

Distinguishing the Differences between Ceramic and Porcelain Tile

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Tile has been used over the centuries in churches, mosques, restaurants, shops, hospitals and stately homes. Fortunately today's tile is not only for the wealthy. Installations cover walls, floors, roofs, pavements and furniture.

The earliest ceramic tiles are credited to the Egyptian Empire in 4,000 B.C. as a product of earthenware pottery. The simplest form of ceramic art, tiles were made by Assyrians, Babylonians and the Islamic Empire. Medieval tilers protected the clay and made it stronger and waterproof by using lead glazes on the red-firing clay.

The opportunities for sophisticated decorations evolved with tin glazing emerging from the Middle Eastern countries that would harden in the firing process making the surface transparent. Designs could be inlaid in the tile before glazing by stamping them into the clay, then filling these areas with slip (white liquid clay). Tiles could also be simply covered with slip before glazing, giving them a different color from tiles without a layer of slip. This art spread through Spain, Italy (Majorca, hence majolica tile*), France and Southern then Northern Netherlands with each country developing their own special characteristics.

Holland was an important center for tiles in the 17th and 18th centuries, especially with the importing of the blue and white Chinese porcelain that became the rage. The Dutch potters tried to imitate the Chinese porcelain but the process for true porcelain was not yet available to them. Not to be discouraged, in the 17th century the potters in the town of Delft created a superior blue earthenware product known as delftware. This blue and white tile is still popular today.

In the 19th century Britain pioneered mass-produced tiles. English tile making expanded rapidly during the industrial revolution, peaked in the late 1800s and slumped soon after the turn of the century. American tile makers enjoyed a similar period of prosperity to their counterparts but had to compete with English imports. The Arts & Crafts movement reinvigorated the handcraft of tile making, and it was used extensively in interiors for fireplace surrounds as well as wall decoration.

Today both ceramic and porcelain tile are widely available for walls, countertops and flooring. The attributes of each type of tile differs making the selection specific for the application.

Ceramic (non-porcelain) tiles are thin slabs of red or white clay, in the form of shale, gypsum or sand, converted into a material known as bisque. This bisque is given the shape of tiles and hardened, through the process of firing, in a kiln with temperatures up to 2500° F.

Since ceramic tiles are porous in nature, they are often coated with glaze. Ceramic tiles are prone to wear and to chipping or cracking on forceful impact. The glaze on the tile does not go all the way through, so the core (usually white) becomes obvious if the tile is chipped. Glazed ceramic tiles may tend to get scratched on frequently-used countertops, but they are ideal for walls. Glazed tiles are available in high-gloss, matte, and abrasive slip-resistant finishes. Ceramic tiles are quite inexpensive compared to other types of tiles.

The benefits of ceramic tile include a vast array of textures, colors and sizes. They can match almost any and every decorating style. The tiles are durable and easy to maintain. Ceramic tiles are suitable for light to moderate traffic. The Porcelain Enamel Institute (PEI) durability rating for ceramic tile is 0 to 3 (see durability ratings below).

Porcelain tiles are generally made by pressing porcelain clays and baking at a higher temperature in the kiln than for most ceramics. The tile is dense, impervious, fine grained, and smooth with a sharply formed face. The color may run consistent through the body of the tile (full-body) to minimize the appearance of chipping.

Glazed porcelain tiles are much harder and have more wear- and damage-resistance than ceramic tiles, making them suitable for any residential and light commercial application. Glazing also results in a porcelain tile usually having a much lower water absorption rate than ceramic tiles, making them more frost resistant though not frost proof.

The benefits of porcelain tile include greater wear-resistance due to the hardness and full-body color. Porcelain tiles may take on the appearance of natural slate and other types of stone. The durability rating usually starts at 5, which makes them the hardest wearing tiles on the market.

Porcelain Enamel Institute (PEI) Ceramic and Porcelain Tile Wear Ratings, the current rating system for ceramic tile, is the only reliable gauge for consumers to use in determining wear expectations for a particular tile application. PEI has developed a rating scale that can effectively guide any consumer through the process of choosing the right tile for their particular application. This rating system is shown below and recommended by the American Society for Testing and Materials (ASTM C-1028-89).

Durability Classification

Class 0	Generally not recommended for use on floors
Class 1	Light traffic, for residential bathroom floors
Class II	Medium-Light Traffic, residential interiors with the exceptions of kitchens, stairs, landings and areas near external entries.
Class III	Medium-Heavy Traffic, all residential applications. Commercial applications which are similar in traffic to residential applications. Specifically excepted are areas of prevalent circulation or turning points.
Class IV	Heavy Traffic, all residential and most commercial applications such as the public areas of exhibition halls, hotels, restaurants, supermarkets, shops and schools.
Class IV+	Extra Heavy Traffic, all residential and commercial applications similar to Class IV where extra durability may be required.

Coefficient of friction testing is another rating system that gauges the slip-resistance of a surface. Slip resistance is based on the frictional force necessary to keep a shoe heel or crutch tip from slipping on a walking surface under conditions likely to be found on the surface. A slip-resistant surface provides sufficient frictional counterforce to the forces exerted in walking to permit safe walking.

The Occupational Safety and Health Administration recommend that walking surfaces have a static coefficient of friction of 0.5. A research project sponsored by the Architectural and Transportation Barriers Compliance Board (Access Board) conducted tests with persons with disabilities and concluded that a higher coefficient of friction was needed by such persons. A static coefficient of friction of 0.6 is recommended for accessible routes and 0.8 for ramps.

To conclude with this data, a 0.1 to 0.4 coefficient of friction rating indicated less slip resistance than a 0.5 and greater. This rating is a critical reference since slipping has been deemed the #1 cause of preventable accidents. Porcelain tile usually has a greater slip-resistant rating than ceramic tile. Check with the manufacturer for the coefficient of friction rating, especially when specifying or purchasing tile for the floor.



***Majolica tile** is a type of soft earthenware ceramic formed with plaster of paris molds and lead-based glazing with brightly colored metal oxide glazes applied on top. Patterns are inspired by nature such as ocean themes, animals, fruits and exotically colored plant motifs, to name a few. Murals are whimsical and fun. Colors used in the original majolica tiles were blue, orange, green, yellow and purple. These bright colors embody the stylized patterns that have endured over time and are still popular today. See examples below.





Web site references:

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