



# Factors that Affect Final Cement Grout Color

## TDS 174

Color variation is inherent with any cement based grout. There are many variables which can affect the final color of the grout. Some of these variables include uneven hydration of the cement, varying density and porosity of the tile or stone, type of substrate, over-glazed tile edges, self-spacing tile lugs, varying amounts of water used for grout mixing, excessive or varying amounts of water used during grout clean-up, job site conditions, mortar high in the joint, lighting, and different manufacturer's "dye lots" when multiple units of grout are installed. We will look at some of these variables in more depth;

**Varying density and porosity of tile and stone** - varying density of tile and stone can cause cement grouts to hydrate unevenly and thereby cause an inconsistent (blotchy) grout color, upon drying. For example, a porous natural stone, such as marble, can draw moisture from the cement grout, oftentimes very quickly. On the other hand, a dense stone such as granite, can draw less moisture from the cement grout. In some cases, stone can have different absorption rates within one module (stone tile). In some cases, the same batch of cement grout may potentially dry two different colors depending on the type of tile or stone around which it is installed due to varying absorption rates. Installations where different types of stone are used, or where tile and stone are used, may show variation in grout color based solely on differences in module absorption rates. To help combat this problem, a high performance (ANSI A118.7), calcium aluminate cement-based grout (e.g. PERMACOLOR® Select, PERMACOLOR Grout or PERMACOLOR Select NS) should be used.

**Type of substrate** – the substrate over which tile or stone are installed can also play a significant part in the final color of the cement grout. As an example, a porcelain tile which has an extremely low absorption rate (<0.5%) is installed over a very dry and highly absorbent substrate. The moisture in the grout is drawn into the substrate which means that there is less water for the curing process of the grout. If the grout is not able to "mature" with the proper amount of water, then the color may very well be lighter than what is expected. To help prevent this from happening, it may be necessary to dampen (leave no standing water) with clean, potable water and a sponge over the tile installation just before grouting. This will add moisture to the substrate thereby lowering the absorption rate. Dampening the surface will also clean and cool the tile or stone. As always, it is best to conduct a test area whenever possible to verify results and confirm acceptability.

**Over-glazed tile edges** – the presence and amount of glazing on two sides of the tile can also contribute to the appearance of grout color variation. One process used to apply glaze to tile, the waterfall method, can apply the glazing material to two sides as they go through the process. The sides of the tiles that have the glazing will not allow the grout to dry as quickly as will the porous, clay-bodied edge without the glazing. This means that the grout installed on the sides where glaze is present will dry at a slower pace than the sides with the higher absorption rate. The difference in drying time can have a profound effect on the cured grout color.

**Self-spacing tile lugs** - in the case of wall tile with the self-spacing lugs, the lugs cause the depth of the grout in the joint to differ from where there are no lugs. The different depths of the grout in the joints can cause a "shadowing" effect where the self-spacing lug is almost visible beneath the installed grout. Conducting a test area will help to determine if color variation will occur due to the self-spacing lugs on the tile.

**Amount of water used in mixing** - the use of too much water when mixing the grout can cause the grout to dry lighter than anticipated. Excess water dilutes the color pigment concentration and will often cause the grout to be lighter in color. Excessive amounts of water or any water-based gauging liquid can also lead to the increased chance of efflorescence. Efflorescence is a condition caused by the water added to the grout putting soluble salts (present in all portland cement products) into solution, the water and salt come to the surface of the grout, the water

evaporates, and the salts remain behind where they react with carbon dioxide in the air causing calcium carbonate to form on the surface. This calcium carbonate (efflorescence) appears as a white (or light colored) powder which bonds to the surface causing the grout to look lighter in color. For more information on efflorescence please refer to [TDS 159](#) “Efflorescence – Causes and Prevention”.

**Excessive or varying amounts of water to clean grout** - The use of too much water during the clean-up process can wash out some of the color pigments in the grout, also causing the grout to dry lighter than anticipated. Too much water used to clean the grout may also lead to efflorescence issues. Use a consistent amount of water in the sponge and clean the grout with the same techniques throughout the installation. Changing the cleaning water frequently will also help achieve the best results.

**Jobsite conditions** – in many large jobs there are many factors which can have a significant effect on the installation of the tile or stone and on the grout. Contamination caused by paint overspray, drywall dust, dirt from foot traffic or wind, insulation, and other common jobsite related conditions will typically adhere very well to a grout while it is still wet. Also, exposure to wind, sunlight or other heat source or any condition which can cause uneven drying will affect how the grout will appear when fully cured. Controlling jobsite conditions or protecting the grout from exposure to damage should be mandatory to prevent unsightly, contaminated grout. Protection should include a non-staining brown Kraft® paper on the grout covered by a hard surface (e.g. plywood, OSB, etc...) to bear the weight of the traffic and keep foreign materials from embedding in the grout.

**Mortar high in the joint** – a common problem with grout being uneven in color is the thin-set mortar (often grey in color) not being cleaned out of the joint during the tile or stone installation process. If the mortar is left too high in the joint then a light or medium colored grout may appear darker in color than it should. The higher the mortar is left in the joint, the darker the discoloration will appear. It is very important to ensure that any excess mortar be removed from the joint during the installation of the tile or stone, or while the adhesive mortar is still wet.

**Lighting** – believe it or not, the effect that lighting can have on the appearance of a grout installation is profound. The angle of light, type of light, quality of light, and source of light all play key roles in how the grout will appear. It is not unusual for a grout to appear as one color during the day and as a different color during the night. It is also not unusual for one batch of grout, used on both a floor and a wall to have different color based on the angle of light hitting these surfaces. Wall washing lighting is especially notorious for creating drastic visual variations in grout appearance.

Using different manufacturer’s lot (batch) numbers in the same area, without dry blending all of the grout powder first, can cause the grout to appear different shades where the first batch of grout stops and the new batch(s) starts. When a different lot number (usually found on the bottom of the bags or above the bar code) is used, remember to mix them together dry in a clean container in order to maintain a consistent color and always follow the manufacturer’s written instructions for mixing and slaking of cement grouts, prior to grouting.

Variances in temperature, curing times, and jobsite conditions will also contribute to color variations. For example, a grout job that is in direct sunlight can dry at a faster rate than an installation in a shaded area, thus causing a color variation in the cement grout color. A portland cement based grout will appear darker in color when it is wet, even after full cure, in the same way that a sidewalk appears darker in color when it rains.

Whatever the cause may be for a cement grout color varying from what is expected, there are viable, industry accepted options for fixing these types of issues. Enhancing Sealers can be used to deepen the color of the grout by giving it a wet look. This option works well for grout that dries consistently light but may not be the best option for grouts that dry “blotchy.” STONETECH® manufactures enhancing type sealers (e.g. STONETECH Enhancer Pro Sealer) which can help alleviate cement grout issues. For more information, contact STONETECH Technical Services at 1.888.786.6343. For blotchy grouts, epoxy-based grout colorants (a.k.a. grout stains) may also be applied directly to the grout joint to help restore a uniform color appearance.

Grout and sealant colors shown on LATICRETE grout color cards, chip clips, swatches, website and other tools are as accurate as the technology used can reproduce. Please note that LATICRETE does not warrant color matching to any stated color representation or to any color guide produced. Actual shade and texture will depend on job site conditions, installation techniques and types of tile or stone used and may vary from any grout color chart, grout color channel kits, grout color swatch on product packaging, or any other color representation. Verify actual appearance and compatibility with a test area before installing. Dry mix grouts with different control numbers.

For additional trouble-shooting information on causes and remedies of cement grout related issues please reference the LATICRETE Cement Grout Trouble-Shooting Guide – [TDS 201](#). For installation, cleaning, and maintenance of LATICRETE® and LATAPOXY® grouts, reference LATICRETE Grout Guide - [TDS 400](#).

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