



## Glazed and Confused? – Here's a Look at the Terminology and Technology

### What is glaze?

The word itself is derived from the Old English word 'glas' for glass; that's how one typically thinks of a ceramic glaze – a glassy coating on top of a ceramic body. Generally pure glass is clear and is made from one of the most abundant minerals found within the Earth's crust: silica. Colored glazes are made by many different methods and formulas, many of which involve mixing different metal compounds (metal oxides) with silica. These different compositions provide an essentially unlimited range of colors and textures such as matte, mottled, glossy, etc., once the tiles are fired.

Traditionally, it was relatively easy to determine whether or not a tile was glazed. One could simply turn the tile over or cut into the tile and see that the body was one color and the glaze layer was as distinct as icing on a cake. In some of the modern techniques, the line between the glaze and body has become more diffused.

### What are some of the changes?

Rather than depositing a glaze in the traditional sense where a clear or colored glassy material is applied to a ceramic tile body and fired; techniques such as double loading or double pressing can be used to achieve decorative

characteristics. These techniques allow flexibility in color application and can result in a decorative layer which goes deeper into the body of the tile. This has enabled manufactures to emulate the look of natural stone and produce intricate designs while maintaining surface structure and texture.

Double loading is a method where the cavity of the die in a tile press is filled once with one composition and then followed by a second fill with a different powder composition. The tile is pressed and fired after the second fill. With this technique the decorative powder layer is typically thicker and carries the decorative properties deeper into the body of the tile. The result is that the tile carries the benefits of a through-body formulation because if the tile was to chip, the color and design below the surface are the same as that on top. This method also allows the tile to be polished because the design runs deep enough into the tile. This enables tiles of a

**Below: The dye cavity of a Welko press**



particular design to be fabricated in polished and unpolished versions.

Double pressing is a method where the die cavity is filled with one formulation and pressed and then a second powder or even liquid is applied and the tile is pressed a second time to give texture. This technique also allows the color to be carried through the surface texture because the texture is pressed into the deposited colorants. Because a thinner layer of colorants is generally used in this technique the tiles are not intended to be polished. On the other hand, with this method, high resolution designs are possible because the colorant is being added to the smooth surface of a pre-pressed tile. During double *loading*, which has a thicker "colorant" layer, lower design resolution results because this second layer is deposited onto the loose powder of the base layer. Some of the traditional printing methods wouldn't work on tiles with high profiles or texture because the glaze couldn't be applied around corners or in the

nooks and crannies of tile, depending on the method of application.

### Wet glazing – dry glazing

Wet or dry refers to the glaze itself and is just what it states, the glaze is either applied as a dry powder or wet as a slurry or paste. Dry glazes and dry technology evolved based on the need over the past several years to try and match real-stone effects. This wasn't as easily achieved using traditional glazing methods. Rollers and screens were sometimes limited when glaze needed to be applied to tiles with deep surface features. There would be gaps in the glazing and this limited the allowable texture depth to 0.5 mm or so. At first the solution was that the profiles were sometimes smoothed to try and accommodate this limitation. By spreading out the hills and valleys, for example, glaze rollers could still go down into the profile features. Double loading and double pressing are some of the methods that addressed these limitations.

### What's true through and through?

When it comes to the finished product it's sometimes difficult to define glazed and unglazed. Oftentimes a tile which is unglazed is referred to as a through-body. Simply stated, a through-body has the same characteristics throughout the entire thickness of the body. Whether the characteristics being discussed are color, density, etc., depends on the situation. It may be difficult to state unequivocally whether an unglazed tile, porcelain or not, is a through-body unless more is known about the manufacturing. Sometimes double-loaded or double-pressed tiles are referred to as through-body tiles because the decorative layer runs deeper into the tile.

The implication that these tiles are completely homogeneous through the full thickness isn't implicit whether a tile is processed by either of these methods.

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Although the decorative layer may be thicker, there's still the bottom layer formulation and then the second layer formulation which, literally speaking, implies that it's not a through-body. For all intents and purposes whether a tile is homogenous from the surface all the way through the thickness to the bottom doesn't matter to the end user if their pri-

mary concern is that the tile doesn't show a different color if it gets chipped on top. This can also be achieved if a traditional glaze is similar in color to the tile body.

In the end, it may turn out to be a matter of semantics; is a tile a through-body if the glaze is essentially the same color as the body, if the decorative layer is diffused and permeates deep beneath

the top surface, etc.? On this matter there are a wide range of opinions.

### Inkjet printers?

There are undoubtedly more techniques to glazing than mentioned here. As manufacturers continue to address new problems that arise with new and improved methods, new technologies will continue to evolve. And what's relatively "old hat" in one industry may turn out to be the new kid on the block in another industry. An example is the inkjet printer – an old familiar term when one talked about computer printers but now it's one of the technologies that's available to manufacturers for glazing and decorating ceramic tiles. Soluble salts used with inkjet technology allow the designer to access a full palette of colors based on the 4 primary colors. Using 100s of injectors, many combinations of color and patterns are available.

### It's all in a look

When it comes to tile, no matter how it's decorated, the primary feature that the customer is looking for is something they enjoy looking at. All these new developments will help keep customers' interests as new and old, rugged, and refined decorative features continue to grace the faces of tile. **TILE**

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