CERAMIC AND PORCELAIN PRODUCT KNOWLEDGE

COMPANY OVERVIEW

Grupo Lamosa is the most innovative brand of wall and floor tiles in Mexico. distinguished by the largest new-product launches in the market; presenting the best design, technology and quality in the industry. 2007, Porcelanite is acquired as a Grupo Lamosa's strategic expansions plan which let the company continue its growth trend, expand the business base and accomplish important synergy opportunities. Started in 1890, Grupo Lamosa is the third largest tile manufacturer in the world and can supply the demand of 60% of the US consumption. With 17 state-of-the-art production centers strategically located for better market coverage and a capacity of 1.7 billion square feet. Lamosa' s fashion forward trends have guickly become a favorite choice for any consumer.

All Grupo Lamosa products have sustainable actions and products aimed to preserve the environment by providing added value to their consumers and are the first Mexican manufacturer to be certified under the integral standard in sustainability Green Squared ANSI A 38.1 issued by TCNA.

"Green Matters" to Lamosa; all products consist of the following:

> •Durable, waterproof, not conducive to bacteria or dust accumulation and fire resistant avoiding toxic vapors.

> •Manufactured with recycled materials, reducing inputs and using high-tech cogeneration systems. •Sustainable products that allow credits for LEED (Leadership in Energy & Environmental Design) certification.





CURRENT ASSORTMENT

Porcelanite - Lamosa Current Assortment at Lowe's					
17x17 Marbled Brown	17x17 Soleil Beige	17x17 San Cristobal			
13x13 Devanna	17x17 Harrigan Café	17x17 Avalon Café			
12x12 Black	13x13 Cotto Malva	22x22 Mayan Slate			
12x12 White	17x17 Padova	17x17 Abbey Rd			

SELLING FEATURES					
Hygienic, easy cleaning, and zero porosity on its surface	Complete Durability: Waterproof, stain proof and scratch-resistant	Resistant to chemical agents, detergents and acids	Tile sold individually, so you can purchase the ideal quantity for the project	Color is unalterable in artificial or natural light	
Ceramic tile constructed from durable material that creates a stylish look in any room and a broad range of other commercial and residential spaces. Our tile is easy to lay in custom patterns and features an impervious water absorption rating which makes it a great choice for both indoor and covered outdoor use.					

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CERAMIC

Ceramic tile is a popular choice of flooring due to their aesthetic appeal, as well as their durability and easy care. A properly installed ceramic tile floor will outperform and outlast nearly any other floor covering product created for the same application. Glazed ceramic tile resists stains, odors and dirt, and can be cleaned with a damp mop or common household cleaners. Grade III and Grade IV glazed ceramic tile are extremely scratch resistant.

CERAMIC BASICS:

1. Ceramic tile is made from a combination of clays, polymers, and fine powders such as sand and feldspar.

2. All ceramic tile is fired in a kiln at a specific time and temperature. Changes in kiln time and temperature can affect the stability, strength and appearance of the tile.

3. Ceramic has either a red body or a white body which is determined by the type of clay used as well as the combination of materials used and has no bearing on the quality of the tile.

4. Once the tile is fired, the edges will either stay pressed "non-rectified" or they will be "rectified" by cutting or grinding the perimeter of the tile at a 90-degree angle.

5. The body of a ceramic has a >.5% water absorption rate.

PORCELAIN

Porcelain is a type of ceramic tile with some distinct qualities. The term Porcelain refers to a compact, dry (or dust-pressed) tile produced with high quality raw materials and specialized production techniques. Porcelain tile are denser and pressed under higher pressure so the body is typically stronger than traditional ceramic and is fired at higher temperatures for longer periods of time than regular ceramic. The resulting tile has a denser body with lower porosity, which give certain advantages.

PORCELAIN BASICS:

1. Porcelain is a type of ceramic with a much more refined body, and is dry pressed.

2. All porcelain tile are fired in a kiln just like ceramics but are fired under higher heat

- for longer periods of time and under pressure, which adds to the density of the body.
- 3. The body of a porcelain has a <.5% water absorption rate.

4. It is not possible to tell the difference between a glazed porcelain and glazed ceramic by looking at the tile's surface.

5. Once the tile is fired, the edge detail will either remain pressed "non-rectified" or will be "rectified" by cutting or grinding around the perimeter to a 90-degree angle.

6. There are various types of porcelain tile:

- a. Glazed
- b. Through Body
- c. Double Loaded

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TILE BODY AND COMPOSITION Types of Porcelain

GLAZED

1. Glazed porcelain can either have a white body, or a colored body that matches the top glaze color.

2. With glazed porcelain, the hardness and abrasion resistance of the glaze (not the body) will determine what application the tile is suitable for.

THROUGH BODY

Through body porcelain is unglazed and exhibits the same color and pattern from the surface all the way through the tile.

DOUBLE LOADED

Double loaded porcelain, also known as "Double Charging" porcelain, is formed using two layers of porcelain that are sandwiched together then fired.

GLAZE APPLICATION PROCESS

SCREENING

For screen printing, a form must be made for each shape of tile to provide a transfer. Typically each form has its own color so using multiple colors will require multiple forms.

1. This process is similar to T-shirt printing where the colors are pressed through the screen and applied to the surface of the tile.

2. Screening may work for some basic shaped tile but the more complex the shape, the more difficult it is to decorate it.

ROTOCOLOR

This is still a most common method of glazing due to the cost, versatility, and durability of the glaze. Approximate repeat: Every 10-20 tile, depending on the size.

Roto is the most common technique in mass production tile. The glaze image is applied by a rotating drum. The tile surface comes in contact with the drum at random points of the rotation.

1. This controlled random procedure makes each decorated article slightly different which increases the overall attractiveness of items made by this process.

2. Also the breakthrough with this process is the ability to print uneven surfaces allowing the tile to be richer in texture and color.

DIGITAL INKJET PRINTING (HD TECHNOLOGY)

This is the newest and most advanced method of glazing. Approximate repeat: Every 25-40+ tile, depending on the tile size.

Digital printing provides a touchless printing process with the ability to print over high and low reliefs as well as curved or oddly shaped trim pieces edge to edge.

1. Today, digital inkjet decoration is recognized as the leading tile printing technique, helping tile manufacturers improve production efficiency. HD Technology allows tile manufactures to achieve high-definition, detailed looks of natural products such as wood, stone and complex mosaics.

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NANO COATING

Nano Technology involves a treatment to the porcelain's surface that increases sheen, enhances the color, and protection against staining. Nano is only applied to the polished double loaded and through body porcelain tile: nano particles, similar to wax, are applied onto the surface of polished porcelain tile. This process is simply a surface treatment and should not be confused with the glazing application process. Here are the benefits of nano treatment:

1. Nano coating creates a protective layer that covers any air holes or tiny rifts in the surface of the tiles, so dirt can not penetrate the tiles and they are easier to keep clean.

2. The granular material of the protective layer enhances the tile's durability and slip resistance making them suitable for domestic and commercial applications.

BENEFITS OF PORCELAIN AND CERAMIC

- 1. Ceramic and porcelain are very easy to clean and maintain
- 2. Longevity of tile exceeds other flooring types
- 3. Scratch and chemical resistant
- 4. Frost resistant
- 5. Fire resistant
- 6. Water resistant

7. Unlike wood, LVT or carpet, tile will not fade or change color when exposed to direct sunlight

- 8. Porcelains and high-end ceramic add value to a home
- 9. Suitable for underfloor heating applications
- 10. Many tiles contain recycled content and are environmentally friendly

OTHER BENEFITS

It is often recommended to go with larger tile and install them on a diagonal to create the illusion of a wider and more open space. A smaller tile in a straight pattern tends to look busier as your eyes will naturally follow the grout lines as you walk into a room.

When tile is produced, they are separated into dye lots and calibers. It is important to take this into consideration when combining various sizes and even various collections of tiles. It is important to dry fit patterns to make sure they work prior to installation.

1. Porcelain tile are denser and have lower water absorption rates than ceram-

ic and as a result can be used in exterior applications subject to freezing climates.Z. Tile can have pressed or rectified edges. Typically, products with a pressed edge require larger grout joints because the edges are not cut to 90-degree angles

and the joints will appear irregular the closer the tiles are to each other.
The glaze application process does not always define the durability of the glaze. A roto glaze is not necessarily more durable than a screen glaze. It is simply a

glaze. A roto glaze is not necessarily more durable than a screen glaze. It is simply a different application method.

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INDUSTRY STANDARDS

ASTM/ANSI

American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are nationally recognized organizations which provide the testing procedures and standard values, respectively for ceramic tile produced in the United States.

WATER ABSORPTION (ASTM C373)

Ceramic tile are also classified by their water absorption rate which reflects the density of the body of the tile.

There is a direct relationship to the water absorption rate and the suitability of the various types of tile for interior or exterior applications. Tiles suitable for exterior applications must have a very low water absorption rate, especially in climates subject to freezing and thawing cycles.

These are typically porcelain body tile which have a moisture absorption rating of less than .5 percent. If it is more than .5, then it is classified as ceramic.

Water Absorption Levels: Impervious Tile: 0.0 - 0.5% Vitreous Tile: >0.5 - 3.0% Semi-Vitreous Tile: >3.0 - 7.0% Non-Vitreous Tile: Greater than 7.0%

ABRASION RESISTANCE (ASTM C1027)

Abrasion resistance is the measure of the amount of glaze that is removed after numerous cycles of abrasion. Often times it is referred to as a PEI rating. Abrasion resistance is classified

as I-V and determines what application a product is suitable for:

CLASS I: Residential and commercial wall and bare foot traffic.

CLASS II: Wall and residential bath floor, and soft soled traffic.

CLASS III: All residential floors and light commercial floors.

CLASS IV: Medium commercial, light industrial and institutional, moderate soiling. CLASS V: Extra heavy traffic, abrasive dirt, chemically more resistant.

BREAKING STRENGTH (ASTM C648)

Ceramic tiles used on floors and walls must be able to withstand the expected load bearing capacity of various installations. In order to determine the breaking and flexing strength of the tile there is a standard test method used to evaluate individual pieces.

A force is applied to an unsupported portion of the tile until breakage occurs. The ultimate breaking strength is then recorded in pounds. Final selection of the tile should be based upon the breaking strength and appropriate installation method.



INDUSTRY STANDARDS

CHEMICAL RESISTANCE (ASTM C650)

Resistance to chemicals may be an important consideration in the selection of tile for a specific application such as commercial applications. The standard testing procedure involves placing the tile sample in continuous contact with a variety of chemicals for 24 hours, raising the surface and then examining the surface for damage or variation. These are the properties of resistance to the chemically aggressive action of substances that may come into contact with the tile surface.

Chemical properties measured include stain resistance, resistance to household chemicals, acid and alkali resistance. The compactness of the surface layer is extremely important in this aspect: In fact, a greater surface porosity promotes the absorption of these substances. Clazed products usually posses a fairly good level of chemical resistance, in particular to alkaline substances. As for unglazed products, on the other hand, resistance to chemical attack is generally excellent for all products.

COEFFICIENT OF FRICTION (COF - ASTM C1028)

The coefficient of friction is a measure of slip resistance and is typically a rating of 0-1. Most U.S. safety standards state that floors with a rating of .5 or greater are safe. However, in commercial applications due to ADA recommendations the industry has adopted .6 for flat surfaces and .8 on ramps. Floors with higher ratings mean they are slip resistant but not slip proof. Neolite is the standard material used to conduct the slip testing to make sure results are measured accurately each time. It is important to get both a dry and wet reading as wet conditions will typically cause tiles to become slippery.

FROST RESISTANCE (ASTM C1026)

Frost resistance is defined as the ability of ceramic tile to withstand freeze/thaw conditions. The frost resistance of ceramic tile is dependent on the tile's porosity and water absorption levels.

Frost damage can occur when the ceramic tile absorbs moisture and the trapped water freezes when temperatures drop. As the trapped water expands when it freezes, it exerts tension inside the body of the tile, which may cause crack in the ceramic tile. A tile that is not frost resistant may not perform optimally in freezing weather conditions. A ceramic tile intended and warranted for outside applications is always tested for frost resistance. The water absorption percentage of each tile is clearly listed on the tile data sheet.

SCRATCH RESISTANCE (MOHS)

The scratch resistance of a tile is measured by the MOHS scale of hardness. The MOHS scale of minerals determines what type of object is hard enough to scratch the surface. The higher the number, the greater the scratching resistance:

- 1 Talc- talcum powder, sodium
- 2 Gypsum- used in various plasters
- 3 Calcite- limestone, shells, copper
- 4 Fluorite- iron, nickel
- 5 Apatite- tooth enamel
- 6 Orthoclase- titanium
- 7 Quartz- fused glass
- 8 Topaz- hardened steel
- 9 Corundum- titanium carbide
- 10 Diamond- diamonds

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INDUSTRY TOLERANCES

RECOMMENDED OFFSET FOR BRICK JOINT PATTERNS

A 50% offset is not recommended on large format square and rectangular tile due to standard manufacturing tolerances.

A 33% max offset is preferable and proper grout joint width must be used to prevent the appearance of lippage.

When tile cup or bow within tolerance they usually do so at the ends of the tile. As a result, you should avoid a 50% offset as cupping may become more noticeable. By setting the offset at a 1/3 ratio any cupping or bowing at the ends will blend into adjacent tiles.

Rectangular tile flatness: Rectangular tile in compliance with ANSI A137.1 (American National Standard Specifications for Ceramic Tile) are sufficiently flat for successful lippage-free installations. ANSI A137.1 defines acceptable edge warpage as a percentage of the tile's edge length, and also sets a maximum allowable warpage amount in millimeters regardless of tile size.

For example, a 6" rectified porcelain tile's maximum allowable warpage, based on the allowable edge warpage percentage criteria, is 0.6 mm, while a 24" calibrated tile's maximum allowable warpage "caps out" at 1.3 mm, or nearly 1/16". Therefore, patterns and grout joint accommodations that work well with smaller tiles would not work with larger tiles exhibiting the maximum allowable warpage. Such tiles that are just barely within ANSI tolerances are not generally recommended for offset patterns and can be highly problematic when installed with a 50% offset and a narrow grout joint.

COMMON MISCONCEPTIONS

ABOUT LIPPAGE

Many customers and installers may not be aware of the manufacturing and installation standards set forth by ANSI, ASTM and TCNA. Most people think that everything must line up 100%, be square, level and contain no variation at all. If there are any subtle variations in the size, shape or thickness of the tile, the product is often considered defective. This assumption is in fact false.

The reality is that some imperfections are acceptable by industry standard as it is the nature of all fired products.

ABOUT GROUT JOINTS

Rectified porcelain tile is a good example of a common industry myth. Because the edges are cut / grinded to a 90-degree angle around the perimeter of the tile, the most common thing you hear is to go closer with the grout joint. Although this is sometimes true, rectified products also have a warping and wedging tolerance to accommodate blade cuts and settings for grinding the edges. Butt joints or close joints are not always suitable. Technically, according to the wedging tolerances in ANSI A137.1, tile can warp "out of square" up to 0.8mm. With a very close grout joint over a span of an application, the tile can misalign.



TILE CARE AND MAINTENANCE

Porcelain and ceramic tile are easy to clean. Due to their impenetrable glazed surfaces, tiles are resistant to water, dirt, chemicals, oil, debris, and even germs and bacteria. It is highly recommended to sweep or vacuum the surface of your floors prior to washing them with water to prevent the tile from becoming muddy or leaving a residue after cleaning. There are many cleaning solutions on the market today suitable for cleaning tile, but it is best to stick to a pH neutral cleaner or water with a mild soap solution. This will increase the longevity of the application including the grout. Although the glaze of a tile is resistant to staining they are not always chemical proof and, in some cases, will discolor if exposed to aggressive chemicals. The following instructions explain how to clean glazed tile surfaces.

POST-INSTALLATION CLEANING

Cleaning is a necessary step at the end of each job. The inappropriate or late removal of the residues may leave streaks that are difficult to remove at a later time. These streaks can form into a cement film on the floor that will absorb every type of dirt, giving the impression that the material is constantly dirty.

REMOVING CEMENT FILLERS

1. Wash the floor with a heavy-duty tile and grout cleaner which is a solution ready to use straight out of the bottle. If necessary, a water and acid solution must be used to cut through heavier film.

2. Follow manufacturers' instructions closely regarding application and clean up.

3. Rinse floors thoroughly with water to ensure that the floor is free from detergents or residues. If needed, the operation can be repeated.

CLEANING GLAZED PRODUCTS

For glazed tiles, use the following instructions for general cleaning:

1. Sweep or vacuum loose dirt and dust from the floor. An untreated dry dust mop is recommended instead of a broom.

2. Mop the floor with a mild detergent, degreaser, or tile cleaning solution (do not use wax, oil-based, or abrasive cleaners).

3. Rinse the tile thoroughly with clean water.

4. Drying with a clean cloth or rag is recommended to increase the shine.



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CLEANING TEXTURED GLAZED PROD-UCTS

A textured tile surface requires additional cleaning procedures. A standard wet-mopping may not effectively clean a textured surface. For cleaning textured surfaces, follow these instructions:

1. Sweep or vacuum dust and debris from the floor. When sweeping, use a soft-bristle broom and sweep in multiple directions. First follow the direction of the tile, and then sweep diagonally. This will ensure the removal of all foreign material that might be residing in the texture.

2. Saturate the tile with a neutral tile cleaning solution, mild detergent, or a degreaser. Allow the cleaning solution to remain on the floor 5 - 10 minutes. Scrub the floor with a medium bristle brush, again using a two-direction method.

3. Rinse the floor with clean water to remove any left-over detergents.

4. For high traffic areas it is recommended to clean the floor at least once per day and wet mop at regular intervals.

5. Drying with a clean cloth or rag is recommended to increase the shine and to prevent water spots.

WHEN CLEANING ALWAYS FOLLOW THESE GUIDELINES

1. Do not clean tile flooring with cleaners that contain ammonia, bleach and/or acids which may modify grout color and stability.

2. Use a cleaner that is pH neutral. Do not use wax, oil-based, abrasive cleaners, or sealants.

3. Agents that contain any dyes or colors are not recommended.

4. Use rugs at entrances to prevent dirt and grit from being tracked onto the tile flooring from outdoors. Tiles are scratch resistant but not scratch proof.

5. Do not use steel wool pads to remove tough debris or stains. Steel wool may scratch your tile and loose steel particles may eventually create rust stains in the grout over time.

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GLOSSARY

ASTM: American Society for Testing and Materials (ASTM). Most product catalogs and specifications will provide product-specific ASTM ratings such as abrasion resistance, scratch resistance, moisture absorption, chemical resistance and breaking strength.

BACKING: Material used as a base over which a finished tile is to be installed.

BISQUE: The body of the tile.

BODY: The structural portion of a ceramic product and to the materials or mixture from which it is made.

BULLNOSE: A trim tile with a radius on one side. Used for finishing the top of a tub or shower and turning of an outside corner.

BUTTERING: The spreading of a bond coat to the back of the ceramic tile immediately before tile is placed.

FIELD TILE: When creating a pattern with different ceramic tile, the more prominent tile that is throughout the largest area is called the "field tile".

GLAZED: Glazed ceramic tile are coated with glass forming minerals and ceramic stains. Typically, they have a matte, semi-gloss or high-gloss finish. They can offer better stain and moisture resistance than unglazed tile. When you look at a glazed tile from the side you can see 2 layers. The body of the tile, or the largest layer, is called the bisque. The top layer is called the glaze. Glazed tiles have a hard non-porous, impermeable surface after firing.

CROUT: Crout is a type of cement that is used to fill the space and provide support.

IMPERVIOUS TILE: Tile that has less than .5% moisture absorption. These tile are frost proof and can be used in exterior areas or on the outside of building facades.

NOMINAL SIZE: Tile is usually referred to by its nominal size, not its actual size. During the firing process, ceramic tile shrinks, on average, about 10% in size. For example, a 12" x 12" floor tile can measure 11 7/8" square.

NON-VITREOUS TILE: Tile that absorbs 7% or more moisture. They are not suited for indoor use only.

SANDED GROUT: These are two types of grout commonly used in home installations: Portland cement based and epoxy based. Both of these grout compounds may have sand added to provide additional strength to the tile joint. Sanded grout is recommended for tile joints 1/8th of an inch and larger.

SANITARY COVE BASE: A ceramic floor tile trim that has a rounded finished top like a bullnose to cover up the body of the tile.

SEMI-VITREOUS TILE: Tile that absorbs from 3% to 7% moisture. They may not be suited for frost-prone installations.

SHADE VARIATION: Shade variation is inherent to all fired ceramic products and certain tile will show greater variation within dye lots. Shade variation is usually listed on the back label of each sample with a low, moderate or high rating.

SUBSTRATE: The process for installing a ceramic floor begins with the preparation of the tile foundation or substrate. Common substrates in home installations are concrete, plywood and drywall.

THINSET: Today, many tile installers have opted for the industry accepted and more efficient thinset method, where the tile is adhered directly onto a backer board that is nailed to a plywood or concrete substrate using a much thinner layer of mortar.

TRIM: Various shapes necessary to achieve an installation of an architectural design.