

GROUT COLOR: WHY DOES IT LOOK DIFFERENT?

GROUT COLOR

Color comprises a large and important portion of our lives. The magic of color interaction is that our perception of a color changes when the color is viewed under different conditions. The way color appears is affected by the environment in which the color is seen.

Rarely do we see a single, isolated color. They are always seen next to other colors. Hue, value and intensity describe a color as we see it; however, these attributes can dramatically change when the color is placed in the context of surrounding colors and materials of different textures. Some combinations are naturally pleasing and some colors clash with each other based on their position in the color spectrum.

A grout color selected in a brightly lit show room can appear quite different after installation, depending on the colors in the room and the interior lighting conditions. It is frustrating (and expensive) to install a colored grout with the perfect tone for a particular scheme, only to discover that it appears to have a different shade when applied between the tiles.

Changes in color perception occur whether we want them to or not, so it is critical for project owners and designers to understand how colors interact and to anticipate those interactions.

CURING OF THE GROUT

Cement grouts cure by hydration of the cement in the grout. The color of the hydrated cement is generally lighter than that of the un-hydrated cement. If the grout is not fully cured, it may not yet have achieved the color that was selected from the color cards or sample grout channels. It is important to mix grout powder with the proper water ratio and follow manufacturer's directions for the installation of the grout to obtain the correct color. Higher performance cement grouts like Prism® will cure quickly, and in many cases, reach the desired color sooner than traditional cement grout. To assure the accuracy of the color in your project, and not be dependent on the cure state of the grout, use a Single Component® grout like Fusion Pro® or an epoxy grout like CEG-Lite™ in your tile project. These grouts do not rely on hydration of the

cement and the differing colors of the hydration states. The resins and pigments in these formulas will maintain the same color throughout their curing cycle. Fusion Pro will cure to the same color regardless of the tile type, substrate or environmental conditions.

GROUT TEXTURE

The texture and finish of installed grout are a result of the type of grout used and the installation and finishing techniques used by the installer. Surface texture and finish alter the way color is perceived. Rough, textured areas of raised sand in a sanded grout will appear darker in color. Smooth areas found with non-sanded grout and over-worked sanded grout will appear lighter in color.

Today, it is not uncommon to find different types of grout on the floor (e.g., epoxy grout) and the wall (e.g., cement grout) plus a silicone sealant used in the corners and movement joints. All of these materials have slightly different textures and can therefore appear as different colors, even though they were color matched to the same color standard. The source of lighting that a tile installation is exposed to can also accentuate surface irregularities by casting shadows on the tile surface and grout joints and affect the perceived color of each.

LIGHTING

Metamerism is the phenomenon of colors changing when viewed in different light sources. The grout color that looked great with the tile in the showroom is not even close when installed. The problem is the light source. You may have picked the grout color in the showroom under fluorescent lighting but the installation site may be in a mix of daylight and incandescent lighting. The perceived color of the different types of grout, printed samples, plastic channels and ceramic tile will change as the light source changes and most of the time the change is not in the same direction. It is important that you view the grout and tile combination in the lighting found on the project. Creating a test panel and evaluating it in the location of the intended installation is highly recommended for any tile installation.



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MAINTENANCE

Unfortunately, the color of many grouts will not remain the same over time. As the grout becomes contaminated with spills and even cleaning agents, the perceived color will drift. Sealing a cement grout with Aqua Mix® Sealers Choice® Gold or installing stain resistant grout like Fusion Pro or CEG-Lite will make it easier to clean and maintain the original color longer. Note that epoxy resin will yellow when exposed to the UV from sunlight and this can result in color shifts for epoxy grout. To keep the original, intended color as long as possible, it is important to install as well as maintain the grout based on the manufacturer's directions.

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GROUT JOINT WIDTH: WHAT IS THE RIGHT SIZE?

All ceramic and natural stone tiles are installed with a gap or space between each tile in the assembly. This is generally referred to as the grout joint. However, the required width of a grout joint is not always understood. ANSI defines the requirement for grout joints in ceramic and natural stone tile installations in A108.02 Section 4.3.8. This section states that under no circumstances should the grout joint be less than 1/16" (1.6 mm).

Due to the amount of size variation in the tile, the actual grout joint width may need to vary from what is requested or specified. The actual grout joint size should be equal to three times the variance in actual tile facial dimensions. This means that if the variance in facial dimensions of the tile is 1/8", the actual grout joint will need to be 3/16". The wider spacing will help to accommodate placement of tile and maintaining straight lines.

TCNA recommends a minimum 1/8" grout joint for rectified tile and minimum 3/16" grout joint for calibrated tile. They also suggest adding to this width the amount of edge warping on the longest edge. For example, if the edge warping of a rectified tile is 1/32", the minimum grout joint is $1/8" + 1/32" = 5/32"$.

To minimize lippage, TCNA also recommends no more than a 33% offset for tile greater than 18". Large format tiles (those with one or more sides longer than 15") should be installed in a running bond or brick pattern, especially if the tile is plank-shaped.

Where is the right place to measure the width of the grout joint? With cushion edge and beveled edge tiles, some will argue that the measurement is at the surface of the tile or the widest point of the bevel. This may minimize the grout joint appearance, but the joint between the tiles is now too narrow to accommodate proper filling and curing of the grout. The grout joint width measurement should be taken at the base of the bevel or at the body of the tile. ANSI states in A108.10 Section 5.3 that grout joints between cushion edge (beveled) tiles should be finished evenly at the depth of the cushion (bevel). This implies that the minimum 1/16" joint width is measured at the base of the cushion or bevel.

Some tiles have lugs or tabs built into the edge of the tile to assist in even spacing. If these lugs do not produce a grout joint in compliance with TCNA recommendation, additional separation may be needed. Also, the space between the lugs and over the lugs may not be sufficient for proper curing of the grout and can result in powdery or discolored grout. Extra care must be exercised when installing tiles with spacing lugs on the edge.

Why is adequate grout joint width so important? First and foremost, it will prevent tripping and breaking the edge of the tile. By increasing the spacing between the tiles, it reduces the slope of the transition from one tile to the next tile. The wheels of carts roll freely over the tile surface and shoes are less likely to catch on a tile edge. Wider grout joints allow the installer to force the grout deeper into the joint between tiles, completely filling the grout joint. The larger mass of grout will cure more completely and result in a harder grout joint. Grout that is placed in joints that are too narrow will be powdery and generally discolored.

Before the tiles are set, the required grout joints should be discussed with the customer and agreed upon. Properly spacing the tiles and selecting the correct grouting material will assure an attractive, safe tile installation that will last for years.

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EFFLORESCENCE ON GROUT

This technical bulletin addresses concerns and questions about the causes, prevention and treatment of efflorescence and mineral film discoloration on Portland cement grout.

Efflorescence can form shortly after grouting, resulting in a brand-new installation that may look splotched or completely covered with a white crust or film, to the dismay of the owner and the installer.

Efflorescence is a mineral deposit that sometimes leaches or migrates to the surface of the grout. These minerals occur naturally in Portland cement, which is present in the grout and many building materials that come into contact with the tile assembly. Many kinds of mineral salts have been detected in samples of efflorescence including sodium sulfate, potassium sulfate, sodium carbonate, calcium sulfate, sodium bicarbonate and calcium carbonate.

Additional minerals can also come from the water used during the installation of the grout or accumulated on the surface of the grout during maintenance. Grout mix consistency, environmental conditions and installation techniques beyond the grout manufacturer's control can also influence the occurrence of efflorescence.

Dense bodied tile such as porcelain, polymer-modified setting mortar and dense substrates prolong the time grout takes to become firm before clean-up. Water mixed with the grout has nowhere to go but out through the grouted joint, and will carry minerals to the grout surface. A wet grout mix and/or clean-up before the grout is properly firm will create the conditions for efflorescence to occur, especially in cooler weather.

Grout selection can reduce the risk of efflorescence appearing on your grout. Prism® Color Consistent Grout is formulated with specialized cement that does not contribute to efflorescence. Fusion Pro® Single Component® Grout is a blend of polymers and inert fillers that does not contain Portland cement and will not effloresce. By selecting the right grout, the installer can leave the project knowing that efflorescence will not appear the next day.

Although unsightly, the mineral deposits can be safely removed by following a few simple steps.

What to do if you have Efflorescence

In most instances, efflorescence can be removed and future growth inhibited with Aqua Mix® Eff-Ex® over unsealed cement grout. Heavy contamination of efflorescence salts may require a mild acid wash. Aqua Mix or TileLab Sulfamic Acid Crystals is a mild, odorless acid that is intended for use with ceramic or porcelain tiles that are not sensitive to acid attack. Aqua Mix Cement Grout Haze Remover may also be used. Care should be exercised when removing efflorescence from the grout between natural stone tiles that may be sensitive to acid etching.

Grout must cure a minimum of 7 days before attempting to remove efflorescence with an acid wash. Aqua Mix Eff Ex may be used the following day of grouting. Follow the manufacturer's directions when using any products to remove efflorescence. Always test in a small inconspicuous area and allow it to dry completely prior to treating the entire installation.

Never seal grout that is not satisfactory in color, hardness or appearance. Normal sealers are not designed to correct a "problem" grout job. Application of sealers over a problem grout will only tend to enhance the issue and prevent usage of simple corrective measures.

Always observe product precautions and wear appropriate safety equipment. Acid cleaners must not be used on soft natural stone such as marble, limestone or travertine installations. Non-acidic cleaners must be used for these acid sensitive materials. Contact CUSTOM Technical Services for recommendations.

Custom Building Products offers a full line of tile and grout care and maintenance products. Contact the Technical Service Department at **800.282.8786** if you have questions concerning these methods or products.

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Technical Bulletin

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REMOVING GROUT OR MORTAR RESIDUE AND MINERAL DEPOSITS

Custom's specially formulated cleaners are an effective first step for removing grout or mortar residue, as well as some mineral deposits. They are also effective for removing grease, dirt and other contaminants. They can be used on grout, tile and stone without harming the surface, and there are no harsh, toxic fumes. Use according to directions.

Acid washing to remove grout residue or mineral deposits is an effective cleaning method, if done properly. If incorrect procedures or strong acid solutions are used, the damage to stone, tile and grout can be substantial. Grout will lose its color or become powdery or sandy. A strong acid solution will damage and dull the glazed finish on most ceramic tile, and also etch or pit the surface of unglazed tile and stone.

Acid washing can be safely accomplished by using Aqua Mix® Sulfamic Acid Crystals. Follow specific grout recommendations for acid washing. It is also effective for concrete etching; as a relatively mild acid, it does not emit toxic fumes. Sulfamic Acid Crystals can be used on tile or colored grouts, but should not be used on some types of natural stone such as polished marble or granite. Refer to the Sulfamic Acid Crystals Technical Data Sheet for proper application and handling.

RELATED PRODUCTS

TileLab® Sulfamic Acid

TileLab® Grout Haze Remover

Aqua Mix® Grout Haze Clean Up

Aqua Mix® Eff-Ex®

Aqua Mix® NanoScrub®

Aqua Mix® Poultice Stain Remover

Aqua Mix® Sealer & Coating Remover

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