

## NATURAL STONE CARE AND MAINTENANCE

**Note:** The first step in stone tile maintenance is the sealing of the stone. Generally, all stone must be sealed. Follow the manufacturer's recommendations for the product chosen.

Knowing the surface type (polished, honed, or natural) coupled with the density and porosity of the stone will determine the best type (petroleum or water based) of sealer to be used.

### Regular Maintenance

- Immediately wipe up spills and messes. Use pH neutral cleaners and soap-less detergents for daily cleaning.
- Rinse the stone and grout thoroughly to remove any remaining cleaner.
- Agitate grout joints with a soft bristled brush to loosen debris.
- Thoroughly rinse, dry, and polish cleaned areas.
- Acidic cleaners will etch and remove the polished surfaces from calcium based stones such as marble, travertine, and limestone. Make sure you read carefully the label of the cleaner. Sometimes acid ingredients are hidden behind the word "natural"
- Acidic cleaners will eventually erode the grout in the joints making cleaning and maintenance more problematic. This is especially true if using acid cleaners on sanded grout installations.
- Colored grout pigment can be permanently damaged by using acidic cleaners. This is especially true if acidic cleaners are used on a daily basis.

### Heavy Duty Maintenance

Heavy duty cleaning requires the use of pH alkaline based cleaners and hot water. These can include scouring cleaners and poultices manufactured for this purpose. Use a soft bristled brush to agitate the cleaners in the grout joints.

- Test an inconspicuous area with any abrasive powder to evaluate if it will adversely affect the finish of the stone.
- Allow the cleaner to rest upon the surface to gain the full potential of the cleaner.
- If these results are not acceptable, then proceed to the more aggressive high alkaline "heavy duty" or "deep clean" type cleaners available from reputable manufacturers.
- Commercial floor buffers or cleaning machines are perfectly suited to clean large areas. The biggest question here is the selection of the cleaning solution.
- It is very important to rinse the tile and grout thoroughly to remove any remaining cleaner.
- If the results are not satisfactory using high PH alkaline cleaners, it may be necessary to use an acidic solution to solve a particular problem.
- Acidic cleaners will etch and remove the polished surfaces from calcium stones like marble, travertine, and limestone.
- Sulfamic and phosphoric acids are the safest and most used acids in solving cleaning problems. These two acids have very specific mixing and application recommendations must be followed correctly.
- Always, thoroughly rinse the cleaned area, dry, and polish.

### **Other Maintenance Information for Natural Stone**

- Most stones, once protected, require occasional scrubbing to remove surface build-up of dirt and grime.
- Using a neutral cleaner, apply cleaner as directed, rinse using clean water.
- Towel drying after rinsing removes streaks especially on polished surfaces.
- On some types of stone, you can apply coatings to produce a “wear layer” or “sacrificial coating” but this may change the look of the stone and may sometimes require more maintenance to maintain the beauty of the floor.
- On honed (smooth but not polished) or slate (rough) finish stones, a good scrubbing is required more often, due to the texture of the product holding the dirt to the surface.
- A good penetrating sealer cuts down on the frequency of this task.
- Most stones will be easy enough to maintain with a high-quality sealer and regular maintenance.
- With all stones, establish what sealer to use or has been used previously, and then work within the manufacturer’s guidelines to set up a regular maintenance schedule.

### **Stain Removal**

- For stains on marble or stone, a product commonly referred to as “poultice” should be used.
- Poultice is used in a paste form and is applied to the surface, covering the entire area where the stain is located.
- Then apply a piece of plastic, larger than the stain area, over the poultice and seal off with painter tape.
- Allow it to set the prescribed amount of time by the manufacturer and remove plastic.
- The stain is normally drawn out of the stone.
- Some poultice type products push the stain down into the stone away from the surface of the stone and allow you to seal the stone, thus keeping the stain away from the surface. Follow manufacturer’s directions and recommendations.
- Some stains may require multiple applications or can only be partially removed.

### **Repair of Marble**

- Polishing stones to make attractive edges or to fix damage done by chemicals can be done in small areas.
- Kits are available that have all the products to do this in one box.
- If you have a large area that is damaged or if you want to establish a once-a-year regular maintenance procedure to keep your marble glowing with the original luster finish, contact a company that specializes in this type of work.
- In cases where the marble surface is badly scratched, worn, or needs major work, professional refinishers maybe the answer.

Natural stone products are porous by nature. To ensure your natural stone products will provide you with a lifetime of aesthetics and performance, proper maintenance is crucial.

## **New Installation**

Sealing is strongly recommended for newly installed marble and other natural stone to provide maximum surface and below surface protection.

## **Pre-Grouting Sealing**

Non-Sanded grout is typically used for a natural stone installation. This type of grout has very fine particles of cement, polymers, and color pigments that can penetrate the microscopic pores of the stone surface where they become trapped and appear as a stain in the stone. Therefore, travertine, slate, tumbled stone, and honed/flamed/unpolished granite should be sealed prior to the grouting process to protect stain from penetrating where appropriate. A grout releasing sealer can be used for this application. A good quality sealer can also be used as a pre-grout sealer and applied again as the final sealing process once the installation is finished.

## **Sealing Natural Stone**

Sealers used for natural stone are either designed to penetrate below the surface (penetrating sealers/impregnators) or coating-type sealers designed to affix a protective coating over the stone surface. Penetrating/impregnator sealers can generally be used on all natural stone surfaces whereas coating-type sealers are normally designed for rough textured surfaces such as slate and sandstone. Also, note the limitations of topical sealers – do not allow vapor transmission, not for exteriors/wet areas. It makes the surface slippery.

The type of stone and the environment of the application must determine the type of treatment that is applied to the surface of the stone. All surface treatments must be used in accordance with manufacturer's specifications. Surface treatments (topical and penetrating agents) may be used when a defined benefit can be determined. Benefits from the use of surface treatments may be considered for use when:

1. The risk of staining is present.
2. As an aid in daily maintenance procedures.
3. A coating may help preserve the stone finish in excessively high wear conditions.
4. Where weathering has, or might impact the integrity of the stone surface.
5. To preserve the aesthetic elegance of the original installation.
6. Where the risk of graffiti or other vandalism is high.

## **Natural Look Penetrating Sealer**

A premium natural look penetrating/impregnating sealer is the normal choice on polished or honed marble, limestone, granite and slate. Penetrating/impregnating stone sealers are non-sheen, natural look sealer that can be water-based or solvent-based, good for interior and exterior applications. The natural look penetrating sealer is not a surface coating and will not alter the natural look of the stone.

## **Stone Enhancer Sealers**

Stone enhancer sealers are non-sheen, penetrating/impregnator sealers that are formulated to darken, enrich, and high-light the natural color of tumbled, antique, or slate products. They

will rejuvenate and improve the appearance of worn and weathered stone. However, they will also darken the color of grout joints.

### **Stone Care**

Use cleaners specifically designed for cleaning stone. Stone cleaners should never contain acid or bleach. Acids, even a light solution of vinegar and water, will etch and eventually damage calcium based natural stone such as marble, limestone and travertine.

### **Stain Removal**

Stains can often be removed by cleaning with an appropriate cleaning product or household chemical. Identifying the type of stain is the key to removing it. Look for color, shape and environmental factors that could be causing the staining. Always do a test area first.

### **TYPES OF STAINS & FIRST STEP CLEANING ACTIONS**

**Oil Based:** Include grease, tar, cooking oil, milk and cosmetics. An oil based stain will darken the stone and normally must be chemically dissolved so the source of the stain can be flushed or rinsed away. Blot first and then clean gently with a high PH cleaner, soft liquid cleanser or household detergent or ammonia or mineral spirits or acetone.

**Organic:** Includes coffee, tea, fruit, tobacco, paper, food, urine, leaves, bark and bird droppings. May cause a pinkish brown stain and may disappear after the source of the stain has been removed. Outdoors, with the sources removed, normal sun and rain action will generally bleach out the stains. Indoors, clean with a 12% hydrogen peroxide and a few drops of ammonia.

**Metal:** Includes iron, rust, copper and bronze. Iron or rust stains are orange to brown in color and follow the shape of the staining objects such as nails, bolts, screws, cans, flower pots, and metal furniture. Copper and bronze stains appear as green or muddy brown and result from the action of moisture on nearby or embedded bronze, copper or brass items. Metal stains must be removed by making a poultice. Deep seated, rusty stains are extremely difficult to remove and the stone may be permanently stained.

**Biological:** Includes algae, mildew, lichens, moss and fungi. Clean, dilute with 1.2 cup in a gallon of water with only one of the following: ammonia, bleach, or hydrogen peroxide. **DO NOT MIX BLEACH AND AMMONIA! THIS COMBINATION CRE-ATES A LETHAL AND TOXIC GAS!**

**Ink:** Includes magic marker, pen and ink. Clean with bleach or hydrogen peroxide for light colored stones. Lacquer thinner or acetone may be used for dark colored stones. However, caution should be taken as these products are highly flammable.

**Paint:** Small amounts can be removed with lacquer thinner or scraped off carefully with a razor blade. Heavy paint coverage should be removed with a commercial "heavy liquid" stripper. Paint strippers can etch the surface of the stone; re-polishing may be necessary. Do not use acids or flame tools to strip paint from the stone.

**Water:** Water spots and rings that include surface accumulation of hard water. Buff with dry 0000 steel wool or light abrasive cleaner, testing first to ensure desired results.

**Fire and Smoke Damage:**

Older stones and smoke or fire-stained replaces may require a thorough cleaning to restore their original appearance. Commercially available “smoke removers” may save time and effort.

**Etch Marks:** Usually caused by acids left on an acid sensitive stone. Some materials will etch the finish but not leave a stain; others will both etch and stain. Once the stain has been removed, wet the surface with clean water and sprinkle with marble polishing powder or compound. Rub into the stone with a damp cloth or by using a buffing pad with a low-speed power drill. Continue buffing until the etch mark disappears and the stone surface shines. Honing may be required for deep etching.

**Efflorescence:** Is defined as a white powder that may appear on the surface of the stone. It is caused by water carrying mineral salts from below the surface of the stone rising through the stone and evaporating. When the water evaporates, it leaves the powdery substance. If the installation is new, soft brush, dust mop or vacuum powder. Repeat as necessary as the stone dries out. Do not use water to remove the powder. If the problem persists, contact the contractor to identify and remove the cause of the moisture.

**POULTICE**

A stone poultice is designed to remove most stains and light grout haze from the stone. Poultice is a fine, non-acid, absorptive clay cleaning powder that removes deep-set oil stains, grease and light cementitious grout haze from polished and unpolished natural stone. A poultice is a liquid cleaner or chemical mixed with an absorbent material to form a paste with a thick, creamy consistency. The poultice is spread over the stained area to a thickness of 6 mm to 12 mm with a wood or plastic spatula or scraper, covered with plastic and left to work for 24 to 48 hours. The liquid cleaner or chemical will draw out the stain into the absorbent material. Poultice procedures may be repeated to thoroughly remove a stain, but some stains may never be completely removed.

Poultice materials include kaolin, fuller’s earth, whiting, diatomaceous earth, powdered chalk, white molding plaster or talc. Approximately one pound of prepared poultice material will cover one square foot (30cm). Do not use whiting or iron type clays as fuller’s earth with acid chemicals. The reaction will cancel the effect of the poultice. A poultice can also be prepared using white cotton balls, white paper towels or gauge pads. Pre-mixed poultices that require only adding water are also available from stone maintenance supply companies.

**Poultice Additives for Removing Stains**

**Oil Based Stains:** Poultice with baking soda and water OR one of the powder based poultice materials and mineral spirits or an alkaline cleaner.

**Organic Stains:** Hydrogen peroxide solution OR use acetone instead of hydrogen peroxide.  
**Iron Stains:** Light acidic cleaner. Rust stains are particularly difficult to remove. Professional assistance may be required.

**Copper Stains:** Ammonia. These stains are difficult to remove. Professional assistance may be required.

**Biological Stains:** Diluted ammonia OR bleach OR hydrogen peroxide. DO NOT MIX AMMONIA AND BLEACH! THIS COMBINATION CREATES A TOXIC AND LETHAL GAS!

### **Application of Poultice**

Prepare the poultice. If using powder, mix with the cleaning agent or chemical to a paste with a thick creamy consistency. If using paper, soak the chemical and let drain. Do not let the liquid drip. Wet the stained area with distilled water. Apply the poultice to the stained area, approximately ¼" (6mm) to ½" (12mm) thick and extend the poultice beyond the stained area by approximately 1" (2.5cm). Use a wood or plastic scraper to spread the poultice evenly. Cover the poultice with plastic and seal the edges with blue painter's tape. Allow to dry thoroughly, usually 24 to 48 hours. The drying process pulls the stain out of the stone and onto the poultice material. After approximately 24 hours, remove the plastic and allow the poultice to dry.

Remove the poultice from the stain, rinse with distilled water and buff dry with a soft cloth. Use a wood or plastic scraper if necessary.

Repeat the poultice application if the stain is not removed. It may take up to five (5) applications for difficult stains.

If the surface is etched by the chemical, apply polishing powder and buff with a polishing pad recommended by the polishing powder manufacturer.

### **RESTORATION OF NATURAL STONE**

If the floor surface has holes or cracks, this area must be repaired and color matched prior to the grinding process using epoxy or polyester compounds or a cement acrylic paste whichever is appropriate for the surface involved. All lippage must be removed by use of specific grinding. If lippage is not removed, excessive wear and damage to the various diamonds or abrasives may result. Wet grind the floor beginning with coarser abrasives, progressing to finer abrasives until the desired degree of finish is obtained. Prior to moving on to the next level of grinding, the entire floor must exhibit a uniform scratch pattern. Higher grades of diamonds or abrasives may be necessary due to the hardness of the stone. According to ASTM C97 if the average absorption rate of granite is 0.4% the moisture will temporarily affect the appearance of the granite causing it to "darken". This effect disappears upon the return to dry conditions. As grinding progresses the slurry produced must be removed by using a wet vacuum. Before moving from one abrasive grind to a finer grind, thoroughly wash the surface to remove any residue from the

previous grind or scoring will result in the next level of grinding. After completion of the final grind, wash and rinse the floor and seal.

**NOTE:** Instructions for restoration and maintenance of agglomerate should be obtained from the manufacturer. Polyester filling compound is used to fill larger holes, cracks and voids. Repair kits are available from the manufacturer.

### **POLISHING OF MARBLE FLOORS**

This process is an alternative to a full restoration procedure to bring back and to maintain a high degree of shine to worn traffic areas. This can be achieved with polishing powders or compounds (Aluminum Oxide, Tin Oxide). These powders are usually white, but can be yellow, brown, gray or black. The abrasive powder or compound is worked into the stone with a 175-rpm buffing machine using water and cloth or polyester fibre pads. The powder or compound is worked into slurry until the desired degree of shine is achieved. Remove slurry from surface with a wet pick-up vacuum or wet mop. Rinse with clean water to remove any excess powder or compound left on floor. Caution should be used. Some marble may polish with a very wet consistency while others may require almost buffing. Test the ratio of powder to water for suitability. Care must be taken as most polishing powders contain oxalic acid and if over used, damage to the marble will occur. If not enough is used the polish may not be achieved. This type of work requires experience and should only be performed by professionals who are specialized in the use of these materials and equipment. Manufacturer's instructions must be followed. On the market there are new diamond pads to restore marble floor. These pads are an alternative process to the diamonds for the maintenance. These pads start from 50 grit up to 5000 grit. The main difference is that they don't need a lot of water and they don't leave marks on the surfaces. They do not require any chemicals in daily cleaning to keep the floors clean and shiny. For floors that require floor finish, they will reduce the frequency of the periodic maintenance.

### **CRYSTALLIZATION/VITRIFICATION OF MARBLE**

These terms, although technically incorrect, have generally been used to describe a process for polishing marble by applying chemicals that react with the marble while buffing the marble surface. The chemicals used may be oxalic acid, silicon fluorides or other proprietary materials.

Crystallization chemically alters the surface of the marble and leaves a harder less permeable surface. Crystallization appears to work well in some marble and under certain service conditions. However certain types of marble may be deteriorated by the chemicals used in crystallization. Generally, marble used on floors should not be finished to a very high gloss but should be given a honed finish and treated with impregnators to improve resistance to staining. A high gloss finish on marble floors may be appropriate for light commercial and residential traffic conditions. Where a high gloss finish is desired, it may be obtained by the use of crystallization or by the application of suitable polishes. Altering the floor surface to a high gloss may affect the slip resistance. Damaged or worn floors can be reground and polished to their original luster and appearance by the use of diamond discs and special equipment

prior to crystallization. Crystallization is only possible on marble and limestone. Granite cannot be crystallized.

**WARNING:** Because crystallization/vitrification uses chemicals and components that transform the surface of marble and stone, there is controversy regarding this method of restoration. This procedure should be used at the discretion of the client. Trained craftsmen who are thoroughly familiar with this process should only carry out this work.

**References:**

<https://www.ttmac.com/en/component/k2/item/128-hard-surface-maintenance-guide-2017-2019-english>