

1 TALC



UNDERSTANDING STONE SEALERS

THE GLOBAL LEADER IN STONE & TILE MAINTENANCE

2 GYPSUM



fig. a



3 CALCITE



fig. b



4 FLUORITE

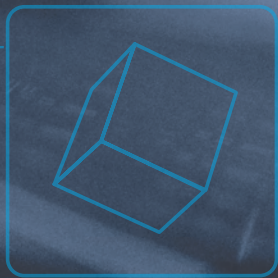


fig. c



5 APATITE

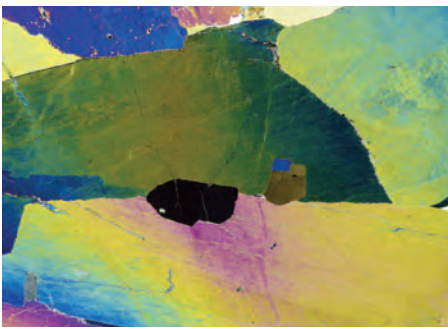


Voted the **Most Preferred Brand of Sealers and Cleaners** in the Tile & Stone Installation Contractor CLEARreport™

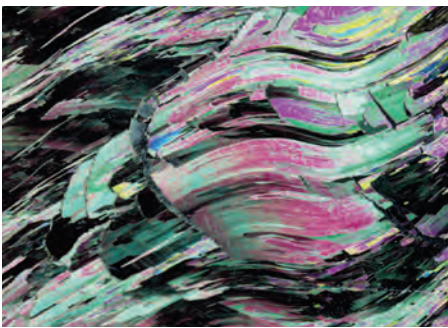


NATURAL STONE MAINTENANCE

As the popularity of natural stone installations grows each year, it also drives additional sales opportunities for care and maintenance products. The varieties of stone, the abundance of colors and textures, and the technical characteristics appeal to those seeking a premier building material for renovations, restorations or new construction. As more and more contractors, designers, architects and homeowners are using the rich look and textures of natural stone in new ways, it has become increasingly important for sales staff, employees, business owners, contractors and homeowners to understand properties and characteristics of natural stone and the basic needs of caring for natural stone after installation.



Electron microscope image of quartz.



Electron microscope image of calcite.

ALL STONE IS NOT CREATED EQUAL – INSIDE STONE

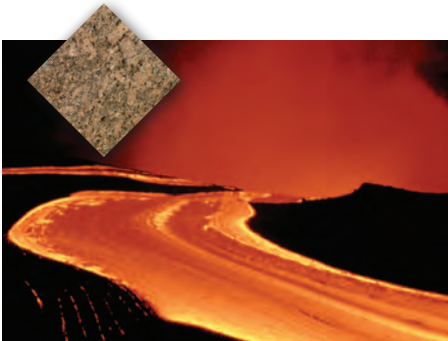
How stone is created is important to understand, because the composition affects its density, absorption rate, hardness and appearance. Ultimately, these characteristics determine how natural stone should be maintained to keep its beauty for life. Every region of our world is different and therefore contains unique mineral deposits due to the earth's formation. All stones vary based on where they are quarried or excavated. The dimensional stones used in commercial applications fall into one of these categories:

Silicas / Siliceous Stone

- Silica is the most common mineral on Earth
- Generally hard stone
- Easy to maintain and very durable

Carbonates / Calcareous Stone

- Next most common rock-forming group
- Generally softer, more porous stone than silica
- Durable, but sensitive to acids (like acid-based cleaners)



IGNEOUS STONES

Created above and below the Earth's surface, these stones are commonly believed to have solidified from molten rock (called magma) under pressure. Underground, they are formed when magma becomes trapped in small pockets. As these pockets of magma slowly cool, the magma becomes dense igneous rocks. On the surface, when magma appears above the Earth, it is called lava. As the lava quickly cools above ground, different varieties of igneous rocks form.

GRANITE A coarse-grained siliceous-based stone of even texture composed chiefly of quartz and feldspar minerals it usually contains small quantities of mica or hornblende. Crystallized at depth, granite masses are exposed at the Earth's surface by crustal movement or by the erosion of overlying rocks.

- Very hard material
- Easy to maintain
- Antimicrobial
- High density
- Low porosity, but susceptible to staining

OTHER IGNEOUS STONES

Quartz • Obsidian • Pumice



SEDIMENTARY STONES

Created from a blend of organic materials; small pieces of our Earth that have been eroded, broken down through the action of glaciers, rivers, wind, oceans and plants. These sedimentary pieces include the skeletal remains of living organisms collected to form rock beds (carbonates). These stones have a variety of combinations.

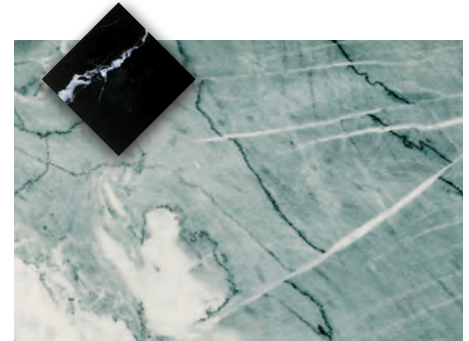
LIMESTONE Wholly or in large part composed of calcium carbonate, it commonly contains minerals and ancient creatures from seawater. Limestone texture varies from coarse to fine and does not show much graining or crystalline structure. It is ordinarily white but may be colored by impurities, iron oxide making it brown, yellow, or red and carbon making it blue, black, or gray.

- Varies in hardness
- Most susceptible to staining

TRAVERTINE A variety of limestone and marble that contains holes formed from heat, pressure and water flowing through the stone. These holes are often filled with foreign materials such as cements or resins during the fabrication process to create a flat, polished surface. It is often beautifully colored and banded as a result of the presence of iron compounds or other (e.g., organic) impurities.

OTHER SEDIMENTARY STONES

Sandstone • Gypsum • Conglomerate



METAMORPHIC STONES

The result of the transformation of a pre-existing rock type, in a process called metamorphism, which means "change in form". The precursor rock is subjected to extreme heat and pressure causing intense physical and/or chemical change. The precursor rock may be sedimentary rock, igneous rock, or another older metamorphic rock. Metamorphic rocks make up a large part of the Earth's crust and are classified by texture and by chemical and mineral assembly. They are also formed by the forces of molten rock into solid rock, particularly at the place of contact between the magma and solid rock, where the temperatures are high.

SLATE A fine-grained stone formed when sedimentary rocks such as shale are changed by great pressure. Slate splits into wide thin layers. Slate is intermediate in hardness between rocks composed of laminated, often flaky parallel layers of mica and shale.

MARBLE Marble was once limestone, compacted by heat and pressure that re-crystallized into marble when mineral changes occurred. This produces the colors and veining seen in the stone.

STONE HARDNESS

TALC

GYPSUM



Fig. 2

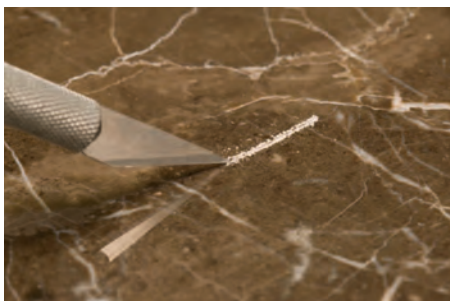


THE DENSITY FACTOR

Hardness is one measure of the strength of stone. The hardness of a stone is relative to the stone's density. Density can be a factor when considering stone types for a particular project installation. For example, polished marble can be a beautiful addition to a residential home, but not a shopping mall floor due to the extensive care and maintenance required. The high foot traffic of a mall can eventually dull the surface of polished marble.



Hardened steel and quartz (granite) have the same hardness rating.



Calcite (marble) is rated at a 3 for hardness.



Sedimentary rock (slate) can be clay, shale or quartz based varying in hardness from 3 to 7. This image shows a slate equivalent to a softer marble.

MOHS HARDNESS SCALE

Stones hardness can be determined very easily. If a stone can be scratched by a known mineral from the Mohs Hardness Scale list, it is softer than that mineral. If it will scratch another known mineral, then it is harder than that mineral. In this classification, the numbers assigned to objects represent the rank order (1st, 2nd, 3rd etc.) of the entities measured.

The variables are called ordinal variables or rank variables. Comparisons of greater and less can be made, in addition to equality and inequality. However, operations such as conventional addition and subtraction are still meaningless.

10	Diamond	Diamond, Abrasives
9	Corundum	Ruby, Sapphire, Abrasives
8	Topaz	Topaz, Emerald
7	Quartz	Hardened Steel, Granite
6	Orthoclase/Feldspar	Granite, Iron Pyrite, Glass
5	Apatite	Knife Blade, Iron
4	Fluorite	Platinum
3	Calcite	Marble, Limestone, Travertine, Slate, Gold, Silver, Fingernail
2	Gypsum	Plaster of Paris
1	Talc	Talcum powder

SCRATCH TEST

Extremely dense stones – typically granites – are not as easily scratched, making them suitable for countertop and floor installations. Lower-density stones, such as the calcite-based stones limestone and travertine, are frequently used in lower traffic areas for aesthetics and beauty.

There is an easy, practical way to test the hardness of a stone through a scratch test. You may apply this test on the top or back sides of a piece of stone. (Warning: do not conduct this test on the surface of an installed stone – it may ruin the stone.) Using a box knife steel blade, simply score it across the stone's surface. Do not apply hard pressure.

A stone categorized as granite (quartz/feldspar) will not typically scratch. Because granite has a higher tolerance to scratching, it is widely used on countertops. Marble, travertine, limestone or slate will usually scratch fairly easily with a sharp knife.

FABRICATED & APPLIED TEXTURE

Rough stone blocks are extracted from quarries around the world and then shipped to a fabrication plant. The stone blocks are put through a series of processing steps, depending upon the end product desired. These steps include cutting the block into thin slabs, polishing the slabs, and cutting thin slabs into floor tiles or veneer for building exteriors (curtain).

Equipment used in fabricating stone includes diamond wire saws, large blade saws with diamond inserts, and saws durable enough to cut thick slabs for monuments. Computer-controlled machines are capable of easily cutting intricate shapes to satisfy the needs of architects and designers.

The fabrication of the stone will affect its porosity and its appearance. There are many types of textures applied or fabricated to dimensional stone surfaces. This list shows some of the more popularly used fabrication methods applied to stone.

POLISHED

A glossy, highly reflective surface

- Surface is very smooth and not very porous
- Polished crystals bring out brilliant colors and grains (400 to 3500 grit to polish stone)
- Shine comes from the natural reflection of the stone's crystals
- Polish can wear away due to heavy foot traffic and improper maintenance

TUMBLED

A slightly rough texture that is achieved by tumbling small pieces of marble, limestone or granite to achieve an old-world/worn appearance

HONED

A flat matte to low sheen gloss

- Surface is very smooth, but very porous
- Many more and wider gaps in surface than polished stone
- Medium density
- Commonly used in low traffic areas or for aesthetics
- Colors are not as vibrant as a polished stone

Other Textured Surfaces

SAND BLASTED

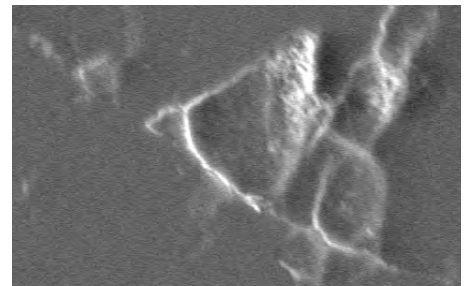
Pressurized flow of sand and water that results in a matte finish

FLAMED

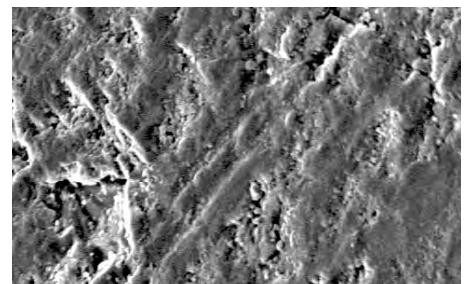
Rough surface developed through intense heat

BUSH-HAMMERED

Pounding action of hammer develops textured surface. Reduces stone's color tones



Microscopic Detail of Polished Granite



Microscopic Detail of Honed Travertine

MOISTURE VAPOR

The pores and capillaries of stone affect the amount of water that can evaporate through stone – also known as moisture vapor. Moisture vapor is carried from the substrate through the stone to keep the substrate dry– through a process referred to as moisture vapor transmission (MVT). MVT allows the stone to “breathe” naturally, reducing the possibility of mold growth, damage to the substrate, or stone discoloration.

STONE SEALERS

All sealers contain two parts – carriers and actives – in varying amounts.

CARRIERS

Carriers contribute to the amount of actives delivered or absorbed into a substrate. Once a carrier has delivered the actives below the surface it evaporates, leaving only the active material to protect the stone.

Water-Based Chemicals

- Easy to use
- Non-flammable
- No toxic fumes

Solvent-Based Chemicals

- Hydrocarbons
- Excellent penetration for low porosity, dense stone

ACTIVES/SOLIDS

Actives are the components that adhere to the surface of the substrate, changing the surface tension of the stone, thus preventing staining agents from penetrating into the stone.

Silicones

- Water repellency
- UV stability
- Water beading
- Less oil resistant

Fluorocarbons

- Excellent oil repellency
- Invisible
- Water repellency
- Less UV stable

Resins/Waxes

- Repels water & oil
- Reduces MVT
- Alters appearance

COMMON TRADE NAMES

There are many different trade terms for stone sealers that can create confusion among homeowners, designers, architects and contractors.

Penetrating / Impregnating Sealers

- Chemical and mineral agents absorbed into pores/capillaries of material on the surface
- Modifies physical properties to resist stains
- Allows MVT

Finishing / Topical Sealers

- Film-forming surface coatings
- Acrylics
- Resins
- Waxes
- Can close pores and reduce MVT

Enhancing / Penetrating Sealers

- Highlights natural colors of unpolished, textured and faded stone or masonry
- Seals and highlights
- Allows MVT

Note: Finishing sealers create a topical finish, covering the stone's surface, to help repel water and oil. However, based on the job application or improperly-prepared installations, some finishing sealers can trap moisture or inhibit MVT. Most penetrating sealers do not inhibit MVT. Be aware of the type of application, and read all manufacturers' directions, when selecting a sealer.

HIGH PERFORMANCE SEALERS

- Prevent a variety of stains – both oil and water-based
- Allow MVT (Moisture Vapor Transmission)
- Provides time to react to stains and spills

Premium sealers contain higher quality active ingredients than their more economical counterparts, delivering complete coverage of the gaps in the stone to provide better stain resistance, regardless of porosity and density.

Dense stones need smaller sealer molecules to fit into the smaller pores in the surface.

Penetrating, water-based sealers offer excellent protection for stone with water as the carrier.

Solvent-based sealers protect and penetrate with solvent-based carriers.

The choice between a water-based and solvent-based sealer is a matter of intended application. As long as both are premium sealers, they will offer maximum levels of protection.

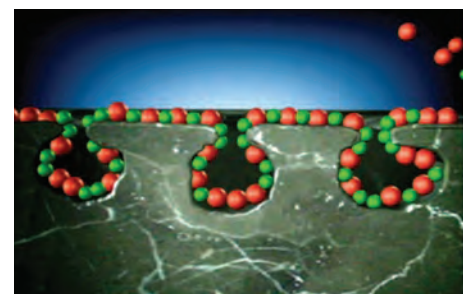
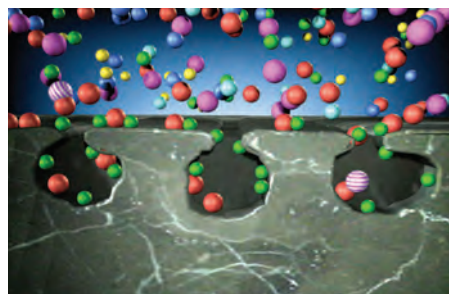


PENETRATING SEALERS

Active ingredients, or solids, bond with stone and fill in the gaps, or pores, to penetrate the surface. What doesn't penetrate the surface gets wiped away.



Many Aqua Mix products contribute to "Leadership in Energy and Environmental Design" certification.



MICROSCOPIC DETAIL

Illustration shows Penetrating Sealer as if under powerful magnification. Note the various sealing molecules that penetrate and bond to the stone's surface.



CLEANING FACTS

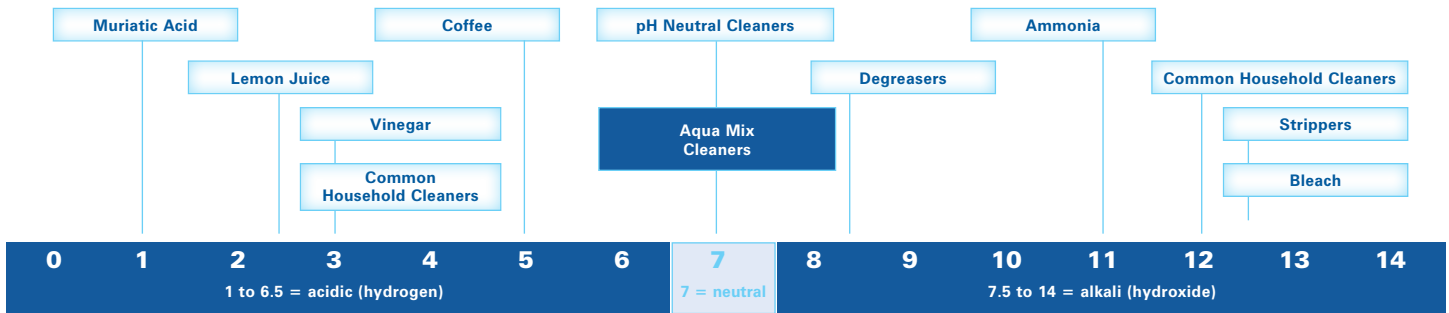
Acid-based cleaners will slowly damage the appearance of calcium-based stone. The acid creates bigger pores for increased staining potential. It also chemically reacts with the stone causing damage and etching. Some household cleaners can be labeled “tile cleaner” or “all-purpose cleaner”, but can still be very acidic and will damage many types of stone and grout.

ACID CAN DAMAGE STONE

Because carbonates (marble, travertine or limestone) react to acid (acidic cleaners) to create carbon dioxide, the effects to the stone are permanent. The destruction of carbonates shows on the surface of stone as etching. Although the particles of stone cannot be recovered, they can be polished or refinished to match the finish of the stone.



Heavy-duty cleaners and strippers containing alkali are ideal for special circumstances requiring deep cleaning – but should only be used on an occasional basis to remove or strip acrylic finishes, waxes, dirt, oil, and penetrating sealers.



THE PH BALANCE SCALE

The pH (p=potential of, H=Hydrogen) balance scale measures the acidity or alkalinity of a solution on a scale from 1 to 14. Neutral solutions are rated as a 7. From 7, the number increases with alkalinity and decrease with acidity. Each number from 7 (neutral) is 10x stronger than the previous number.



AQUA MIX CLEANERS

All Aqua Mix cleaners are non-acidic, they safely clean stone surfaces with formulas designed for both routine or heavy-duty cleaning.



Many Aqua Mix cleaners are designed to break down quickly and naturally in the environment.



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QUALITY PRODUCTS YOU CAN TRUST

Professional contractors understand their reputation depends on the lasting beauty and durability of each installation. That’s why experts have been recommending Aqua Mix products to clean, protect, and beautify natural stone, tile, and grout for over 25 years.

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