to follow safety recommendations and pre-testing to ensure accurate and clean cuts and drill holes in this durable and versatile material.

2.2.1.2 White body stoneware

White body stoneware is a ceramic material widely used in wall and floor coverings due to its strength and versatility. This type of tile, although less hard than porcelain, requires specific tools and techniques to make cuts and perforations without damaging the material and ensuring a professional finish. Below is a detailed guide covering the different types of cuts and perforations, as well as the tools required, taking into account the different finishes and tile thicknesses.

Classification by Type of Cutting and Tools Required

Straight Cut

Straight cutting is essential for adjusting tiles to the desired size, especially in areas where a precise fit is required.

- **Tools:**

Manual Tile Cutter:

Description: Uses a tungsten carbide wheel to mark the tile surface and a lever to apply pressure and break the tile along the marked line.

Use: Suitable for tiles up to 10 mm thick. Ideal for fast and precise cuts in small and medium-sized projects.

Advantages: Easy to use, portable and requires no electricity. Ideal for clean, straight cuts in medium thickness tiles.

Disadvantages: Limited to straight cuts and thinner tiles. Not suitable for very thick tiles or curved cuts.

Electric Water Cutter:

Description: Uses a diamond blade and a water cooling system to reduce dust and cool the blade during cutting.

Use: Recommended for tiles up to 20 mm thick. Ideal

for long, precise cuts on large projects and for thicker tiles.

Advantages: Provides very precise cuts, significant dust reduction and avoids overheating of the blade.

Disadvantages: Requires electricity, water system maintenance and is less portable than a manual cutter.

Table Saw with Diamond Disc:

Description: Similar to an electric water cutter, but mounted on a table for stability and accuracy.

Use: Suitable for tiles up to 20 mm and precise cuts in large work volumes.

Advantages: Superior stability and accuracy, ideal for large quantity cuts and large size tiles.

Disadvantages: Expensive, requires space and electricity, and is less portable.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

• **Types of Finishes:**

Matte: Dull surface that hides scratches and wear. It does not require special care when cutting, but it is important to avoid chipping.

Gloss: Shiny surface that may show chips or imperfections if not cut accurately.

Grinding: Perfectly straight edges, allowing for minimal joints and requiring extremely precise cuts to maintain aesthetics.

Non-Grinding: Irregular edges, tolerates more imperfections in the cut, but it is still important to make the cleanest cuts possible.

Angle Cutting (45°)

The 45-degree cut is used to create beveled edges, ideal for corners and finishing details.

• **Tools:**

Miter Cutter with Diamond Disc:

Description: Specialized adjustable tool for precise angle cutting.

Use: Ideal for creating beveled edges on tiles up to 20 mm thick.

Advantages: High precision in angles, ideal for professional finishing and large volume cutting.

Disadvantages: Costly, requires experience and space for its use.

Angle Grinder with Diamond Disc:

Description: Portable tool equipped with a diamond blade, adjustable for cutting at different angles.

Use: Suitable for angled cuts in smaller tiles and for on-site adjustments.

Advantages: Versatile and portable, allows for fast angled cuts.

Disadvantages: Lower accuracy compared to miter cutter, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

• **Types of Finishes:**

Grinding: Requires absolute precision to maintain minimum joints and an impeccable aesthetic finish.

Unground: More tolerant of small imperfections in the bevel, but still requires care in cutting.

Curved or Rounded Cut

Curved cuts are necessary to fit tiles around round objects such as columns, toilets and other elements.

- Tools:

Diamond Blade Jig Saw:

Description: Uses a diamond-coated saw blade for precise, detailed cuts.

Use: Ideal for curved cuts in tiles up to 10 mm thick.

Advantages: High precision in curved cuts and fine details.

Disadvantages: Limited to thinner tiles, requires practice to obtain clean cuts.

Angle Grinder with Segment Disco:

Description: Uses a segmented disc that allows curved cuts to be made.

Use: Suitable for wider curved cuts in tiles up to 20 mm.

Advantages: Versatility and ability to make on-site adjustments.

Disadvantages: Less precision in fine details, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Applicable to all types of finishes: Practicing on leftover tiles is crucial to ensure accuracy and avoid visible errors in the final material.

Drilling of White Paste Stoneware Tiles

Drilling is necessary to install items such as pipes, drains, outlets and other accessories in the tiles.

Small drill holes (for fasteners, screws)

- Tools:

Hammerless Drill with Diamond Drill Bit:

Description: Diamond coated drill bit for precise and clean drilling.

Use: Suitable for drilling holes in tiles up to 20 mm thick.

Advantages: High precision and durability, suitable for hard materials.

Disadvantages: Requires continuous water cooling to avoid overheating and damage to the drill bit.

Hammerless drill with tungsten carbide drill bit:

Description: High hardness drill bit, suitable for ceramic materials less hard than porcelain.

Use: Ideal for tiles up to 10 mm thick.

Advantages: Lower cost compared to diamond drills.

Disadvantages: Lower durability and accuracy, also requires cooling to avoid overheating.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Applicable to all finishes: It is essential to keep the drill chilled to avoid chipping and damage to the tile surface.

Security:

- Personal Protective Equipment (PPE): The use of safety goggles, gloves, face masks and hearing protection is essential to avoid accidents and to protect against dust and particles.
- Cooling: Using water to cool diamond blades and bits is crucial to avoid overheating and possible fractures in the material.

Practice and Accuracy:

- Preliminary Testing: Perform test cuts and drill holes in leftover tiles to adjust techniques and tools prior to final application. This helps to avoid mistakes and ensure a perfect finish.

Conclusion

Cutting and drilling white body stoneware tiles is a process that requires attention to detail, the right tools and specific techniques for each type of cut and finish. With practice and the right equipment, it is possible to achieve professional results that enhance the aesthetics and functionality of the space. It is crucial to follow safety recommendations and pre-testing to ensure accurate and clean cuts and perforations in this durable and versatile material.

2.2.1.3 Red body stoneware

Red body stoneware is a ceramic material commonly used in wall and floor tiles, known for its durability and versatility. This type of tile, although less hard than porcelain tile, requires specific techniques and tools to make cuts and perforations without damaging it. The following is a detailed guide covering the different types of cuts and perforations, as well as the tools required, taking into account the different finishes and thicknesses of the tiles.

Classification by Type of Cutting and Tools Required

Straight Cut

Straight cutting is essential for adjusting tiles to the required size, especially in areas where a precise fit is required.

- Tools:

Manual Tile Cutter:

Description: Uses a tungsten carbide wheel to mark the tile surface and a lever to apply pressure and break the tile along the marked line.

Use: Suitable for tiles up to 10 mm thick. Ideal for fast and precise cuts in small and medium-sized projects.

Advantages: Easy to use, portable and requires no electricity. Ideal for clean, straight cuts in medium thickness tiles.

Disadvantages: Limited to straight cuts and thinner tiles. Not suitable for very thick tiles or curved cuts.

Electric Water Cutter:

Description: Uses a diamond blade and a water cooling system to reduce dust and cool the blade during cutting.

Use: Recommended for tiles up to 20 mm thick. Ideal for long, precise cuts on large projects and for thicker tiles.

Advantages: Provides very precise cuts, significant dust reduction and avoids overheating of the blade.

Disadvantages: Requires electricity, water system maintenance and is less portable than a manual cutter.

Table Saw with Diamond Disc:

Description: Similar to an electric water cutter, but mounted on a table for stability and accuracy.

Use: Suitable for tiles up to 20 mm and precise cuts in large work volumes.

Advantages: Superior stability and accuracy, ideal for large quantity cuts and large size tiles.

Disadvantages: Expensive, requires space and electricity, and is less portable.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Matte: Dull surface that hides scratches and wear. It does not require special care when cutting, but it is important to avoid chipping.

Gloss: Shiny surface that may show chips or imperfections if not cut accurately.

Grinding: Perfectly straight edges, allowing for minimal joints and requiring extremely precise cuts to maintain aesthetics.

Non-Grinding: Irregular edges, tolerates more imperfections in the cut, but it is still important to make the cleanest cuts possible.

Angle Cutting (45°)

The 45-degree cut is used to create beveled edges, ideal for corners and finishing details.

- Tools:

Miter Cutter with Diamond Disc:

Description: Specialized adjustable tool for precise angle cutting.

Use: Ideal for creating beveled edges on tiles up to 20 mm thick.

Advantages: High precision in angles, ideal for professional finishing and large volume cutting.

Disadvantages: Costly, requires experience and space for its use.

Angle Grinder with Diamond Disc:

Description: Portable tool equipped with a diamond blade, adjustable for cutting at different angles.

Use: Suitable for angled cuts in smaller tiles and for on-site adjustments.

Advantages: Versatile and portable, allows for fast angled cuts.

Disadvantages: Lower accuracy compared to miter cutter, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Grinding: Requires absolute precision to maintain minimum joints and an impeccable aesthetic finish.

Unground: More tolerant of small imperfections in the bevel, but still requires care in cutting.

Curved or Rounded Cut

Curved cuts are necessary to fit tiles around round objects such as columns, toilets and other elements.

- **Tools:**

Diamond Blade Jigsaw:

Description: Uses a diamond-coated saw blade for precise, detailed cuts.

Use: Ideal for curved cuts in tiles up to 10 mm thick.

Advantages: High precision in curved cuts and fine details.

Disadvantages: Limited to thinner tiles, requires practice to obtain clean cuts.

Angle Grinder with Segment Disc:

Description: Uses a segmented disc that allows curved cuts to be made.

Use: Suitable for wider curved cuts in tiles up to 20 mm.

Advantages: Versatility and ability to make on-site adjustments.

Disadvantages: Less precision in fine details, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- **Types of Finishes:**

Applicable to all types of finishes: Practicing on leftover tiles is crucial to ensure accuracy and avoid visible errors in the final material.

Red Paste Stoneware Tile Drilling

Drilling is necessary to install items such as pipes, drains, outlets and other accessories in the tiles.

Small drill holes (for fasteners, screws)

- **Tools:**

Hammerless Drill with Diamond Drill Bit:

Description: Diamond coated drill bit for precise and clean drilling.

Use: Suitable for drilling holes in tiles up to 20 mm thick.

Advantages: High precision and durability, suitable for hard materials.

Disadvantages: Requires continuous water cooling to avoid overheating and damage to the drill bit.

Hammerless drill with tungsten carbide drill bit:

Description: High hardness drill bit, suitable for ceramic materials less hard than porcelain.

Use: Ideal for tiles up to 10 mm thick.

Advantages: Lower cost compared to diamond drills.

Disadvantages: Lower durability and accuracy, also requires cooling to avoid overheating.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Applicable to all finishes: It is essential to keep the drill chilled to avoid chipping and damage to the tile surface.

Large Boreholes (for pipes, drains)

- **Tools:**

Diamond Coated Crown Saw:

Description: Diamond coated circular tool designed for large diameter drilling.

Use: Ideal for large holes in tiles up to 20 mm thick.

Advantages: High precision and ability to make clean, large cuts.

Disadvantages: Requires constant cooling to avoid overheating, can be expensive.

Angle Grinder with Diamond Cutting Disc:

Description: Uses a cut-off wheel to enlarge and adjust initial perforations.

Use: To adjust the diameter of large bore holes after

the initial cut has been made.

Advantages: Flexibility and ability to make on-site adjustments.

Disadvantages: Less precision in the final finish, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Recommended for rectified tiles: To ensure a professional and aesthetic finish when drilling.

Additional Considerations

Tile Thickness:

- **10 mm:** Hand tools and lower power tools are usually adequate. Hand cutters and tungsten carbide drills are sufficient for most cutting and drilling.
- **20 mm:** Robust power tools, discs and high quality drills are necessary. It is preferable to use water-cooled tools to avoid overheating and damage to the material.

Security:

- Personal Protective Equipment (PPE): The use of safety goggles, gloves, face masks and hearing protection is essential to avoid accidents and to protect against dust and particles.
- Cooling: Using water to cool diamond blades and bits is crucial to avoid overheating and possible fractures in the material.

Practice and Accuracy:

- Preliminary Testing: Perform test cuts and drill holes in leftover tiles to adjust techniques and tools prior to final application. This helps to avoid mistakes and ensure a perfect finish.

Conclusion

Cutting and drilling red body stoneware tiles is a process that requires attention to detail, the right tools and specific techniques for each type of cut and finish. With practice and the right equipment, it is possible to achieve professional results that enhance the aesthetics and functionality of the space. It is crucial to follow safety recommendations and pre-testing to ensure accurate and clean cuts and perforations in this durable and versatile material.

2.2.1.4 White-body ceramic coating

White body cladding tiles are popular for their versatility, aesthetics and ease of installation on interior walls. This type of tile, while less hard than porcelain tile, requires specific techniques and tools to make cuts and drill holes without damaging the tile. Below is a detailed guide covering the different types of cutting and drilling, as well as the tools required, taking into account the different finishes and thicknesses of the tiles.

Classification by Type of Cutting and Tools Required

Straight Cut

Straight cutting is essential for adjusting tiles to the required size, especially in areas where a precise fit is required.

- Tools:

Manual Tile Cutter:

Description: Uses a tungsten carbide wheel to mark the tile surface and a lever to apply pressure and break the tile along the marked line.

Use: Suitable for tiles up to 10 mm thick. Ideal for fast and precise cuts in small and medium-sized projects.

Advantages: Easy to use, portable and requires no electricity. Ideal for clean, straight cuts in medium thickness tiles.

Disadvantages: Limited to straight cuts and thinner tiles. Not suitable for very thick tiles or curved cuts.

Electric Water Cutter:

Description: Uses a diamond blade and a water cooling system to reduce dust and cool the blade during cutting.

Use: Recommended for tiles up to 10 mm thick. Ideal for long, precise cuts on large projects and for thicker tiles.

Advantages: Provides very precise cuts, significant dust reduction and avoids overheating of the blade.

Disadvantages: Requires electricity, water system maintenance and is less portable than a manual cutter.

Table Saw with Diamond Disc:

Description: Similar to an electric water cutter, but

mounted on a table for stability and accuracy.

Use: Suitable for tiles up to 10 mm and precise cuts in large work volumes.

Advantages: Superior stability and accuracy, ideal for large quantity cuts and large size tiles.

Disadvantages: Expensive, requires space and electricity, and is less portable.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Matte: Dull surface that hides scratches and wear. It does not require special care when cutting, but it is important to avoid chipping.

Gloss: Shiny surface that may show chips or imperfections if not cut accurately.

Grinding: Perfectly straight edges, allowing for minimal joints and requiring extremely precise cuts to maintain aesthetics.

Non-Grinding: Irregular edges, tolerates more imperfections in the cut, but it is still important to make the cleanest cuts possible.

Angle Cutting (45°)

The 45-degree cut is used to create beveled edges, ideal for corners and finishing details.

- Tools:

Miter Cutter with Diamond Disc:

Description: Specialized adjustable tool for precise angle cutting.

Use: Ideal for creating beveled edges on tiles up to 10 mm thick.

Advantages: High precision in angles, ideal for professional finishing and large volume cutting.

Disadvantages: Costly, requires experience and space for its use.

Angle Grinder with Diamond Disc:

Description: Portable tool equipped with a diamond blade, adjustable for cutting at different angles.

Use: Suitable for angled cuts in smaller tiles and for on-site adjustments.

Advantages: Versatile and portable, allows for quick angled cuts.

Disadvantages: Lower accuracy compared to miter cutter, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- **Types of Finishes:**

Grinding: Requires absolute precision to maintain minimum joints and an impeccable aesthetic finish.

Unground: More tolerant of small imperfections in the bevel, but still requires care in cutting.

Curved or Rounded Cut

Curved cuts are necessary to fit tiles around round objects such as columns, toilets and other elements.

- **Tools:**

Diamond Blade Jig Saw:

Description: Uses a diamond-coated saw blade for precise and detailed cuts.

Use: Ideal for curved cuts in tiles up to 10 mm thick.

Advantages: High precision in curved cuts and fine details.

Disadvantages: Limited to thinner tiles, requires practice to obtain clean cuts.

Angle Grinder with Segment Disc:

Description: Uses a segmented disc that allows curved cuts to be made.

Use: Suitable for wider curved cuts in tiles up to 10 mm.

Advantages: Versatility and ability to make on-site adjustments.

Disadvantages: Less precision in fine details, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- **Types of Finishes:**

Applicable to all types of finishes: Practicing on leftover tiles is crucial to ensure accuracy and avoid visible errors in the final material.

Drilling of White Paste Cladding Tiles

Drilling is necessary to install items such as pipes, drains, outlets and other accessories in the tiles.

Small drill holes (for fasteners, screws)

- **Tools:**

Hammerless Drill with Diamond Drill Bit:

Description: Diamond coated drill bit for precise and clean drilling.

Use: Suitable for drilling holes in tiles up to 10 mm thick.

Advantages: High precision and durability, suitable for hard materials.

Disadvantages: Requires continuous water cooling to avoid overheating and damage to the drill bit.

Hammerless drill with tungsten carbide drill bit:

Description: High hardness drill bit, suitable for ceramic materials less hard than porcelain.

Use: Ideal for tiles up to 10 mm thick.

Advantages: Lower cost compared to diamond drills.

Disadvantages: Lower durability and accuracy, also requires cooling to avoid overheating.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Applicable to all finishes: It is essential to keep the drill chilled to avoid chipping and damage to the tile surface.

Large Boreholes (for pipes, drains)

- Tools:

Diamond Coated Crown Saw:

Description: Diamond coated circular tool designed for large diameter drilling.

Use: Ideal for large holes in tiles up to 10 mm thick.

Advantages: High precision and ability to make clean, large cuts.

Disadvantages: Requires constant cooling to avoid overheating, can be expensive.

Angle Grinder with Diamond Cutting Disc:

Description: Uses a cut-off wheel to enlarge and adjust initial perforations.

Use: To adjust the diameter of large bore holes after the initial cut has been made.

Advantages: Flexibility and ability to make on-site adjustments.

Disadvantages: Less precision in the final finish, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Recommended for rectified tiles: To ensure a professional and aesthetic finish when drilling.

Security:

- Personal Protective Equipment (PPE): The use of safety goggles, gloves, face masks and hearing protection is essential to avoid accidents and to protect against dust and particles.
- Cooling: Using water to cool diamond blades and bits is crucial to avoid overheating and possible fractures in the material.

Practice and Accuracy:

- Preliminary Testing: Perform test cuts and drill holes in leftover tiles to adjust techniques and tools prior to final application. This helps to avoid mistakes and ensure a perfect finish.

Conclusion

Cutting and drilling white body cladding tiles is a process that requires attention to detail, the right tools and specific techniques for each type of cut and finish. With practice and the right equipment, it is possible to achieve professional results that enhance the aesthetics and functionality of the space. It is crucial to follow safety recommendations and pre-testing to ensure accurate and clean cuts and perforations in this durable and versatile material.

2.2.1.5 Red body ceramic coating

Red body cladding tiles are a popular choice because of their durability and versatility in cladding applications. Although less hard than porcelain tile, red body tiles require specific tools and techniques to make precise cuts and holes without damaging

them. Below is a detailed guide covering the different types of cutting and drilling, as well as the tools required, taking into account the different finishes and tile thicknesses.

Classification by Type of Cutting and Tools Required

Straight Cut

Straight cutting is essential for adjusting tiles to the required size, especially in areas where a precise fit is required.

- Tools:

Manual Tile Cutter:

Description: Uses a tungsten carbide wheel to mark the tile surface and a lever to apply pressure and break the tile along the marked line.

Use: Suitable for tiles up to 10 mm thick. Ideal for fast and precise cuts in small and medium-sized projects.

Advantages: Easy to use, portable and requires no electricity. Ideal for clean, straight cuts in medium thickness tiles.

Disadvantages: Limited to straight cuts and thinner tiles. Not suitable for very thick tiles or curved cuts.

Electric Water Cutter:

Description: Uses a diamond blade and a water cooling system to reduce dust and cool the blade during cutting.

Use: Recommended for tiles up to 10 mm thick. Ideal for long, precise cuts on large projects and for thicker tiles.

Advantages: Provides very precise cuts, significant dust reduction and avoids overheating of the blade.

Disadvantages: Requires electricity, water system maintenance and is less portable than a manual cutter.

Table Saw with Diamond Disc:

Description: Similar to an electric water cutter, but mounted on a table for stability and accuracy.

Use: Suitable for tiles up to 10 mm and precise cuts in large work volumes.

Advantages: Superior stability and accuracy, ideal for large quantity cuts and large size tiles.

Disadvantages: Expensive, requires space and electricity, and is less portable.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any

irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Matte: Dull surface that hides scratches and wear. It does not require special care when cutting, but it is important to avoid chipping.

Gloss: Shiny surface that may show chips or imperfections if not cut accurately.

Grinding: Perfectly straight edges, allowing for minimal joints and requiring extremely precise cuts to maintain aesthetics.

Non-Grinding: Irregular edges, tolerates more imperfections in the cut, but it is still important to make the cleanest cuts possible.

Angle Cutting (45°)

The 45-degree cut is used to create beveled edges, ideal for corners and finishing details.

- Tools:

Miter Cutter with Diamond Disc:

Description: Specialized adjustable tool for precise angle cutting.

Use: Ideal for creating beveled edges on tiles up to 10 mm thick.

Advantages: High precision in angles, ideal for professional finishing and large volume cutting.

Disadvantages: Costly, requires experience and space for its use.

Angle Grinder with Diamond Disc:

Description: Portable tool equipped with a diamond blade, adjustable for cutting at different angles.

Use: Suitable for angled cuts in smaller tiles and for on-site adjustments.

Advantages: Versatile and portable, allows for quick angled cuts.

Disadvantages: Lower accuracy compared to miter cutter, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Grinding: Requires absolute precision to maintain minimum joints and an impeccable aesthetic finish.

Unground: More tolerant of small imperfections in the bevel, but still requires care in cutting.

Curved or Rounded Cut

Curved cuts are necessary to fit tiles around round objects such as columns, toilets and other elements.

- Tools:

Diamond Blade Jig Saw:

Description: Uses a diamond-coated saw blade for precise, detailed cuts.

Use: Ideal for curved cuts in tiles up to 10 mm thick.

Advantages: High precision in curved cuts and fine details.

Disadvantages: Limited to thinner tiles, requires practice to obtain clean cuts.

Angle Grinder with Segment Disc:

Description: Uses a segmented disc that allows curved cuts to be made.

Use: Suitable for wider curved cuts in tiles up to 10 mm.

Advantages: Versatility and ability to make on-site adjustments.

Disadvantages: Less precision in fine details, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Applicable to all types of finishes: Practicing on leftover tiles is crucial to ensure accuracy and avoid visible errors in the final material.

Drilling of Red Paste Cladding Tiles

Drilling is necessary to install items such as pipes, drains, outlets and other accessories in the tiles.

. Small drill holes (for fasteners, screws)

- Tools:

Hammerless Drill with Diamond Drill Bit:

Description: Diamond coated drill bit for precise and clean drilling.

Use: Suitable for drilling holes in tiles up to 10 mm thick.

Advantages: High precision and durability, suitable for hard materials.

Disadvantages: Requires continuous water cooling to avoid overheating and damage to the drill bit.

Hammerless drill with tungsten carbide drill bit:

Description: High hardness drill bit, suitable for ceramic materials less hard than porcelain.

Use: Ideal for tiles up to 10 mm thick.

Advantages: Lower cost compared to diamond drills.

Disadvantages: Lower durability and accuracy, also requires cooling to avoid overheating.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Applicable to all finishes: It is essential to keep the drill chilled to avoid chipping and damage to the tile surface.

Large Boreholes (for pipes, drains)

- **Tools:**

Diamond Coated Crown Saw:

Description: Diamond coated circular tool designed for large diameter drilling.

Use: Ideal for large holes in tiles up to 10 mm thick.

Advantages: High precision and ability to make clean, large cuts.

Disadvantages: Requires constant cooling to avoid overheating, can be expensive.

Angle Grinder with Diamond Cutting Disc:

Description: Uses a cut-off wheel to enlarge and adjust initial perforations.

Use: To adjust the diameter of large bore holes after the initial cut has been made.

Advantages: Flexibility and ability to make on-site adjustments.

Disadvantages: Less precision in the final finish, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then

to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Recommended for rectified tiles: To ensure a professional and aesthetic finish when drilling.

Security:

- Personal Protective Equipment (PPE): The use of safety goggles, gloves, face masks and hearing protection is essential to avoid accidents and to protect against dust and particles.
- Cooling: Using water to cool diamond blades and bits is crucial to avoid overheating and possible fractures in the material.

Practice and Accuracy:

- Preliminary Testing: Perform test cuts and drill holes in leftover tiles to adjust techniques and tools prior to final application. This helps to avoid mistakes and ensure a perfect finish.

Conclusion

Cutting and drilling red body cladding tiles is a process that requires attention to detail, the right tools and specific techniques for each type of cut and finish. With practice and the right equipment, it is possible to achieve professional results that enhance the aesthetics and functionality of the space. It is crucial to follow safety recommendations and pre-testing to ensure accurate and clean cuts and perforations in this durable and versatile material.

2.2.1.6 Extruded stoneware

Extruded stoneware tiles are known for their durability, strength and versatility, making them ideal for both indoor and outdoor applications. This type of tile requires specific techniques and tools to perform precise cutting and drilling without damaging the tiles. Below is a detailed guide covering the different types of cutting and drilling, as well as the tools required, and taking into account the different finishes and tile thicknesses.

Classification by Type of Cutting and Tools Required

Straight Cut

Straight cutting is essential for adjusting tiles to the required size, especially in areas where a precise fit is required.

- Tools:

Manual Tile Cutter:

Description: Uses a tungsten carbide wheel to mark the tile surface and a lever to apply pressure and break the tile along the marked line.

Use: Suitable for tiles up to 10 mm thick. Ideal for fast and precise cuts in small and medium-sized projects.

Advantages: Easy to use, portable and requires no electricity. Ideal for clean, straight cuts in medium thickness tiles.

Disadvantages: Limited to straight cuts and thinner tiles. Not suitable for very thick tiles or curved cuts.

Electric Water Cutter:

Description: Uses a diamond blade and a water cooling system to reduce dust and cool the blade during cutting.

Use: Recommended for tiles up to 20 mm thick. Ideal for long, precise cuts on large projects and for thicker tiles.

Advantages: Provides very precise cuts, significant dust reduction and avoids overheating of the blade.

Disadvantages: Requires electricity, water system maintenance and is less portable than a manual cutter.

Table Saw with Diamond Disc:

Description: Similar to an electric water cutter, but mounted on a table for stability and accuracy.

Use: Suitable for tiles up to 20 mm and precise cuts in large work volumes.

Advantages: Superior stability and accuracy, ideal for large quantity cuts and large size tiles.

Disadvantages: Expensive, requires space and electricity, and is less portable.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Matte: Dull surface that hides scratches and wear. It does not require special care when cutting, but it is important to avoid chipping.

Gloss: Shiny surface that may show chips or imperfections if not cut accurately.

Grinding: Perfectly straight edges, allowing for minimal joints and requiring extremely precise cuts to maintain aesthetics.

Non-Grinding: Irregular edges, tolerates more imperfections in the cut, but it is still important to make the cleanest cuts possible.

Angle Cutting (45°)

The 45-degree cut is used to create beveled edges, ideal for corners and finishing details.

- Tools:

Miter Cutter with Diamond Disc:

Description: Specialized adjustable tool for precise angle cutting.

Use: Ideal for creating beveled edges on tiles up to 20 mm thick.

Advantages: High precision in angles, ideal for professional finishing and large volume cutting.

Disadvantages: Expensive, requires experience and space for its use.

Angle Grinder with Diamond Disc:

Description: Portable tool equipped with a diamond blade, adjustable for cutting at different angles.

Use: Suitable for angled cuts in smaller tiles and for on-site adjustments.

Advantages: Versatile and portable, allows for fast angled cuts.

Disadvantages: Lower accuracy compared to miter cutter, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Curved or Rounded Cut

Curved cuts are necessary to fit tiles around round objects such as columns, toilets and other elements.

- Tools:

Diamond Blade Jig Saw:

Description: Uses a diamond-coated saw blade for precise, detailed cuts.

Use: Ideal for curved cuts in tiles up to 10 mm thick.

Advantages: High precision in curved cuts and fine details.

Disadvantages: Limited to thinner tiles, requires practice to obtain clean cuts.

Angle Grinder with Segment Disc:

Description: Uses a segmented disc that allows curved cuts to be made.

Use: Suitable for wider curved cuts in tiles up to 20 mm.

Advantages: Versatility and ability to make on-site adjustments.

Disadvantages: Less precision in fine details, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Applicable to all types of finishes: Practicing on leftover tiles is crucial to ensure accuracy and avoid visible errors in the final material.

Drilling of Extruded Stoneware Tiles

Drilling is necessary to install items such as pipes, drains, outlets and other accessories in the tiles.

Small drill holes (for fasteners, screws)

- Tools:

Hammerless Drill with Diamond Drill Bit:

Description: Diamond coated drill bit for precise and clean drilling.

Use: Suitable for drilling holes in tiles up to 20 mm thick.

Advantages: High precision and durability, suitable for hard materials.

Disadvantages: Requires continuous water cooling to avoid overheating and damage to the drill bit.

Hammerless drill with tungsten carbide drill bit:

Description: High hardness drill bit, suitable for ceramic materials less hard than porcelain.

Use: Ideal for tiles up to 10 mm thick.

Advantages: Lower cost compared to diamond drills.

Disadvantages: Lower durability and accuracy, also requires cooling to avoid overheating.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-

grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Applicable to all finishes: It is essential to keep the drill chilled to avoid chipping and damage to the tile surface.

Large Boreholes (for pipes, drains)

- **Tools:**

Diamond Coated Crown Saw:

Description: Diamond coated circular tool designed for large diameter drilling.

Use: Ideal for large holes in tiles up to 20 mm thick.

Advantages: High precision and ability to make clean, large cuts.

Disadvantages: Requires constant cooling to avoid overheating, can be expensive.

Angle Grinder with Diamond Cutting Disc:

Description: Uses a cut-off wheel to enlarge and adjust initial perforations.

Use: To adjust the diameter of large bore holes after the initial cut has been made.

Advantages: Flexibility and ability to make on-site adjustments.

Disadvantages: Less precision in the final finish, requires manual skill to obtain good results.

Electric or Manual Sander with Different Grits of Sandpaper (80, 120, 220):

Description: Tool for smoothing edges after cutting.

Use: Start with 80 grit sandpaper to remove any irregularities. Switch to 120 grit sandpaper and then to 220 grit sandpaper to smooth and polish the edges until they are smooth to the touch.

Advantages: Guarantees smooth and safe edges after cutting.

Disadvantages: Requires additional time and effort for a perfect finish.

In all cases, after cutting the tile, use an electric or hand sander to smooth the edges. Start with 80-grit sandpaper to remove any irregularities. Switch to 120-grit sandpaper and then to 220-grit sandpaper to smooth and polish the edges until they are smooth to the touch.

- Types of Finishes:

Recommended for rectified tiles: To ensure a professional and aesthetic finish when drilling.

Additional Considerations

Tile Thickness:

- 10 mm: Hand tools and lower power tools are usually adequate. Hand cutters and tungsten carbide drills are sufficient for most cutting and drilling.
- 20 mm: Robust power tools, discs and high quality drills are necessary. It is preferable to use water-cooled tools to avoid overheating and damage to the material.

Security:

- Personal Protective Equipment (PPE): The use of safety goggles, gloves, face masks and hearing protection is essential to avoid accidents and to protect against dust and particles.
- Cooling: Using water to cool diamond blades and bits is crucial to avoid overheating and possible fractures in the material.

Practice and Accuracy:

- Preliminary Testing: Perform test cuts and drill holes in leftover tiles to adjust techniques and tools prior to final application. This helps to avoid mistakes and ensure a perfect finish.

Conclusion

Cutting and drilling extruded stoneware tiles is a process that requires attention to detail, the right tools and specific techniques for each type of cut and finish. With practice and the right equipment, it is possible to achieve professional results that enhance the aesthetics and functionality of the space. It is crucial to follow safety recommendations and pre-testing to ensure accurate and clean cuts and perforations in this durable and versatile material.

2.2.2 Laying of Tiles

2.2.2.1 Porcelain Tiles

The installation of porcelain tiles, both indoors and outdoors, requires precision and attention to detail to ensure a quality finish. The following is a complete guide covering all the essential aspects, considering the various finishes, slipperiness ratings and material shading.

Preparation of the Work Area

Cleaning and Preparation of the Area:

- Make sure the surface is clean, dry and level.
- Remove any residue of dust, grease or substances that may affect adhesion.
- Fill cracks or holes in the surface.

- Use a leveling mortar if there are significant unevenness.

Tools and Materials Needed:

- Laser or manual level
- Leveling system (clips and wedges)
- Tape measure
- Tile cutter
- Serrated trowel
- Spatula
- Drill with mortar mixer
- Sponges and water bucket
- Suitable adhesive mortar
- Vibrating tool for tile installation

Preliminary Material Approach

- Lay the tiles on the surface without adhesive, following the planned design.
- Make sure to leave the spaces corresponding to the placement and perimeter joints.
- Visually inspect each tile for manufacturing defects such as cracks, spalling or shade differences.
- Verify that the tiles are from the same batch to ensure uniformity in color and shade.
- Verify prior to installation that the overall appearance of all tiles is as desired.

Adhesive Selection

Type of Adhesive::

- Use cementitious adhesive (C2) according to UNE-EN 12004 standard for porcelain tiles.
- In areas with high humidity or outdoors, consider adhesives with higher adhesion and flexibility (C2TE S1 or S2).

Gaskets and Spacers

Placement Boards:

- For rectified tiles, a minimum joint of 1.5-2 mm is recommended.
- For non-rectified tiles, a minimum joint of 3 mm.

Perimeter Joints:

- Essential for surfaces larger than 7 m².
- Recommended width: 5-10 mm, hidden by the adjacent coating.
- Location: in corners, changes of plane and changes of material.

Expansion Joints:

- Minimum 5 mm, preferably 8 mm.
- Divide surfaces into sections not exceeding 50-70 m² indoors and 30-50 m² outdoors.
- Interrupt linear dimensions greater than 8 m to ensure stability.

5. Classification According to Finish

Brightness:

- Reflects light.
- Consideration: Higher slipperiness index, not recommended in wet areas.

Mate:

- Does not reflect light.
- Consideration: Lower slipperiness index, check classification according to the slipperiness index indicated on the box.

Polishing:

- Smoother surface.
- Consideration: Requires more maintenance to avoid scratches, recommended in low traffic areas.

Semi Polished:

- Combines characteristics of matte and polished finish.
- Consideration: Balance between aesthetics and functionality, moderate slipperiness index.

Classification According to Slipperiness Index

The slipperiness of ceramic tiles is a crucial aspect to consider in order to guarantee safety in various areas, especially those exposed to moisture or pedestrian traffic. The most relevant standards and classifications that regulate the slipperiness of ceramic tiles are detailed below.

European Standards: Standard UNE-EN 14411

Standard UNE-EN 14411 establishes the requirements for ceramic tiles, including slipperiness. Slipperiness tests are performed according to the methods established in DIN 51130 and DIN 51097.

Classification DIN 51130 DIN-EN 16165 ANNEX B:

- This test is applied to tiles for commercial and industrial areas. Slipperiness is measured using a ramp method and is classified according to the angle of inclination at which slippage occurs.

R9: Angle of inclination between 6° and 10°.

R10: Angle of inclination between 10° and 19°.

R11: Angle of inclination between 19° and 27°.

R12: Angle of inclination between 27° and 35°.

R13: Angle of inclination greater than 35°.

Classification DIN 51097 DIN-EN 16165 ANNEX A :

- This test applies to tiles for barefoot wet areas, such as swimming pools and showers. Slipperiness is measured using a ramp method and is classified according to the angle of inclination at which slippage occurs.

Class A: Angle of inclination between 12° and 18°.

Class B: Angle of inclination between 18° and 24°.

Class C: Angle of inclination greater than 24°.

Spanish Regulations: Technical Building Code (Código Técnico de la Edificación, CTE)

The Spanish Technical Building Code also establishes slipperiness requirements for ceramic tiles depending on their use.

Classification according to CTE UNE-EN 16165 NATIONAL ANNEX A :

- Dry Zones (Passage Zones):
Minimum slip resistance: Class 1 ($R_d \geq 15$).
- Wet areas (bathrooms, kitchens, etc.):
Minimum slip resistance: Class 2 ($R_d \geq 35$).
- Outdoor Areas and Industrial Areas:
Minimum slip resistance: Class 3 ($R_d \geq 45$).

International Standard: ANSI A137.1 / ANSI A 326.3

In the United States, ANSI A137.1/ ANSI A 326.3 establishes tests and classifications for ceramic tile slipperiness.

Dynamic Coefficient of Friction (DCOF):

- ANSI A137.1 establishes a minimum value of 0.42 for the dynamic coefficient of friction (DCOF) for ceramic tiles used on wet flat surfaces.

Factors to Consider for Tile Selection

Use and Location:

- Determine whether the tile will be used indoors or outdoors.
- Consider the level of humidity to which the surface will be exposed.

Pedestrian Traffic:

- High traffic areas require tiles with higher slip resistance.

Maintenance:

- Tiles with greater slipperiness may require more maintenance to avoid dirt accumulation that affects their effectiveness.

Practical Recommendations

Appropriate Selection:

- Use tiles with the appropriate classification for each type of area according to the applicable standards (DIN 51130, DIN 51097, CTE, ANSI A137.1).

Installation and Maintenance:

- Make sure that the tiles are installed according to the manufacturer's specifications and regulations.
- Keep tiles clean and free of substances that may increase the risk of slipping.

Material Destonification

Classification:

- **Not Destonified**: Uniform colors and tones.
- **Slightly Detonated**: Minimal pitch variations.
- **Moderately Destonified**: Visible but consistent variations.
- **Highly Detonated**: Significant and random variations, natural effect.

Destonification Management:

- Mix tiles from different boxes for an even distribution of variations.
- When purchasing, make sure that all tiles come from the same lot.

Self-Leveling Systems

Clips and Wedges:

- Place a clip under each corner of the tile and tighten with a wedge.
- It helps to keep the tiles at the same level and avoids unevenness.

Installation Steps with Self-Leveling System:

- Spread a layer of adhesive mortar with a notched trowel.
- Set the tile in place.
- Insert the clips under the edges of the tile.
- Place the next tile and repeat the process.
- Adjust the shims on the clips to ensure a uniform level.

Installation Procedure

Adhesive Application:

- Spread the adhesive with a notched trowel, making sure to completely cover the surface.

- Use the double gluing method (adhesive on the surface and on the back of the tile) to ensure proper adhesion.

Placement:

- Coloque las baldosas presionando firmemente y • Set the tiles by pressing firmly and moving them slightly to settle them into the adhesive with a mallet or vibrating machine.
- Use leveling systems (clips and shims) to maintain joint uniformity.
- Regularly check alignment and leveling.

Joint Filling

Grouting:

- Use a grout suitable for the tile type and joint width.
- Apply the grout with a rubber trowel, making sure to completely fill the joints.
- For tiles with high relief, the use of grouting machines that do not stain or stain the surface as little as possible is recommended. If this is not possible, clean the surface immediately.

Cleaning:

- Wipe off excess grout with a damp sponge before it dries.
- Allow to dry completely according to the manufacturer's recommendations.

Sealing and Finishing

Sealing Perimeter Joints:

- Use elastic caulk to seal perimeter joints.
- Cover with a baseboard for an aesthetic and functional finish.

Final Cleaning:

- Carry out a final cleaning with products suitable for porcelain tiles, avoiding abrasive substances that may damage the surface.

International Norms and Standards

UNE-EN 12004:

- Standard for adhesives used in the installation of ceramic tiles.

UNE-EN 14411:

- Standard regulating specifications for ceramic tiles, including recommended joint sizes.

ISO 13006:

- International standard that establishes guidelines for ceramic tile installation, including joint and adhesive recommendations.

Factors to Consider

Environmental Conditions:

- The temperature of the working area should be between 5°C and 30°C during installation.
- Avoid direct exposure to sunlight or air currents during installation and drying.
- For outdoors, consider factors such as rain, frost and extreme temperature changes.

Maintenance and Care:

- Use non-abrasive cleaning products to avoid damaging the surface.
- Perform periodic inspections to detect and repair possible damage or wear.

By following these standards, a professional and long-lasting installation of porcelain tiles in interiors and exteriors is ensured, guaranteeing both the functionality and the aesthetics of the tiling.

Special care with tiles with crackle glazes

The installation of tiles with crackle glaze requires special attention due to the unique nature of this type of glaze, which presents small cracks on the surface of the tiles.

Preparation of the installation area

Base Surface: Make sure the surface where the ceramic tile will be installed is clean, dry and level. This is crucial to prevent the pieces from peeling or fracturing over time.

Materials: Gather all necessary materials, including high quality ceramic adhesive, spacers, notched trowel, level, ceramic cutter, sponge and water.

Adhesive selection

Adhesive type: Use a flexible adhesive suitable for glazed ceramics. This must be compatible with the water absorption of the ceramic and must have sufficient adhesion to hold the pieces in place.

Adhesive preparation: Follow the manufacturer's instructions for mixing the adhesive. The consistency should be such that it allows a good grip, but should not be too runny.

Ceramic placement

Adhesive Application: Use a notched trowel to apply the adhesive to the surface. The direction of the grooves should be uniform and perpendicular to the direction in which the pieces will be placed.

Installing the pieces: Place the ceramic pieces with crackle glaze carefully into the adhesive, using spacers to ensure even joints. Avoid applying too much pressure on the surface to avoid damaging the glaze.

Leveling: Make sure all pieces are level and level with adjacent pieces. Use a spirit level to check alignment.

Grouting

Grout selection: Use a grout or grout that is compatible with the type of tile and the crackle glaze. It is important to choose a grout that will not stain the glaze and is water resistant.

Application of the grout: Apply the grout over the joints with a rubber trowel, making sure to completely fill the spaces between the pieces. Do not cover the pieces with the grout or bonding material, to prevent the product from remaining in the holes, if so, clean the pieces before the material hardens with a sponge and plenty of clear water.

Initial cleaning: Clean excess grout from the ceramic surface immediately after application using a damp sponge. Careful cleaning is essential to prevent grout from penetrating into cracks in the cracked glaze.

Final cleaning

Residue Removal: Once the grout has dried slightly, wipe the surface of the parts again with a clean sponge and clean water. Several cleanings may be necessary to remove any grout film or residue.

Drying and Curing: Allow the grout and adhesive to cure thoroughly according to the manufacturer's recommendations before exposing the tile to any moisture.

Sealing (Recommended)

Sealer application: apply a special sealer on the cracked glazed ceramic and grout to protect the pieces and prolong their life.

Sealant Drying: Allow the sealant to dry completely before using the installed area.

Additional considerations

Maintenance: Ceramic with crackle glaze requires regular maintenance to prevent the accumulation of dirt in the cracks of the glaze. Use mild cleaners and avoid abrasive products that may damage the glaze.

Damage prevention: Avoid bumps or heavy loads on the ceramic, as the cracked glaze may be more susceptible to damage.

Final inspection

Installation check: Once everything is dry and cured, inspect the installation to make sure that all pieces are firmly attached and that there are no problems with grouting or sealing.

This manual will guide you in the correct installation of crackle glazed ceramic tiles, ensuring an aesthetic and durable result. Always remember to follow the specific recommendations of the manufacturer of the materials you are using.

Special care with tiles with grits, polishes, precious materials (decorated)

Tiles decorated with glazes containing grits, lustres and precious metals are high-end products (DECORATED) that require careful installation to preserve their aesthetics and functionality. This manual details each step of the installation process to ensure an optimal and long-lasting result.

Materials and Tools Needed

Materials:

High quality cementitious adhesive (preferably with deformability characteristics).

Epoxy or cementitious mortar joint.

Compatible joint sealant.

Foam cleaning pads.

Tools:

Notched trowel (adapted to the size of the tile).

Rubber hammer.

Tile separators.

Bubble or laser level.

Rubber spatula.

Tile cutter with diamond disc.

Sponges and buckets of clean water.

Surface Preparation

Cleanliness: Make sure the surface where the tiles will be installed is clean, dry and level. Remove any dust, grease or paint residue that may affect adhesion.

Leveling: If the surface is not level, apply a coat of self-leveling to ensure a flat base.

Waterproofing: If the installation is in wet areas (such as bathrooms), apply a suitable waterproofing membrane.

Installation Planning

Tile Distribution:

Make a preliminary dry layout to plan the distribution of the tiles, starting from the center of the room towards the walls.

Make sure that the cut tiles are on the edges and that the cuts are symmetrical.

If the parts are delivered covered with plastic, do not remove it before installation.

Aesthetic Considerations:

If tiles have specific patterns or decorations, pay attention to orientation and layout to ensure a consistent design.

Adhesive Application

Adhesive preparation:

Mix the cementitious adhesive according to the manufacturer's instructions. Make sure to obtain a homogeneous consistency without lumps.

Application:

Use the notched trowel to spread an even layer of adhesive over the surface, covering a manageable area to prevent the adhesive from drying before setting the tiles.

Apply a layer of adhesive to the back of each tile (double glue) if large tiles are involved or if superior adhesion is required.

Laying the Tiles

Installation:

Place the tiles on the adhesive with a light pressing motion to ensure full contact between the tile and the adhesive.

Use spacers to maintain a uniform joint between tiles.

Periodically check the level with a spirit level or laser, adjusting with the rubber hammer as necessary.

Review:

Inspect each tile after installation to ensure that it is level and aligned with adjacent tiles and free of surface defects.

Clean up any excess adhesive that may come out of the joints before it hardens.

Joints and Finishes

Drying Time: Allow the adhesive to dry completely (according to the manufacturer's instructions) before applying the joints.

Application of the Boards:

Prepare the joint mortar according to the manufacturer's instructions.

Using a rubber spatula, apply the mortar in the joints, making sure to completely fill the spaces between the tiles.

Remove excess mortar with the trowel, using diagonal movements to avoid dragging the material out of the joints.

Cleanliness:

After an initial setting time (approximately 15-30 minutes), clean the surface of the tiles with a damp sponge, making sure not to drag the mortar out of the joints.

Perform a final cleaning after the mortar has set completely, using a slightly damp sponge or soft cloth.

Sealed:

Once the joints are dry, apply a joint sealant to protect against stains and moisture.

Special Considerations for Tiles with Granillas, Lustres and Precious Metals

Manipulation:

Handle tiles carefully to avoid scratches or damage to glazes with luster and precious metals.

Cutting:

When cutting tiles, use a tile cutter with a diamond blade and make slow, controlled cuts to avoid chipping.

Cleanliness:

Avoid using abrasive cleaning products that may damage the luster of polishes or precious metals. Use only mild, non-abrasive cleaners.

Post-installation maintenance

Cleanliness Regular:

Clean the tiles regularly with a damp cloth and a mild detergent. Avoid acidic or abrasive products.

Review of Joints:

Periodically inspect joints and apply additional sealant if necessary to maintain moisture and stain protection.

Damage Repair:

In case of damage to a tile, carefully remove it and replace it following the same installation steps described above.

Conclusion

The installation of tiles with glazes containing grits, lustres and precious metals requires attention to every detail to ensure a perfect finish. By following this technical manual, a durable and aesthetically flawless installation can be achieved, preserving the beauty and quality of these special materials.

2.2.2.2 Interior and Exterior White Paste and Red Paste Ceramic Tile

The installation of white body and red body tiles, on both interior and exterior walls, requires precision and attention to detail to ensure a durable and aesthetically pleasing finish. Below is a comprehensive guide covering all the essentials.

Preparation of the Work Area

Cleaning and Preparation of the Area:

- Make sure the surface is clean, dry and level.
- Remove any residue of dust, grease or substances that may affect adhesion.
- Fill cracks or holes in the surface.
- Use a leveling mortar if there are significant unevenness.

Tools and Materials Needed:

- Laser or manual level
- Leveling system (clips and wedges)
- Tape measure
- Tile cutter
- Serrated trowel
- Spatula
- Drill with mortar mixer
- Sponges and water bucket
- Suitable adhesive mortar
- Vibrating tool for tile installation

Preliminary Material Approach

- Lay the tiles on the surface without adhesive, following the planned design.
- Make sure to leave the spaces corresponding to the placement and perimeter joints.
- Visually inspect each tile for manufacturing defects such as cracks, spalling or shade differences.
- Verify that the tiles are from the same batch to ensure uniformity in color and shade.
- Verify prior to installation that the overall appearance of all tiles is as desired.

Adhesive Selection

Type of Adhesive:

- Use cementitious adhesive (C1 or C2) according to the UNE-EN 12004 standard for white body and red body tiles.
- In areas with high humidity or outdoors, consider adhesives with higher adhesion and flexibility (C2TE S1 or S2).

Gaskets and Spacers

Placement Boards:

- For rectified tiles, a minimum joint of 1.5-2 mm is recommended.
- For non-rectified tiles, a minimum joint of 3 mm.

Perimeter Joints:

- Essential for surfaces larger than 7 m².
- Recommended width: 5-10 mm, hidden by the adjacent coating.
- Location: in corners, changes of plane and changes of material.

Expansion Joints:

- Minimum 5 mm, preferably 8 mm.
- Divide surfaces into sections not exceeding 50-70 m² indoors and 30-50 m² outdoors.
- Interrupt linear dimensions greater than 8 m to ensure stability.

Installation Procedure

Adhesive Application:

- Spread the adhesive with a notched trowel, making sure to completely cover the surface.
- Use the double gluing method (adhesive on the surface and on the back of the tile) to ensure proper adhesion.

Placement:

- Set the tiles by pressing firmly and moving them slightly to seat them in the adhesive.
- Use leveling systems (clips and shims) to maintain joint uniformity.
- Regularly check alignment and leveling.

Joint Filling

Grouting:

- Use a grout suitable for the tile type and joint width. For tiles with high relief, the use of grouting machines that do not stain or stain the tile surface as little as possible is recommended. If this is not possible, clean the surface immediately.
- Apply the grout with a rubber trowel, making sure to completely fill the joints.

Cleaning:

- Wipe off excess grout with a damp sponge before it dries, in the case of highly embossed products clean the surface as soon as it is stained.
- Allow to dry completely according to the manufacturer's recommendations.

Sealing and Finishing

Sealing of Perimeter Joints:

- Use elastic caulk to seal perimeter joints.
- Cover with a baseboard for an aesthetic and functional finish.

Final Cleaning:

- Carry out a final cleaning with products suitable for white and red body tiles, avoiding abrasive substances that may damage the surface.

International Norms and Standards

UNE-EN 12004:

- Standard for adhesives used in the installation of ceramic tiles.

UNE-EN 14411:

- Standard regulating specifications for ceramic tiles, including recommended joint sizes.

ISO 13006:

- International standard that establishes guidelines for ceramic tile installation, including joint and adhesive recommendations.

Factors to Consider

Environmental Conditions:

- The temperature of the working area should be between 5°C and 30°C during installation.
- Avoid direct exposure to sunlight or air currents during installation and drying.
- For outdoors, consider factors such as rain, frost and extreme temperature changes.
- If craquelure material is to be placed in wet areas, it requires the application of sealers on the surface.

Maintenance and Care:

- Use non-abrasive cleaning products to avoid damaging the surface.
- Perform periodic inspections to detect and repair possible damage or wear.

By following these standards, a professional and durable installation of white body and red body tiles on interior and exterior walls is ensured, guaranteeing both the functionality and the aesthetics of the cladding.

Special care with tiles with crackle glazes

The installation of tiles with crackle glaze requires special attention due to the unique nature of this type of glaze, which

presents small cracks on the surface of the tiles.

Preparation of the installation area

Base Surface: Make sure the surface where the ceramic tile will be installed is clean, dry and level. This is crucial to prevent the pieces from peeling or fracturing over time.

Materials: Gather all necessary materials, including high quality ceramic adhesive, spacers, notched trowel, level, ceramic cutter, sponge and water.

Adhesive selection

Adhesive type: Use a flexible adhesive suitable for glazed ceramics. This must be compatible with the water absorption of the ceramic and must have sufficient adhesion to hold the pieces in place.

Adhesive preparation: Follow the manufacturer's instructions for mixing the adhesive. The consistency should be such that it allows a good grip, but should not be too runny.

Ceramic placement

Adhesive Application: Use a notched trowel to apply the adhesive to the surface. The direction of the grooves should be uniform and perpendicular to the direction in which the pieces will be placed.

Installing the pieces: Place the ceramic pieces with crackle glaze carefully into the adhesive, using spacers to ensure even joints. Avoid applying too much pressure on the surface to avoid damaging the glaze.

Leveling: Make sure all pieces are level and level with adjacent pieces. Use a spirit level to check alignment.

Grouting

Grout selection: Use a grout or grout that is compatible with the type of tile and the crackle glaze. It is important to choose a grout that will not stain the glaze and is water resistant.

Application of the grout: Apply the grout over the joints with a rubber trowel, making sure to completely fill the spaces between the pieces. Do not cover the pieces with the grout or bonding material, to prevent the product from remaining in the holes, if so, clean the pieces before the material hardens with a sponge and plenty of clear water.

Initial cleaning: Clean excess grout from the ceramic surface immediately after application using a damp sponge. Careful cleaning is essential to prevent grout from penetrating into cracks in the cracked glaze.

Final cleaning

Residue Removal: Once the grout has dried slightly, wipe the surface of the parts again with a clean sponge and

clean water. Several cleanings may be necessary to remove any grout film or residue.

Drying and Curing: Allow the grout and adhesive to cure thoroughly according to the manufacturer's recommendations before exposing the tile to any moisture.

Sealing (Recommended)

Sealer application: apply a special sealer on the cracked glazed ceramic and grout to protect the pieces and prolong their life.

Sealant Drying: Allow the sealant to dry completely before using the installed area.

Additional considerations

Maintenance: Ceramic with crackle glaze requires regular maintenance to prevent the accumulation of dirt in the cracks of the glaze. Use mild cleaners and avoid abrasive products that may damage the glaze.

Damage prevention: Avoid bumps or heavy loads on the ceramic, as the cracked glaze may be more susceptible to damage.

Final inspection

Installation check: Once everything is dry and cured, inspect the installation to make sure that all pieces are firmly attached and that there are no problems with grouting or sealing.

This manual will guide you in the correct installation of crackle glazed ceramic tiles, ensuring an aesthetic and durable result. Always remember to follow the specific recommendations of the manufacturer of the materials you are using.

Special care with tiles with grits, polishes, precious materials (decorated)

Tiles decorated with glazes containing grits, lustres and precious metals are high-end products (DECORATED) that require careful installation to preserve their aesthetics and functionality. This manual details each step of the installation process to ensure an optimal and long-lasting result.

Materials and Tools Needed

Materials:

High quality cementitious adhesive (preferably with deformability characteristics).

Epoxy or cementitious mortar joint.

Compatible joint sealant.

Foam cleaning pads.

Tools:

Notched trowel (adapted to the size of the tile).

Rubber hammer.

Tile separators.

Bubble or laser level.

Rubber spatula.

Tile cutter with diamond disc.

Sponges and buckets of clean water.

Surface Preparation

Cleanliness: Make sure the surface where the tiles will be installed is clean, dry and level. Remove any dust, grease or paint residue that may affect adhesion.

Leveling: If the surface is not level, apply a coat of self-leveling to ensure a flat base.

Waterproofing: If the installation is in wet areas (such as bathrooms), apply a suitable waterproofing membrane.

Installation Planning

Tile Distribution:

Make a preliminary dry layout to plan the distribution of the tiles, starting from the center of the room towards the walls.

Make sure that the cut tiles are on the edges and that the cuts are symmetrical.

If the parts are delivered covered with plastic, do not remove it before installation.

Aesthetic Considerations:

If tiles have specific patterns or decorations, pay attention to orientation and layout to ensure a consistent design.

Adhesive Application

Adhesive preparation:

Mix the cementitious adhesive according to the manufacturer's instructions. Make sure to obtain a homogeneous consistency without lumps.

Application:

Use the notched trowel to spread an even layer of adhesive over the surface, covering a manageable area to prevent the adhesive from drying before setting the tiles.

Apply a layer of adhesive to the back of each tile (double glue) if large tiles are involved or if superior adhesion is required.

Laying the Tiles

Installation:

Place the tiles on the adhesive with a light pressing motion

to ensure full contact between the tile and the adhesive.

Use spacers to maintain a uniform joint between tiles.

Periodically check the level with a spirit level or laser, adjusting with the rubber hammer as necessary.

Review:

Inspect each tile after installation to ensure that it is level and aligned with adjacent tiles and free of surface defects.

Clean up any excess adhesive that may come out of the joints before it hardens.

Joints and Finishes

Drying Time: Allow the adhesive to dry completely (according to the manufacturer's instructions) before applying the joints.

Application of the Boards:

Prepare the joint mortar according to the manufacturer's instructions.

Using a rubber spatula, apply the mortar in the joints, making sure to completely fill the spaces between the tiles.

Remove excess mortar with the trowel, using diagonal movements to avoid dragging the material out of the joints.

Cleanliness:

After an initial setting time (approximately 15-30 minutes), clean the surface of the tiles with a damp sponge, making sure not to drag the mortar out of the joints.

Perform a final cleaning after the mortar has set completely, using a slightly damp sponge or soft cloth.

Sealed:

Once the joints are dry, apply a joint sealant to protect against stains and moisture.

Special Considerations for Tiles with Granillas, Lustres and Precious Metals

Manipulation:

Handle tiles carefully to avoid scratches or damage to glazes with luster and precious metals.

Cutting:

When cutting tiles, use a tile cutter with a diamond blade and make slow, controlled cuts to avoid chipping.

Cleanliness:

Avoid using abrasive cleaning products that may damage the luster of polishes or precious metals. Use only mild,

non-abrasive cleaners.

Post-installation maintenance

Cleanliness Regular:

Clean the tiles regularly with a damp cloth and a mild detergent. Avoid acidic or abrasive products.

Review of Joints:

Periodically inspect joints and apply additional sealant if necessary to maintain moisture and stain protection.

Damage Repair:

In case of damage to a tile, carefully remove it and replace it following the same installation steps described above.

Conclusion

The installation of tiles with glazes containing grits, lustres and precious metals requires attention to every detail to ensure a perfect finish. By following this technical manual, a durable and aesthetically flawless installation can be achieved, preserving the beauty and quality of these special materials.

2.2.2.3 White Paste and Red Paste Stonewares

The correct installation of white body and red body stoneware tiles is essential to ensure their durability and aesthetics both indoors and outdoors. This guide provides a detailed step-by-step guide, including relevant regulations to ensure proper installation.

Preparation of the Work Area

Cleaning and Preparation of the Area:

- Make sure the surface is clean, dry and level.
- Remove any residue of dust, grease or substances that may affect adhesion.
- Fill cracks or holes in the surface.
- Use a leveling mortar if there are significant unevenness.

Tools and Materials Needed:

- Laser or manual level
- Leveling system (clips and wedges)
- Tape measure
- Tile cutter
- Serrated trowel
- Spatula

- Drill with mortar mixer
- Sponges and water bucket
- Suitable adhesive mortar
- Vibrating tool for tile installation

Preliminary Material Approach

- Lay the tiles on the surface without adhesive, following the planned design.
- Make sure to leave the spaces corresponding to the placement and perimeter joints.
- Visually inspect each tile for manufacturing defects such as cracks, spalling or shade differences.
- Verify that the tiles are from the same batch to ensure uniformity in color and shade.
- Verify prior to installation that the overall appearance of all tiles is as desired.

Adhesive Selection

Type of Adhesive:

- Use adhesivo cementoso (C1 o C2) según la norma UNE-EN 12004 para baldosas de gres de pasta blanca y pasta roja.
- En áreas con alta humedad o exteriores, considere adhesivos con mayor adherencia y flexibilidad (C2TE S1 o S2).

Gaskets and Spacers

Placement Boards:

- For rectified tiles, a minimum joint of 1.5-2 mm is recommended.
- For non-rectified tiles, a minimum joint of 3 mm.

Perimeter Joints:

- Essential for surfaces larger than 7 m².
- Recommended width: 5-10 mm, hidden by the adjacent coating.
- Location: in corners, changes of plane and changes of material.

Expansion Joints:

- Minimum 5 mm, preferably 8 mm.
- Divide surfaces into sections not exceeding 50-70 m² indoors and 30-50 m² outdoors.
- Interrupt linear dimensions greater than 8 m to ensure stability.

Classification According to Slipperiness Index

The slipperiness of ceramic tiles is a crucial aspect to consider in order to guarantee safety in various areas, especially those exposed to moisture or pedestrian traffic. The most relevant standards and classifications that regulate the slipperiness of ceramic tiles are detailed below.

European Standards: Standard UNE-EN 14411

UNE-EN 14411 establishes the requirements for ceramic tiles, including slipperiness. Tests are performed according to DIN 51130 and DIN 51097.

DIN 51130 Classification:

- This test is applied to tiles for commercial and industrial areas. Slipperiness is measured using a ramp method and is classified according to the angle of inclination at which slippage occurs.

R9: Angle of inclination between 6° and 10°.

R10: Angle of inclination between 10° and 19°.

R11: Angle of inclination between 19° and 27°.

R12: Angle of inclination between 27° and 35°.

R13: Angle of inclination greater than 35°.

DIN 51097 Classification:

- This test applies to tiles for barefoot wet areas, such as swimming pools and showers. Slipperiness is measured using a ramp method and is classified according to the angle of inclination at which slippage occurs.

Class A: Angle of inclination between 12° and 18°.

Class B: Angle of inclination between 18° and 24°.

Class C: Angle of inclination greater than 24°.

Spanish Regulations: Technical Building Code (Código Técnico de la Edificación, CTE)

The Spanish Technical Building Code also establishes slipperiness requirements for ceramic tiles depending on their use.

Classification according to the CTE:

- Dry Zones (Passage Zones):

Minimum slip resistance: Class 1 (Rd ≥ 15).

- Wet areas (bathrooms, kitchens, etc.):

Minimum slip resistance: Class 2 (Rd ≥ 35).

- Outdoor Areas and Industrial Areas:

Minimum slip resistance: Class 3 (Rd ≥ 45).

International Standard: ANSI A137.1

In the United States, ANSI A137.1 establishes tests and classifications for ceramic tile slipperiness.

Dynamic Coefficient of Friction (DCOF)::

- ANSI A137.1 establishes a minimum value of 0.42 for the dynamic coefficient of friction (DCOF) for ceramic tiles used on wet flat surfaces.

Factors to Consider for Tile Selection**Use and Location:**

- Determine whether the tile will be used indoors or outdoors.
- Consider the level of humidity to which the surface will be exposed.

Pedestrian Traffic:

- High traffic areas require tiles with higher slip resistance.

Maintenance:

- Tiles with greater slipperiness may require more maintenance to avoid dirt accumulation that affects their effectiveness.

Practical Recommendations**Appropriate Selection:**

- Use tiles with the appropriate classification for each type of area according to the applicable standards (DIN 51130, DIN 51097, CTE, ANSI A137.1).

Installation and Maintenance:

- Make sure that the tiles are installed according to the manufacturer's specifications and regulations.
- Keep tiles clean and free of substances that may increase the risk of slipping.

Material Destonification**Classification:**

- Not Destonified: Uniform colors and tones.
- Slightly Detonated: Minimal pitch variations.
- Moderately Destonified: Visible but consistent variations.
- Highly Detonated: Significant and random variations, natural effect.

Destonification Management:

- Mix tiles from different boxes for an even distribution of variations.
- When purchasing, make sure that all tiles come from the same lot.

Self-Leveling Systems**Clips and Wedges:**

- Place a clip under each corner of the tile and tighten with a wedge.

- It helps to keep the tiles at the same level and avoids unevenness.

Installation Steps with Self-Leveling System:

- Spread a layer of adhesive mortar with a notched trowel.
- Set the tile in place.
- Insert the clips under the edges of the tile.
- Place the next tile and repeat the process.
- Adjust the shims on the clips to ensure a uniform level.

Installation Procedure**Adhesive Application:**

- Spread the adhesive with a notched trowel, making sure to completely cover the surface.
- Use the double gluing method (adhesive on the surface and on the back of the tile) to ensure proper adhesion.

Placement:

- Set the tiles by pressing firmly and moving them slightly to settle them in the adhesive with a mallet or vibrating machine.
- Use leveling systems (clips and shims) to maintain joint uniformity.
- Regularly check alignment and leveling.

Joint Filling**Grouting:**

- Use a grout suitable for the tile type and joint width.
- Apply the grout with a rubber trowel, making sure to completely fill the joints.

Cleaning:

- Wipe off excess grout with a damp sponge before it dries.
- Allow to dry completely according to the manufacturer's recommendations.

Sealing and Finishing**Sealing of Perimeter Joints:**

- Use elastic caulk to seal perimeter joints.
- Cover with a baseboard for an aesthetic and functional finish.

Final Cleaning:

- Carry out a final cleaning with products suitable for stoneware tiles, avoiding abrasive substances that may damage the surface.

International Norms and Standards

UNE-EN 12004:

- Standard for adhesives used in the installation of ceramic tiles.

UNE-EN 14411:

- Standard regulating specifications for ceramic tiles, including recommended joint sizes.

ISO 13006:

- International standard that establishes guidelines for ceramic tile installation, including joint and adhesive recommendations.

Factors to Consider

Environmental Conditions:

- The temperature of the working area should be between 5°C and 30°C during installation.
- Avoid direct exposure to sunlight or air currents during installation and drying.
- For outdoors, consider factors such as rain, frost and extreme temperature changes.

Maintenance and Care:

- Use non-abrasive cleaning products to avoid damaging the surface.
- Perform periodic inspections to detect and repair possible damage or wear.

By following these standards, a professional and long-lasting installation of white body and red body stoneware tiles in interiors and exteriors is ensured, guaranteeing both the functionality and the aesthetics of the tiling.

Special care with tiles with crackle glazes

The installation of tiles with crackle glaze requires special attention due to the unique nature of this type of glaze, which presents small cracks on the surface of the tiles.

Preparation of the installation area

Base Surface: Make sure the surface where the ceramic tile will be installed is clean, dry and level. This is crucial to prevent the pieces from peeling or fracturing over time.

Materials: Gather all necessary materials, including high quality ceramic adhesive, spacers, notched trowel, level, ceramic cutter, sponge and water.

Adhesive selection

Adhesive type: Use a flexible adhesive suitable for glazed ceramics. This must be compatible with the water

absorption of the ceramic and must have sufficient adhesion to hold the pieces in place.

Adhesive preparation: Follow the manufacturer's instructions for mixing the adhesive. The consistency should be such that it allows a good grip, but should not be too runny.

Ceramic placement

Adhesive Application: Use a notched trowel to apply the adhesive to the surface. The direction of the grooves should be uniform and perpendicular to the direction in which the pieces will be placed.

Installing the pieces: Place the ceramic pieces with crackle glaze carefully into the adhesive, using spacers to ensure even joints. Avoid applying too much pressure on the surface to avoid damaging the glaze.

Leveling: Make sure all pieces are level and level with adjacent pieces. Use a spirit level to check alignment.

Grouting

Grout selection: Use a grout or grout that is compatible with the type of tile and the crackle glaze. It is important to choose a grout that will not stain the glaze and is water resistant.

Application of the grout: Apply the grout over the joints with a rubber trowel, making sure to completely fill the spaces between the pieces. Do not cover the pieces with the grout or bonding material, to prevent the product from remaining in the holes, if so, clean the pieces before the material hardens with a sponge and plenty of clear water.

Initial cleaning: Clean excess grout from the ceramic surface immediately after application using a damp sponge. Careful cleaning is essential to prevent grout from penetrating into cracks in the cracked glaze.

Final cleaning

Residue Removal: Once the grout has dried slightly, wipe the surface of the parts again with a clean sponge and clean water. Several cleanings may be necessary to remove any grout film or residue.

Drying and Curing: Allow the grout and adhesive to cure thoroughly according to the manufacturer's recommendations before exposing the tile to any moisture.

Sealing (Recommended)

Sealer application: apply a special sealer on the cracked glazed ceramic and grout to protect the pieces and prolong their life.

Sealant Drying: Allow the sealant to dry completely before using the installed area.

Additional considerations

Maintenance: Ceramic with crackle glaze requires regular

maintenance to prevent the accumulation of dirt in the cracks of the glaze. Use mild cleaners and avoid abrasive products that may damage the glaze.

Damage prevention: Avoid bumps or heavy loads on the ceramic, as the cracked glaze may be more susceptible to damage.

Final inspection

Installation check: Once everything is dry and cured, inspect the installation to make sure that all pieces are firmly attached and that there are no problems with grouting or sealing.

This manual will guide you in the correct installation of crackle glazed ceramic tiles, ensuring an aesthetic and durable result. Always remember to follow the specific recommendations of the manufacturer of the materials you are using.

Special care with tiles with grits, polishes, precious materials (decorated)

Tiles decorated with glazes containing grits, lustres and precious metals are high-end products (DECORATED) that require careful installation to preserve their aesthetics and functionality. This manual details each step of the installation process to ensure an optimal and long-lasting result.

Materials and Tools Needed

Materials:

High quality cementitious adhesive (preferably with deformability characteristics).

Epoxy or cementitious mortar joint.

Compatible joint sealant.

Foam cleaning pads.

Tools:

Notched trowel (adapted to the size of the tile).

Rubber hammer.

Tile separators.

Bubble or laser level.

Rubber spatula.

Tile cutter with diamond disc.

Sponges and buckets of clean water.

Surface Preparation

Cleanliness: Make sure the surface where the tiles will be installed is clean, dry and level. Remove any dust, grease or paint residue that may affect adhesion.

Leveling: If the surface is not level, apply a coat of self-leveling to ensure a flat base.

Waterproofing: If the installation is in wet areas (such as bathrooms), apply a suitable waterproofing membrane.

Installation Planning

Tile Distribution:

Make a preliminary dry layout to plan the distribution of the tiles, starting from the center of the room towards the walls.

Make sure that the cut tiles are on the edges and that the cuts are symmetrical.

If the parts are delivered covered with plastic, do not remove it before installation.

Aesthetic Considerations:

If tiles have specific patterns or decorations, pay attention to orientation and layout to ensure a consistent design.

Adhesive Application

Adhesive preparation:

Mix the cementitious adhesive according to the manufacturer's instructions. Make sure to obtain a homogeneous consistency without lumps.

Application:

Use the notched trowel to spread an even layer of adhesive over the surface, covering a manageable area to prevent the adhesive from drying before setting the tiles.

Apply a layer of adhesive to the back of each tile (double glue) if large tiles are involved or if superior adhesion is required.

Laying the Tiles

Installation:

Place the tiles on the adhesive with a light pressing motion to ensure full contact between the tile and the adhesive.

Use spacers to maintain a uniform joint between tiles.

Periodically check the level with a spirit level or laser, adjusting with the rubber hammer as necessary.

Review:

Inspect each tile after installation to ensure that it is level and aligned with adjacent tiles and free of surface defects.

Clean up any excess adhesive that may come out of the joints before it hardens.

Joints and Finishes

Drying Time: Allow the adhesive to dry completely (according to the manufacturer's instructions) before applying the joints.

Application of the Boards:

Prepare the joint mortar according to the manufacturer's instructions.

Using a rubber spatula, apply the mortar in the joints, making sure to completely fill the spaces between the tiles.

Remove excess mortar with the trowel, using diagonal movements to avoid dragging the material out of the joints.

Cleanliness:

After an initial setting time (approximately 15-30 minutes), clean the surface of the tiles with a damp sponge, making sure not to drag the mortar out of the joints.

Perform a final cleaning after the mortar has set completely, using a slightly damp sponge or soft cloth.

Sealed:

Once the joints are dry, apply a joint sealant to protect against stains and moisture.

Special Considerations for Tiles with Granillas, Lustres and Precious Metals**Manipulation:**

Handle tiles carefully to avoid scratches or damage to glazes with luster and precious metals.

Cutting:

When cutting tiles, use a tile cutter with a diamond blade and make slow, controlled cuts to avoid chipping.

Cleanliness:

Avoid using abrasive cleaning products that may damage the luster of polishes or precious metals. Use only mild, non-abrasive cleaners.

Post-installation maintenance**Cleanliness Regular:**

Clean the tiles regularly with a damp cloth and a mild detergent. Avoid acidic or abrasive products.

Review of Joints:

Periodically inspect joints and apply additional sealant if necessary to maintain moisture and stain protection.

Damage Repair:

In case of damage to a tile, carefully remove it and replace it following the same installation steps described above.

Conclusion

The installation of tiles with glazes containing grits, lustres

and precious metals requires attention to every detail to ensure a perfect finish. By following this technical manual, a durable and aesthetically flawless installation can be achieved, preserving the beauty and quality of these special materials.

2.2.2.4 Stoneware extrusions**2.2.2 Installation of Extruded Stoneware Tiles****2.2.2 Installation of Extruded Stoneware Tiles**

Installing extruded stoneware tiles, both indoors and outdoors, requires precision and attention to detail to ensure a quality finish. Below is a comprehensive guide covering all the essentials.

Preparation of the Work Area**Cleaning and Preparation of the Area:**

- Make sure the surface is clean, dry and level.
- Remove any residue of dust, grease or substances that may affect adhesion.
- Fill cracks or holes in the surface.
- Use a leveling mortar if there are significant unevenness.

Tools and Materials Needed:

- Laser or manual level
- Leveling system (clips and wedges)
- Tape measure
- Tile cutter
- Serrated trowel
- Spatula
- Drill with mortar mixer
- Sponges and water bucket
- Suitable adhesive mortar
- Vibrating tool for tile installation

Preliminary Material Approach

- Lay the tiles on the surface without adhesive, following the planned design.
- Make sure to leave the spaces corresponding to the placement and perimeter joints.
- Visually inspect each tile for manufacturing defects such as cracks, spalling or shade differences.
- Verify that the tiles are from the same batch to ensure uniformity in color and shade.
- Verify prior to installation that the overall appearance of all tiles is as desired.

- In the case of stairs and pool coping systems, please check the technical information and installation diagrams in the APEGRUPO SWIMMING POOLS catalog.

Adhesive Selection

Type of Adhesive:

- Use cementitious adhesive (C1 or C2) according to the UNE-EN 12004 standard for extruded stoneware tiles.
- In areas with high humidity or outdoors, consider adhesives with higher adhesion and flexibility (C2TE S1 or S2).

Gaskets and Spacers

Placement Boards:

- For rectified tiles, a minimum joint of 1.5-2 mm is recommended.
- For non-rectified tiles, a minimum joint of 5 mm.

Perimeter Joints:

- Essential for surfaces larger than 7 m².
- Recommended width: 5-10 mm, hidden by the adjacent coating.
- Location: in corners, changes of plane and changes of material.

Expansion Joints:

- Minimum 5 mm, preferably 8 mm.
- Divide surfaces into sections not exceeding 50-70 m² indoors and 30-50 m² outdoors.
- Interrupt linear dimensions greater than 8 m to ensure stability.

Classification According to the Slipperiness Index

The slipperiness of extruded stoneware tiles is crucial to ensure safety in various areas, especially those exposed to moisture or pedestrian traffic. The most relevant standards and classifications are listed below.

European Standards: Standard UNE-EN 14411

UNE-EN 14411 establishes the requirements for ceramic tiles, including slipperiness. Slipperiness tests are performed according to the methods established in DIN 51130 and DIN 51097.

DIN 51130 classification:

- This test is applied to tiles for commercial and industrial areas. Slipperiness is measured using a ramp method and is classified according to the angle of inclination at which slippage occurs.

R9: Angle of inclination between 6° and 10°.

R10: Angle of inclination between 10° and 19°.

R11: Angle of inclination between 19° and 27°.

R12: Angle of inclination between 27° and 35°.

R13: Angle of inclination greater than 35°.

DIN 51097 classification:

- This test applies to tiles for barefoot wet areas, such as swimming pools and showers. Slipperiness is measured using a ramp method and is classified according to the angle of inclination at which slippage occurs.

Class A: Angle of inclination between 12° and 18°.

Class B: Angle of inclination between 18° and 24°.

Class C: Angle of inclination greater than 24°.

Spanish Regulations: Technical Building Code (Código Técnico de la Edificación, CTE)

The Spanish Technical Building Code also establishes slipperiness requirements for ceramic tiles depending on their use.

Classification according to the CTE:

- Dry Zones (Passage Zones):
Minimum slip resistance: Class 1 (Rd ≥ 15).
- Wet areas (bathrooms, kitchens, etc.):
Minimum slip resistance: Class 2 (Rd ≥ 35).
- Outdoor Areas and Industrial Areas:
Minimum slip resistance: Class 3 (Rd ≥ 45).

International Standard: ANSI A137.1

In the United States, ANSI A137.1 establishes tests and classifications for ceramic tile slipperiness.

Dynamic Coefficient of Friction (DCOF):

- ANSI A137.1 establishes a minimum value of 0.42 for the dynamic coefficient of friction (DCOF) for ceramic tiles used on wet flat surfaces.

Factors to Consider for Tile Selection

Use and Location:

- Determine whether the tile will be used indoors or outdoors.
- Consider the level of humidity to which the surface will be exposed.

Pedestrian Traffic:

- High traffic areas require tiles with higher slip resistance.

Maintenance:

- Tiles with greater slipperiness may require more maintenance to avoid dirt accumulation that affects their effectiveness.

Practical Recommendations**Appropriate Selection:**

- Use tiles with the appropriate classification for each type of area according to the applicable standards (DIN 51130, DIN 51097, CTE, ANSI A137.1).

Installation and Maintenance:

- Make sure that the tiles are installed according to the manufacturer's specifications and the corresponding regulations.
- Keep tiles clean and free of substances that may increase the risk of slipping.

Material Destonification**Classification:**

- Not Destonified: Uniform colors and tones.
- Slightly Detonated: Minimal pitch variations.
- Moderately Destonified: Visible but consistent variations.
- Highly Detonated: Significant and random variations, natural effect.

Destonification Management:

- Mix tiles from different boxes for an even distribution of variations.
- When purchasing, make sure that all tiles come from the same lot.

Self-Leveling Systems**Clips and Wedges:**

- Place a clip under each corner of the tile and tighten with a wedge.
- It helps to keep the tiles at the same level and avoids unevenness.

Installation Steps with Self-Leveling System:

- Spread a layer of adhesive mortar with a notched trowel.
- Set the tile in place.
- Insert the clips under the edges of the tile.
- Place the next tile and repeat the process.
- Adjust the shims on the clips to ensure a uniform level.

Installation Procedure**Adhesive Application:**

- Spread the adhesive with a notched trowel, making sure to completely cover the surface.

- Use the double gluing method (adhesive on the surface and on the back of the tile) to ensure proper adhesion.

Placement:

- Set the tiles by pressing firmly and moving them slightly to settle them into the adhesive with a mallet or vibrating machine.
- Use leveling systems (clips and shims) to maintain joint uniformity.
- Regularly check alignment and leveling.

Joint Filling**Grouting:**

- Use a grout suitable for the tile type and joint width.
- Apply the grout with a rubber trowel, making sure to completely fill the joints.
- For tiles with high relief, the use of grouting machines that do not stain or stain the surface as little as possible is recommended. If this is not possible, clean the surface immediately.

Cleaning:

- Wipe off excess grout with a damp sponge before it dries.
- Allow to dry completely according to the manufacturer's recommendations.

Sealing and Finishing**Sealing of Perimeter Joints:**

- Use elastic caulk to seal perimeter joints.
- Cover with a baseboard for an aesthetic and functional finish.

Final Cleaning:

- Carry out a final cleaning with products suitable for stoneware tiles, avoiding abrasive substances that may damage the surface.

International Norms and Standards**UNE-EN 12004:**

- Standard for adhesives used in the installation of ceramic tiles.

UNE-EN 14411:

- Standard regulating specifications for ceramic tiles, including recommended joint sizes.

ISO 13006:

- International standard that establishes guidelines for ceramic tile installation, including joint and adhesive recommendations.

Factors to Consider

Environmental Conditions:

- The temperature of the working area should be between 5°C and 30°C during installation.
- Avoid direct exposure to sunlight or air currents during installation and drying.
- For outdoors, consider factors such as rain, frost and extreme temperature changes.

Maintenance and Care:

- Use non-abrasive cleaning products to avoid damaging the surface.
- Perform periodic inspections to detect and repair possible damage or wear.

By following these standards, a professional and durable installation of extruded stoneware tiles in interiors and exteriors is ensured, guaranteeing both the functionality and the aesthetics of the cladding.

Special care with the installation of louvers

Ceramic lattice installation manual

General Recommendations

Bonding material

- The choice of a particular bonding material and its application is determined by the type of substrate, the place of installation, type of product and aesthetic finish.

Type of support

- Determining the type of support and analyzing its condition is of vital importance, since some materials may have traces of other materials or little resistance.

Installation site

- Each installation area may require a different adhesive, differentiating between indoor and outdoor areas.

Type of product

TYPE OF PRODUCT

- The characteristics of the ceramic tile to be installed should be known, since one of the most important factors is water absorption. The absorption of the ceramic tile is determined by its porosity. For example, if a tile has an absorption of less than 3%, its porosity will be considered low and, as a general rule, it will require a higher performance adhesive.
- Dimensional stability will be another important factor in determining the joint element and joint size.

Aesthetic finish

- Influence of the adhesive on the desired image in the lattice cloth. An example would be to use the joint itself flush enhancing the effect of the gaps generated by the lattice piece or recessed in the cloth itself reinforcing the shadows between pieces.
- The union between trusses by means of joints is made with mortar or cement glue, making sure that the correct amount is used to avoid voids or cracks in the interior of the trusses.
 - Cemento glue: Composed mainly of cement, sand and additives that improve its adherence. Among them we can differentiate between C1 (recommended for interior) and C2 (recommended for exterior).
 - Mortero flexible: also known as flexible mortar, it is a solution designed to be more elastic and resistant to structural stresses. It is differentiated from normal cement glue by its classification into S1 and S2, depending on the deformation capacity. S1 are the most common, as S2 offer high deformability.

Thermal Dilatation

All materials expand to a greater or lesser degree under different temperature gradients. Each material used in construction has its own coefficient of expansion, so:

- Joining two materials with different coefficients of expansion responds to high mechanical stresses, which generally generates a compromise between performance and flexibility so as not to compromise the integrity of each of the parts.
- It is necessary to know the type of joint to be worked on (structural, perimeter or intermediate), as well as its dimensioning.
- Element used as a sealant must be able to maintain a uniform bond between the different materials used.

On-site execution

General principles of placement

- Preparation and adequacy of the resistant substrate
- Lift the lattice wall in rows, checking that the result is level and plumb. Use mortar with a consistency that is not too liquid to prevent it from overflowing and staining the piece, providing greater stability to the whole during installation.
- Leave joints between pieces of at least 1 cm. Clean the joints.
- To cover surfaces larger than 4 m², it is advisable to assemble the lattices.
- An arrangement of different types of movement joints has to be studied for the truss panels: perimeter expansion joint and expansion joint between modules.

- Avoid installing the lattice on frosty or extremely hot days.

On-site installation for interior louvres

Indoor trusses are not normally subjected to horizontal stresses such as wind, but may be subject to vertical loads when they are arranged as a load-bearing wall or part of it. In this case it will be necessary to consider the reinforcement if the calculation so indicates. If they are intended for compartmentalization or separation, since they are not structural in nature, reinforcement will not be essential, respecting the general principles of placement and installation.

Stability will be a fundamental factor, taking into account the conditions of attachment to the perimeter or substructure.

- If reinforcement is used and it is an improvement in the guarantee or an essential fact, 6 mm diameter stainless steel threaded rod is recommended, placing two rods in the horizontal staggered row and one in the vertical row every three rows.
- The reinforcement will be embedded in the cement mortar and if we use silicone it is recommended that the lattice has a perimeter slit.

Union of the ceramic lattice pieces.

Cement mortar or polyurethane resins.

- **Dosificación:** 1 volume of P-350 cement + 3 volumes of washed river sand, or using "Sikaflex" type polyurethane adhesive resins.

Joints between parts

- Minimum 1 cm
- **Perimeter joint:** 3,5 cm

In any case, the structural advice of a specialist will be essential.

Installation of latticework for exterior enclosures

Maximum dimensions

- The latticework modules or panels shall not exceed 4 m in any of their dimensions. Once this dimension is exceeded, they must be divided into several modules, introducing expansion and watertightness joints between them.
 - To the difference in thermal expansion coefficients between the supporting material and the ceramic lattice, it is recommended that expansion joints be placed every 16m² by dividing the surface into panels no longer than 4m.
- The modules or panels must be independent from the rest of the work by means of a perimeter joint.

- The reinforcement must not be in contact with the ceramic and must be completely covered.

Stability

- The modules or panels must be attached perimetrically to a structural element, either directly or through an element that serves as a metal, wood or masonry frame.
- In the case of being an independent leaf of the structure and acting as a ventilated facade, the fastening will be done by means of anchors to a metallic substructure or a wall lining.
- If the leaf acts as a curtain wall, the vertical substructure of steel ribs will be embedded in the lattice and anchored to the floor slabs of the building.

Resistance. Reinforcement reinforcement to vertical and horizontal stresses (wind).

- The usual reinforcement in lattice panels up to 4 m in length will be 2 Ø 5 mm - A50 in each horizontal rib and 1 Ø 5 mm in each vertical rib placed in staggered stagger.
- The design must be governed by and adapted to the particular stresses of each case.
- A reference in the reinforcement of this type of trusses is the Murfor or tendon reinforcement, the Technical Building Code (CTE_DB SE-F) defining the minimum amount of reinforcement to provide the panel with ductility and prevent cracking, as well as the Murfor anchors every three vertical courses and horizontal staggered courses.

Union of the ceramic lattice pieces.

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Joints between parts

- Minimum 1 cm
- **Perimeter joint:** 3,5 cm

In any case, the structural advice of a specialist will be essential.

All these recommendations are of a general nature and each project should be studied in a particular way with its more precise conditions.

2.2.3 Recommended adhesives

The correct choice of adhesives is crucial to ensure a long-lasting, quality installation on various types of ceramic tiles. The recommended adhesives and tools for each type of tile are

listed below.

Recommended Adhesives

Adhesives for Porcelain Tile:

- **C2 Cementitious Adhesive:**
Complies with the UNE-EN 12004 standard.
High adhesion and flexibility.
Ideal for high humidity and outdoor areas.
Specific types:
C2TE: Better adhesion and extended open time.
C2TE S1 or S2: Greater flexibility, suitable for heated floors or surfaces with structural movements.

Adhesives for White Paste Stoneware:

- **Cementitious Adhesive C1 or C2:**
Complies with the UNE-EN 12004 standard.
Good adhesion and flexibility.
Suitable for indoor and lower humidity areas.
Specific types:
C1TE: Standard adhesion with extended open time.
C2TE: Better adherence, recommended for more demanding areas.

Adhesives for Red Paste Stoneware:

- **Cementitious Adhesive C1 or C2:**
Complies with the UNE-EN 12004 standard.
Adhesion suitable for indoor use.
Specific types:
C1TE: Standard adhesion with extended open time.
C2TE: Better adherence, suitable for high traffic areas.

Adhesives for Extruded Stoneware:

- **C2 Cementitious Adhesive:**
Complies with the UNE-EN 12004 standard.
High adhesion and flexibility.
Suitable for outdoors and areas exposed to temperature changes.
Specific types:
C2TE: Better adhesion and extended open time.
C2TE S1 or S2: Greater flexibility for areas with structural movements.

By following these recommendations, a professional and long-

lasting installation of porcelain tiles, white body stoneware, red body stoneware and extruded stoneware is ensured, guaranteeing both the functionality and the aesthetics of the tiling.

3 Warranty and certifications

WARRANTY This warranty covers any manufacturing defects under normal conditions of use and with proper installation and assembly in accordance with APE CERAMICA S.L.U. recommendations, for the period specified in the time of coverage section. APE CERAMICA S.L.U. guarantees that its products covered by this warranty are of first quality and are backed by several certificates, including ISO 9001. A thorough check of the condition of the goods is required at the time of delivery. Any anomaly, damage or breakage detected during transport must be noted on the delivery note. **COVERAGE** This warranty covers all APE CERAMICA S.L.U. products. In case of claim for manufacturing defects covered by this warranty, APE CERAMICA S.L.U. will carry out the necessary tests to establish the conformity of the product. If it is proven that the product does not comply with the applicable standards, APE CERAMICA S.L.U. will replace the defective product with an equal one, reserving the right, at APE CERAMICA S.L.U.'s discretion, to make cash refunds, limited to the net value of the product on the date of purchase. In the event that the product to be replaced is discontinued, a product with similar characteristics in terms of appearance and quality, available at that time, will be selected. New parts cannot be guaranteed to match exactly in color, gloss and texture to existing parts. **WARRANTY COVER TIME** This warranty certificate is valid for 3 years from the date of delivery of the product as stated on the invoice or delivery note and will only be valid for the first user. The replacement of a product or a refund in the event of a claim shall not modify or extend the original terms, unless otherwise provided by mandatory laws in each territory. **WARRANTY CONDITIONS** APE CERAMICA S.L.U. is obliged to repair or replace the products covered by this warranty, provided that the following conditions are met:

- That the product has been purchased from an Official Distributor.
- That it has not been altered or modified since leaving the factory.
- That all installation, use and maintenance recommendations of APE CERAMICA S.L.U. have been followed.
- That the products have not been used and have not been exposed indefinitely in any exhibition.
- That a valid proof of purchase is presented by the person claiming the application of the warranty.
- That the purchase price of the product has been fully satisfied. **EXCLUSIONS** This warranty covers defects related to the intrinsic quality of the product due to

manufacturing defects, and does not cover the following situations:

- Damage and breakage caused by improper handling or storage by the customer or the carrier.
- Damages derived from an inadequate, incorrect use or contrary to APE CERAMICA S.L.U. recommendations.
- Damage caused by adverse or inappropriate environmental conditions, such as extreme temperatures or contact with aggressive chemicals.
- Defects caused by the installation of the product in non-recommended or inadequate places according to APE CERAMICA S.L.U. indications.
- Damage resulting from lack of proper product maintenance.
- Any alteration of the original product, including repairs and/or interventions not authorized by APE CERAMICA S.L.U.
- Variations in shade, gloss, color and texture inherent in the nature of the product.
- Deficiencies resulting from improper installation or assembly of the product.
- Damage caused by force majeure, including but not limited to floods, earthquakes, fires and other natural disasters.

CLAIMS PROCEDURE To make this warranty effective, the purchaser must notify APE CERAMICA S.L.U. in writing of the existence of the defect within the warranty period.

EXCLUSIONS

Since APE CERAMICA S.L.U.'s warranty is related to the intrinsic quality of the products, it does not cover:

- The cost of installation and reinstallation materials;
- Any legal interest on the value paid for the products;
- Damages, whether direct or indirect, that may arise before or during the claim or repair process in the commercial, industrial, professional or residential activities of the purchaser, the user of the product or third parties;
- The costs of materials and labor associated with the reinstallation of the product covered by the warranty after replacement by APE CERAMICA S.L.U., nor the additional repairs or modifications such as plumbing, electrical, coatings, plating and modifications necessary for the replacement of the product covered by this warranty (these repairs and modifications will be the responsibility of the customer);
- No other costs not described in this certificate.

APE CERAMICA S.L.U. works continuously in the development and improvement of its products, therefore, during the validity of this warranty, APE CERAMICA S.L.U. reserves, without prior notice, the possibility of modifying the technical specifications and design of its products.

APE CERAMICA S.L.U. reserves the right to visit the site, on a previously agreed date, to examine the product and verify the warranty conditions.

APE CERAMICA S.L.U. SHALL NOT BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT OR CONSEQUENTIAL DAMAGES; INCLUDING, BUT NOT LIMITED TO: LOSS OF PROFITS, REVENUE OR INFORMATION (WHETHER DIRECT OR INDIRECT) OR COMMERCIAL LOSS FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY OF ITS PRODUCT, EVEN IF APE CERAMICA S.L.U. HAS BEEN PREVIOUSLY ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Some local jurisdictions do not allow the exclusion or limitation of special, indirect, incidental or consequential damages, so this limitation or exclusion may not apply to you.

EXCEPT WHERE PROHIBITED BY APPLICABLE LAW, ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THIS PRODUCT IS EXPRESSLY DISCLAIMED. Some local laws do not allow limitations on how long an implied warranty lasts, so this limitation may not apply to your jurisdiction.

COMPLAINTS PROCEDURE:

If you wish to make this warranty valid, please follow these steps:

- Verify that you have complied with all the steps and requirements established in the APE CERAMICA S.L.U. installation, use and maintenance manuals.
- Report in writing to the authorized dealer/seller or directly to APE CERAMICA S.L.U., within 30 days from the appearance of the damage or defect.

The action to claim compliance with the provisions of the additional commercial warranty shall be time-barred six months after the end of the warranty period.

This document is intended for all types of customers worldwide, so there may be mandatory laws in certain territories that give you greater rights than those described here.