



Grout Selection for Ceramic and Stone Tile — What's New

How does a tile contractor select the right type of grout for a job when over seven choices are available? Understanding the performance advantages and limitations of each type of grout is the first step. While most grouts meet the requirements of a particular ANSI standard, that does not necessarily mean that the product will satisfy the needs of a project, the ease of use demanded by an installer or the performance expectations of an end user.

Contractors typically want a grout that has ample working time, fills joints completely, dries quickly, and is easy to clean off the face of the tile. They do not want to have to return to the job to clean off grout haze or seal the grout.

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CUSTOM[®]

It is important to understand the requirements of the project when selecting a grout.



End use customers typically want an aesthetically pleasing grout that never changes in appearance. They expect the grout to wear the same as their tile and to not stain when exposed to household liquids, dirt and fungus. In the past, there has not been a single grout that could meet all these requirements. However, Custom Building Products has fused the top benefits of the various types of grout into a new solution, referenced as a Single Component Grout™. Fusion Pro® presents the stain resistance, color uniformity and durability of an epoxy grout with the ease of installation found in a traditional cement-based grout.

SELECTING THE CORRECT GROUT

Grout is an integral part of tile installation, but not every type of grout is designed to meet the unique requirements of a job. It is important to evaluate the options when choosing a grout for your tile installation.

In the 2011 TCNA Handbook, seven categories of tile grout were identified. We now recognize that there are eight categories with the introduction of Fusion Pro Single Component Grout.

SAND-PORTLAND CEMENT GROUT

An on-the-job mixture of 1 part Portland cement to 1 part fine, graded, clean sand for joints up to 1/8"; 1:2 mixture for joints up to 1/2" and 1:3 mixture for joints wider than 1/2".

This is not much different than the grout that has been used for centuries. The base color is gray or off white. If a different color is desired, the grout mixture will have to be colored at the job site with pigments. Since the grout is generally mixed in small quantities it can be difficult to maintain consistent color throughout the job.

These job site-mixed grouts do not have the chemical additive modifiers of factory-prepared grout, so it can be more difficult to install. It is imperative that the installed grout joint is misted with water for several days to assure maximum strength and color uniformity of the grout. The cement make up of these grouts can make them prone to efflorescence. Since these grouts are mixed at the job site instead of at a factory, it is difficult to consistently measure an exact ratio of sand and cement. As a result, this can affect the strength and durability of the grout. While this type of grout generally carries a lower price point, the results are unpredictable and may not meet the customer's expectations.





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STANDARD PERFORMANCE CEMENT GROUT: ANSI A118.6

A factory-prepared mixture of cement, fine aggregate, and other ingredients to produce a water-resistant, dense, uniformly-colored material for joints 1/8" or less. The fine aggregate is generally replaced with clean, graded sand for joints greater than 1/8".

These grouts are generally labeled as non-sanded when they are made with extremely fine fillers and are suitable for joints less than 1/8", and they are labeled sanded for joints greater than 1/8". This is a substantial improvement over the job site mix. Custom® Building Products' Polyblend® Sanded and Non-sanded Grout are examples of this type of grout. These factory-prepared grouts are available in a multitude of colors and are quality controlled so that each bag produces the same color and composition as the last bag used. This assures a more consistent color throughout the installation. Polyblend is available in 48 colors, satisfying the needs of most tile installations.

These grouts are formulated for ease of use, with significantly longer working times than non-modified job site mixes. They are designed to stay in joints on vertical surfaces without slumping, and they maintain full joints on the floor. The components are precisely measured in the factory, which leads to consistent durability and handling properties. Cement-based grouts pack well into joints, and the joints stay full throughout the cleaning process. However, a light haze can be left behind though it is easily removed the next day. Because these grouts are based on Portland cement, they are porous and can be stained from common household agents. Since their primary makeup is cement based, they are prone to efflorescence if over-watered during the installation process. These grouts meet the requirements of ANSI A118.6.

HIGH PERFORMANCE POLYMER MODIFIED TILE GROUT: ANSI A118.7

A factory prepared mixture of cement and other ingredients, including a redispersible latex/polymer powder (to which only water is added at the jobsite) or a liquid latex admixture (that is added at the jobsite in place of the water); designed for grout joints 1/8" or less. Generally clean, graded sand is added for grout joints greater than 1/8".

Prism® SureColor® Grout's hard, dense grout joints are also more stain resistant to common household staining agents than most standard Portland cement grouts.



While many of the standard performance cement grouts do contain some polymer, they generally do not take advantage of the latest developments in polymer technology. On the other hand, high performance cement grouts have higher polymer content and benefit from years of development in polymer chemistry. These grouts solve many of the shortcomings of standard cement grout.

The drawbacks of many standard cement grouts are that they do not dry hard (compared to the tile surface), mottle or shade in the joints, and cure with efflorescence (white haze) on the surface of the grout. All of these issues are the result of inadequate hydration of the Portland cement in the standard grout; un-hydrated cement in standard cement grout can be much darker than fully hydrated cement, leading to a mottled look. Custom Building Products recognized these issues with standard Portland cement grout and developed high performance Prism® SureColor® Grout. Prism SureColor Grout utilizes Control Cure Technology™ (CCT) to eliminate many of these problems that challenge standard cement grouts. Prism SureColor Grout utilizes unique cements, polymers and modifiers that help complete the hydration process in a short time.

Since the cement becomes fully hydrated quickly, it cures to a uniform color. The color of the Prism SureColor Grout used in an installation between dense porcelain tiles is the same color as when it is placed between porous limestone tiles. The complete hydration also binds any free calcium salts in the grout, so that they do not migrate to the surface and lead to a white haze or efflorescence. Prism SureColor Grout sets fast and develops higher early strength for excellent abrasion resistance. The optimization of the particle size of the fine aggregates and cement binders in Prism SureColor Grout allow for its placement in joints from 1/16" to 1/2" wide (eliminating the need to stock both non-sanded and sanded grout) and assure that the grout will cure hard. Prism SureColor Grout's hard, dense grout joints are also more stain resistant to common household staining agents than most standard Portland cement grouts. Prism SureColor Grout is available in 24 of the most popular colors to meet the needs of architects and designers. Prism SureColor Grout meets the more demanding requirements of ANSI A118.7.

EPOXY GROUT: ANSI A118.3

Epoxy is a grouting system employing epoxy resin and hardener portions, often containing coarse silica filler. These are formulated for industrial and commercial installations where chemical resistance is critical.



Because epoxy grouts eliminate many of the limitations of standard cement grouts and have excellent stain resistance, they are sometimes used in common residential tile installation such as kitchens.

These two and three component grouts are composed of epoxy resins, hardeners (curing agents) and graded aggregates. They do not contain any volatile solvents or water and are considered 100% solids. Epoxy resins have more chemical resistance, primarily to acidic materials, than the more common cement grouts. Because of their ability to resist chemicals, they are commonly used in commercial applications that are routinely exposed to corrosive chemicals or food items for extended periods of time, such as dairies and soft drink bottlers.

Because epoxy grouts eliminate many of the limitations of standard cement grouts and have excellent stain resistance, they are sometimes used in common residential tile installations, such as kitchens. Custom Building Products developed CEG-Lite™ 100% Solids Epoxy Grout for these uses.

Historically, installers have shied away from installing epoxy grout. While these products satisfy the needs of the end user with uniform color, durability and stain resistance, they are more difficult to install. The consistency of the epoxy grout makes it difficult to spread and fill the joints. Many have marginal water solubility and are difficult to clean up and maintain full joints. Custom Building Products' CEG-Lite 100% Solids Epoxy Grout was developed with the latest epoxy technology and is one of the easiest epoxy grouts to install. CEG-Lite 100% Solids Epoxy Grouts meet ANSI A118.3.

EPOXY EMULSION GROUT

Epoxy emulsion grout is a grout system employing epoxy resin and hardener portions, both of which contain additional water to form an emulsion. The coarse sand filler portion also contains Portland cement.

Epoxy emulsion grouts are a hybrid of the 100% epoxy and the Portland cement grout. Generally they cost less than a 100% epoxy grout, because they are extended with water. These grouts rely on the hydration of the Portland cement in addition to the cured epoxy resin for their ultimate strength. However, because their performance is dependent on the hydration of the Portland cement they can be prone to the same issues that plague standard Portland cement grouts. Unfortunately, the addition of the epoxy also makes these grouts more difficult to install than a standard cement-based grout. Because of these limitations, there are few of these types of products in the market. These grouts meet ANSI A118.8.





FURAN RESIN GROUT

Furan resin grout is a grout system consisting of furan resin and hardener portions. Furan grout is used in industrial and commercial installations requiring chemical resistance.

Furan resin grouts are a highly specialized grout, a thermosetting polymer designed to withstand continuous exposure to temperatures up to 350° Fahrenheit. As a grout it is primarily used in applications such as dairies, that require resistance to routine exposure from organic acids (contained in milk products) and elevated temperatures. Furan is a reactive polymer-like epoxy, though it requires special installation techniques and should not be attempted by a novice. It can not be cleaned from the surface of the tile with water alone during the installation process, and generally requires pre-sealing of the surface of the tile before installation. Furan grouts meet the requirements of ANSI A118.5.

While epoxy grout does not meet the definition of a furan grout, many epoxy grouts claim to meet the performance characteristics of a furan grout. These epoxy grouts do have higher resistance to extreme temperatures and will hold up longer when exposed to most corrosive chemicals, but they are not based on furan resins. They are easier to install than true furan resin grouts, but generally not as easy as the more common 100% epoxy grouts meeting the requirements of ANSI A118.3.

PRE-MIXED POLYMER RESIN GROUT

Pre-mixed polymer resin grout is a one-part liquid, ready-to-use grout that requires no mixing with water.

These recently developed, easy to use grouts are generally a mixture of acrylic and/or urethane polymer, fine fillers and water. They are pre-blended and can be applied to the joints between installed tiles straight from the container; no or little mixing is required. While these are acknowledged by TCNA and the tile industry as an alternative to traditional grout, they do not have ANSI or other specifications to date. Since there are no standards, there are wide variations in the properties of these premixed grouts from the various suppliers. They can dry slower than traditional Portland cement and epoxy grouts.

DIY installers are attracted to the convenience of opening the container and being able to begin spreading with no mixing required. Custom Building Products has developed one of the best grouts in this category with the SimpleGrout® brand.





Fusion Pro® Single Component Grout™ combines the properties of cement and epoxy grouts, including high stain resistance, color consistency, no efflorescence, excellent hardeners, high spreadability and easy clean-up.

SimpleGrout is easy to install and develops excellent stain resistance. Typically, pre-mixed grout does not have strong water resistance and should be used in dry or intermittently wet areas. One should consult the manufacturer for specific applications before installing a pre-mixed grout.

SINGLE COMPONENT GROUT — NEW CATEGORY

Custom Building Products developed Fusion Pro® Single Component Grout™ to satisfy the needs and desires of the end user and installer, eliminating the typical concerns of other grout types. Fusion Pro is formulated with the latest advancements in acrylic copolymer development and silicone resin. Silicone resin is known for having excellent chemical resistance and is used in the most demanding applications. A silicone resin has a very high surface tension and easily repels water. These properties of silicone resin contribute to the excellent stain and water resistance of Fusion Pro.

Acrylic polymers are known for their excellent durability and can be found in many exterior applications. The durability of the acrylic polymers minimizes cracks from appearing in the grouted joints and extends the longevity of the Fusion Pro grout in the tile installation. These polymers and resins are combined with other ingredients to fuse together a grout that is easy to install, quick to dry and easy to clean up. Because of the excellent stain resistance properties, Fusion Pro Single Component Grout does not have to be sealed and is easy to maintain along with the tile. While single component grout does not have an industry standard, Fusion Pro does meet the performance properties of ANSI A118.3 and A118.7. Based on the success of this latest developments in grout technology, tile industry associations will soon recognize it with a new industry standard. The properties of Fusion Pro will be the basis for that standard.

In addition to these ceramic tile grouts, deformable sealant/caulk is used in the joints between tiles, whenever movement between adjoining tiles is suspected.

SEALANTS/CAULKS

Suitable sealants/caulks include silicone, urethane and polysulfide based materials. The sealant/caulk must meet the requirements of ASTM C-920, Type S or M, Grade P or NS, Class 25 or 12.5, and Use T or NT, M and G. Sealant/Caulk for use in traffic areas requires a Shore hardness of 35 or greater.



The tile installation is not complete until soft movement joints are properly installed. Consider the fact that there is movement in every floor and wall assembly; this movement can be from the curing of cement/concrete surfaces, thermal changes, or even settling of the structure. Placement of movement joints is described in ANSI and the TCNA Handbook. To eliminate cracks in the tile assembly, these guidelines should be followed. Soft joints should also be installed wherever there is a change of plane or the independent movement of two surfaces is possible. Custom Building Products' Commercial 100% Silicone Caulk meets these needs and has a Shore hardness greater than 35, making it suitable for high traffic areas.

WHICH GROUT MATCHES THE NEEDS OF A JOB SITE?

It may seem confusing with so many grout choices, but each option is the result of an evolution to satisfy the needs of specific project conditions. Fusion Pro® is the most dynamic innovation in grout to date offering the best performance characteristics of existing grouts with the fewest limitations. Easy to use, strong in performance and competitive with high performance grout alternatives, Fusion Pro is the technology of the future available today.

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ABOUT THE AUTHOR

Steve Taylor is Director of Architecture and Technical Marketing for Custom Building Products and has more than 30 years of experience developing products for the construction industry. Steve is a member of the Tile Council of North America (TCNA), helping to determine proper tile installation methods and standards, including the simplification of tile installation processes, which enables tile professionals to save time and money.