

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.

The information in this bulletin is presented in good faith, but no warranty, express or implied, is given nor is freedom from any patent in as much as any assistance furnished by CUSTOM with reference to the safe use and disposal of its products provided without charge. Custom Building Products assumes no obligation or liability therefore, except to the extent that any such assistance shall be given in good faith.

TB21 4/17R



Technical Bulletin

Technical Services 800-282-8786
custombuildingproducts.com

Aqua Mix Technical Bulletin #6:

REMOVAL OF EFFLORESCENCE

Purpose: To remove white mineral residue (efflorescence) from tile, stone, masonry or grout surface

Product Recommendation: Eff-Ex® (Notes A, B & C)

Equipment: Synthetic mop and bucket with wringer and scrub brush

Coverage: Approximately 30 - 125 sq. ft. (3 m² - 12 m²) per gallon (3.78 L)

Procedure:

1. Always test a small area first to ensure satisfactory results.
2. Apply undiluted per product directions.
3. Allow to dwell on surface for 30 to 60 minutes. For heavy efflorescence, allow a 60-minute dwell time.
4. Do not allow to dry on surface, apply additional product if necessary to keep wet.
5. Agitate with a scrub brush. A low RPM (175 to 350 RPM) scrub machine may be used.
6. Mop up or wet-dry vacuum dirty solution.
7. Rinse thoroughly with clean water agitating with a scrub brush to ensure removal of cleaning agents.
8. For exterior areas, a hose or high-pressure water sprayer may be used.

Note A: If efflorescence is entrapped below a non-breathable sealer, follow directions of Technical Bulletin #10 to remove sealer prior to efflorescence removal.

Note B: Not recommended on polished marble, limestone and travertine as it may lightly etch polished surfaces.

Note C: If efflorescence has been allowed to crystallize on surface, it may be necessary to use an acidic cleaner such as Aqua Mix Phosphoric Acid Substitute. This acidic cleaner will etch polished marble and other acid-sensitive surfaces.

These recommendations are intended as guidelines for the removal of efflorescence. The actual cleaning requirements may vary depending on method of application, and amount of efflorescence/ hard water present. READ PRODUCT DIRECTIONS THOROUGHLY PRIOR TO USE. ALWAYS TEST FIRST. KEEP SURFACE CLEAN AND DRY TO REDUCE POSSIBILITY OF SLIP-FALL ACCIDENTS.

HOW TO PREVENT GROUT RESIDUE AND TILE STAINING

A Glossary of Terms Used

Grout – mortar or resin-based product used to fill spaces between tiles

Grout Haze – residue attached to the surface of the tiles after the grouting process

Grout Retention – grout particles trapped in micro pores, textures or fissures in the tile surface

Grout Migration – tile discoloration from cement or resins absorbed into porous tile, primarily edges and unsealed natural stone

Grout Release – a liquid product applied to the tile surface that is not absorbed and acts as a temporary barrier to grout adhesion by filling surface spaces

Sealer – a liquid product applied to the tile that is absorbed into the tile or stone surface. Some sealers can be applied in a six-sided method to protect all the tile surfaces from staining. Unless topical and film-forming, sealers do not protect against grout retention.

Coating – a liquid sealer or wax applied to the tile surface before grouting that fills spaces in the surface and forms a barrier until chemically and mechanically removed

Additives – liquid added to rinse water to improve grout cleanup and reduce/eliminate the potential for grout haze/residues.

Technology is a Factor

Ceramic tile, natural stone and grouts have always been compatible materials but with the advances in grout formulation technology using polymers and resins, grout adhesion has increased dramatically! Though the grout products are water-cleanable, grout residues must be removed thoroughly from the tile surfaces before they set or cure. Adding to the potential for grout haze or grout retention, the most widely used grouts in today's installations are rapid-setting or rapid-curing to achieve extremely accurate color consistency and to accommodate fast track installation schedules. These fast-setting properties can create a challenge for some grout finishers, especially in warm, dry and windy conditions.

Technology for tile manufacturing has also advanced where now porcelain tiles can be profiled to achieve the strict requirements for slip resistance, to replicate wood plank and slate textures, or polished so smooth it's hard

to tell that they're not natural stones. Some of these advancements in tile design and manufacturing have inadvertently created new "spaces" for grout to fill.

All grout formulations combine a binder and an aggregate or powder to fill joints. The binder might be made of cement and polymer that attaches to sand, glass or limestone. Other binders include acrylic resins, urethanes and epoxies.

The grout haze from cement grouts is typically made up of a combination of the binder and fine particles of the filler. Resin based grouts - acrylics, urethanes and epoxies most often leave a clear film residue.

Tile discoloration from grout retention very often leads to complete tile replacement as the binder and/or fine aggregate particles become trapped in the tile surface, becoming permanently "grouted." More often, unglazed tiles are the most problematic but polished surfaced tiles that appear to be smooth can have fissures and "dove-tailed" pores from the grinding process. When the grout and tile are similar in color, the residue is unnoticed until traffic dirt and spills discolor or adhere to the grout, making remediation much more costly in an occupied project.

Grout migration is usually very evident after the grouting process as the discoloration darkens the entire tile or picture-frames the edges. As with grout retention, tiles are typically permanently damaged.

So, with all these advances, the possibility of a tile discoloration disaster is always present and only by taking precautions can you prevent it from happening. The primary causes for grout haze are listed below. Some instances are caused by inadequate installation practice, but others will occur on certain types of tile even when the grout is placed in a professional manner if protection is not in place.

Primary Causes of Grout Haze

- Spreading too much grout
- Leaving grout too long before finishing
- Improper cleaning technique
- Applying grout to tiles in hot, dry or windy conditions
- Textured/profiled tiles
- Tile with micropores
- Polished tile/stone with fissures
- Porous tiles



CUSTOM®

Technical Bulletin

Technical Services (800)282-8786
custombuildingproducts.com

HOW TO PREVENT GROUT RESIDUE AND TILE STAINING

Prevention:

Awareness of the possibility of these occurrences is the first line of defense against experiencing a problem! Here are some "red flags" to watch for on your next project:

- Unglazed porcelain tiles may have been designed with well-intentioned micropores to create high slip resistance, but these pores are traps for grout particles.
- Textured porcelain "wood-look" plank tiles may have absorptive areas from the manufacturing processes created by removing the dense outer layer of the tile. This leads to grout flash-setting long before a normal timeframe.
- Polished porcelain surfaces need to be ground to a depth that does not leave considerable voids. This is impossible to see with the naked eye so plan on using a grout release.
- Not all sealers are compatible for use with resin-based grouts. The grout may attach itself to the sealer and be very difficult to remove. Best to use products from the same manufacturer as they've been tested or confirm with the grout manufacturer.
- Most grout manufacturers recommend lightly dampening tiles with water to cool the surface when needed and/or lessen adhesion.
- The use of a grout release on the tile surface helps prevent grout from adhering to the tile and will prevent grout retention on most tiles.
- **MOCK-UPS:** With certain tiles or natural stones, using a penetrating sealer as the grout release is all that's required. In other cases, using a temporary film former (grout release) product is the solution and/or using a rinse water additive may be helpful. There will be times when both a sealer and grout release will be necessary. Apply a sufficient amount of grout to determine the correct process.
- Some non-slip tiles with micropores have surfaces that require a coating similar to a floor wax that is removed after the grout cures.

Consult individual product Technical Data Sheets for specific recommendations and limitations regarding project conditions. Contact CUSTOM Technical Services for questions and product information: [CONTACT CUSTOM](#) or (800) 282-8786.

The information in this bulletin is presented in good faith, but no warranty, express or implied, is given nor is freedom from any patent in as much as any assistance furnished by CUSTOM with reference to the safe use and disposal of its products provided without charge. Custom Building Products assumes no obligation or liability therefore, except to the extent that any such assistance shall be given in good faith.

TB109 12/21



Technical Bulletin

Technical Services (800)282-8786
custombuildingproducts.com

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

The information in this bulletin is presented in good faith, but no warranty, express or implied, is given nor is freedom from any patent in as much as any assistance furnished by CUSTOM® with reference to the safe use and disposal of its products provided without charge. Custom® Building Products assumes no obligation or liability therefore, except to the extent that any such assistance shall be given in good faith.



Technical Bulletin

Technical Services 800-282-8786
custombuildingproducts.com

Aqua Mix Technical Bulletin #1:

REMOVAL OF CEMENT OR GROUT HAZE RESIDUE

Method A (within first 10 days of grouting)

Purpose: To remove cement or latex modified grout haze that has cured on the tile or stone surface

Product Recommendation: Grout Haze Clean-Up (Notes A & B)

Equipment: Scrub pad or brush, bucket and cotton towels

Optional: scrub machine, wet-dry vac

Coverage: Approximately 200 sq. ft. (20 m²) per gal (3.78 L)

Procedure:

1. Always test a small area first to ensure satisfactory results.
2. Sweep or vacuum surface.
3. Apply Grout Haze Clean-Up full strength onto a manageable area of up to 10 sq. ft. (1 m²)
4. Allow to dwell 5 to 10 minutes. A longer dwell time may be needed.
5. Agitate with a scrub brush or scrub pad.
6. Mop up dirty solution.
7. Rinse thoroughly with clean water.

Method B (after grout has cured a minimum of 10 days)

Product Recommendation: Phosphoric Acid Substitute (Notes A & B)

Equipment: Synthetic mop and bucket with wringer and scrub brush or scrub pad

Coverage: Approximately 400 - 1,200 sq. ft. (35 m² – 110 m²) per gallon (3.78 L)

Procedure:

1. Allow newly grouted installations to cure a minimum of 10 days.
2. Always test a small area first to ensure satisfactory results.
3. Sweep or vacuum surface.
4. Pre-wet surface with water.
5. Mix 1 part Phosphoric Acid Substitute to 5 parts water. Stronger solution may be used if necessary.
6. Apply solution onto a manageable area of up to 10 sq. ft. (1 m²). Do not allow solution to dry.
7. Allow to dwell 1 to 2 minutes.
8. Agitate with a scrub brush or scrub pad.
9. Mop up dirty solution. A wet-dry vacuum may be used.
10. Rinse thoroughly with clean water agitating with a scrub brush to ensure removal of cleaning agents and acid.
11. Repeat procedure if necessary.

Note A: Do not use on marble or on other acid-sensitive tile or stone. Refer to Aqua Mix Technical Bulletin #3.

Note B: Mix NanoScrub® into a wet slurry with either Grout Haze Clean-Up or Phosphoric Acid Substitute for stubborn, difficult to remove grout haze problems.

These recommendations are intended as general guidelines for the removal of cementitious standard and latex modified grout haze. The actual product dilution ratios and cleaning requirements may vary depending on the use, amount and type of grout film present and method of application. READ PRODUCT DIRECTIONS THOROUGHLY PRIOR TO USE. ALWAYS TEST FIRST. KEEP SURFACE CLEAN AND DRY TO REDUCE POSSIBILITY OF SLIP-FALL ACCIDENTS.