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**A GUIDE TO  
NATURAL STONE  
MATERIALS**

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Use this handbook as a guide to learn about natural stone surfaces and to help you and your clients select the right material for their needs. This guide offers information on the types of stone used for flooring, countertops and construction and suggests the best uses for each of these stones.

Mountaintop Stoneworks, Inc. is a fabricator of granite, marble and quartz slabs. We work throughout the Tri-State area and welcome architects, designers, contractors, and consumers to our showroom to choose from our in house stock of stone slabs.

We look forward to seeing you.

## INTRODUCTION TO GRANITE

Granite has been used as a building material since ancient times. It is one of the oldest and most durable building products available, and will far outlast the building in which it's installed. It has become the material of choice for today's luxury homes and offices because of its enduring beauty, and because no synthetic material can compare to its elegance and performance. Products made of this stone will not depreciate with time and will continuously add value to any property where they are installed. Unlike synthetics, granite presents a surface depth that seems almost three-dimensional. It has a luminance that's absent from other surfaces. Regardless of its finish, granite creates an immediate impression of elegance, and is considered a definite plus on any real estate broker's checklist.

Granite is sold both in tiles and slabs, and is frequently used not only for kitchen countertops, bar tops, and vanities, but also for walls, floors, fireplace surrounds, windowsills, and even building fascia. Its unique variations in color and veining make each specimen a natural work of art.

Granite is one of the hardest stones available, having a rating of 6 on the Moh's Measurement of Hardness Scale. In contrast, marble is rated only a 3. And since their main component is calcium, marble and the others are more susceptible to damage by acids such as vinegar and citrus beverages.

Several factors affect the price of granite, the most important of which are supply and demand. Supply is affected by the accessibility of the quarry, the uniformity of the stone within the quarry, and the stone's workability. A granite slab that is exquisitely figured, one that contains rare colors (e.g. blue), or one that is found only in a third world country will be more costly.

### **Origins and Sources**

Granite is believed to have been formed as long ago as 300 million years. It began as a mass of molten rock formed by volcanic activity about 11-12 miles underground. Forces of nature caused the magma to gradually rise to the surface where it began to cool very slowly over the next million years or so, solidifying into granite. Over time, the land above it erodes, leaving a scattering of granite quarries all over the world. Aside from the traditional sources, such as Italy, USA, and Canada, popular granite producing areas now include India, China, many African nations, much of mountainous South America, and the northern European countries.

Granite is composed primarily of feldspar, quartz, and mica. It may also contain hints of muscovite, biotite, hornblende, and pyroxene and other minerals. These minerals are what give it its various colors. The white mineral grains in granite are feldspar, our planet's most abundant rock. The light gray, glass-like veins are quartz, and the black, flake-like veins are biotite or black mica. Other minerals imbue the stone with a rainbow of colors, depending on their source.

Granite is drilled and blasted from the quarry in large blocks, cut into slabs by a gang saw, and polished to uniform thickness by automatic polishing machines. It is cut and fabricated into countertops using diamond saw blades or drill bits.

### **Physical Characteristics**

Being crystalline in structure, Granite always has tiny pits or spaces between the various mineral crystals but these usually are unobtrusive on finished pieces once the surface is highly polished. Granite also contains natural fissures that may appear to be cracks, but they are not structural defects and will not impair the function or durability of the material. Each slab cut from a quarry differs slightly from the next one and therefore is unique. Those seeking absolute consistency should look to engineered stone as their first choice.

Due to quarry variances, granite slabs are sold in random sizes. A typical slab will measure 4-5 ½ ft. wide and 7-9 ft. long. While seams are common and usually unavoidable in countertops, most people want an island with no seams. To accomplish this, you will need to choose a slab large enough for your island.

Granite is very heavy. Finished slabs weigh approximately 12-13 lbs per sq. ft. in 2 cm thicknesses, and approximately 18-19 lbs per sq. ft. in 3 cm thicknesses. An 8 ft. top 3 cm thick will weigh between 144 and 152 lbs. Granite may vary in thickness as much as a quarter inch over the length of the slab. The installer will compensate for these variations with additional support during installation.

Although granite is very durable when it's installed properly, it's not unbreakable. It can be chipped or cracked if it's struck a sharp blow by a heavy object and also can break if it's dropped during installation. It is not flexible, and will crack if it is forced to twist or bend. Granite should only

be handled by professionals and must always be adequately supported by proper framing or cabinetry.

Granite is the least susceptible of all natural products to scratches. If not abused, it will hold its luster forever. However, harsh chemicals and abrasive cleaners will dull the surface over time.

Granite will not scorch or burn through ordinary use. It's also resistant to stains. However, a few varieties may absorb some moisture with prolonged contact. Usually, no evidence remains when the liquid is removed and the granite dries, but this could be a problem with dark pigmented liquids or oils. A stone sealer should always be applied to its surface after installation.

The quality of granite is highly subjective. The “best” granite is the one that best suits the need of the buyer, both for aesthetic and practical reasons. However, it is often rated on its luster when polished, its surface porosity, and its mingling of colors. Nearly all examples are quite suitable for counters, floors, and walls. The quality of the finished product lies more in the workmanship of the fabricator than in the product itself.

### **The Selection Process**

Many customers must select materials based on a budget. Once a budget is determined, the next step is to choose a color that falls within that budget. Granite is a primordial stone with naturally occurring variations in color, tone, granularity, pattern, etc. These variations, referred to as ‘movement’, should be expected and are the source of its natural beauty. Because of this, there are many colors of granite to choose from.

### **Additional Information**

- Granite is a very hard, crystalline, igneous rock primarily composed of feldspar, quartz, orthoclase or microcline accompanied by one or more dark minerals. It is the most common plutonic rock of the Earth's crust, forming by the cooling of magma (silicate melt) at depth.
- Granite is the hardest building stone and occupies a prominent place among dimensional stones on account of its hardness, resistance to weathering, capability to take mirror polish, fascinating colors and textural patterns.

- The principal characteristics of dimensional granite also include high load bearing capacity, crushing and abrasive strength, amenability to cutting and shaping, ability to yield thin and large slabs and - above all - durability. Polished granite slabs and tiles have achieved a special status as building stones world over.

Granite is used as a building material in the form of granite tiles and granite slabs for wall cladding, roofing and flooring and a variety of other interior and exterior applications and especially for counter tops, kitchen work tops and vanity units.

## GRANITE MYTHS

**Granite Emits Radon:** While granite and other natural stones may contain minute traces of radon, in terms of building materials, radon emissions from concrete, cement and gypsum are far greater in comparison and more often used. A full report is available at Marble Institute of America's web site at [www.marble-institute.com](http://www.marble-institute.com)

**Granite Harbors Bacteria:** Granite continues to be used and approved in food and medical applications. The Centers for Disease Control and Prevention (CDC) has no records of granite harboring bacteria.

**Granite is Higher Priced than Solid Surface Materials:** With increased technology in the stone processing industry, granite now is available for the same price as artificial, manmade solid surface materials, and granite offers a wider variety of colors and patterns to choose from. Granite offers an unmatched value with its natural beauty, elegance and longevity.

**Granite is Difficult to Maintain:** Granite is very easy to maintain. Clean with a neutral soap and water, wipe off film with a solution of vinegar and water, and on occasion, from one to every five years, additional sealants can be applied. We also offer cleaners specifically made for stone surfaces.

**Granite is Absorbent:** Granite qualifies as impervious to water and is actually less absorbent than some solid surface (plastic) products. Granite is commonly used as building material for high-rise buildings due to its ability to withstand gale force winds and rain.

**Granite Stains Easily:** Granite is resistant to stains. Generally, any liquid spilled on a granite top, if wiped up within a few minutes, will not stain.

However, even water can soak into a granite countertop and leave a dark colored spot but this will evaporate in minutes. Liquids that do not evaporate, such as oils will cause stains if left to soak into the stone.

**Stains in Granite are Permanent:** Most stains can be removed. Even oil stains can usually be removed using a poultice or paste that will draw out the oil from the stone.

**Granite Will Lose its Polish Over the Years:** While this may be true of marble, granite will shine years from now just as if it was brand new.

**Heat Will Cause Granite to Chip and Crack:** Granite is heat resistant and can withstand the heat of hot pots and pans without damage. Impact from a heavy object may chip granite but heat from anything short of a blowtorch will not affect your countertop.

**Dark colored granites are harder than light colored granites:** Granites are composed of a variety of minerals, each of which has specific performance properties. The hardest mineral commonly found in granite is quartz, which is normally a somewhat translucent, white to grey colored mineral.

**Granite and marble are essentially the same:** Besides the fact that they are both natural stones and can be polished, they are otherwise very different. Marble is generally a calcious stone, formed from oceanic deposits and then compressed under pressure (metamorphosed). Granite, however, is an igneous rock, essentially molten magma, which is cooled and then hardened below the earth's surface.

## TOP 10 KITCHEN COUNTERTOPS

There are lots of options on the market for kitchen countertops. Our list of top picks gives the pros and cons of the top 10 choices so that you can make an educated choice when you remodel your kitchen.

### 1) Granite

Granite is the material of choice. It defines elegance in a kitchen. The beauty of the stone contributes to the beauty of even modest kitchens.

**Pros:** holds up to heat; comes in beautiful colors; looks permanent and substantial.

**Cons:** Expensive, requires annual maintenance, can crack if mishandled, can stain if neglected.

## 2) Engineered Stone

Engineered stone is composed of quartz particles. It is available in a large range of colors and has a nonporous surface that resists scratches. It's easy to maintain, and does not require annual maintenance.

*Pros:* Resistant to stain and acid; easy care; consistent material.

*Cons:* Expensive; consistent material (can not replicate natural stone).

## 3) Solid Surface

Because solid surface counters are just what they're called, solid, any scratches can be sanded out. The countertops are custom-made to your specifications.

*Pros:* Comes in many colors and patterns; seamless; stain resistant.

*Cons:* Vulnerable to hot pans which can damage the surface; can be moderately expensive.

## 4) Ceramic Tile

Ceramic tile is durable and easy to clean when sealed correctly. Add to that inexpensive and you've got a really good choice for countertops for the average home. Because it's installed a section at a time, it can be done by most resourceful homeowners.

*Pros:* Takes hot pans; easy to clean; wide range of price, color, texture and design.

*Cons:* Counter surface is uneven; tiles can easily chip or crack; grout lines can stain; custom-designed tiles are very expensive.

## 5) Laminates

Laminate counters are made of plastic-coated synthetics with a surface that's easy to clean. The pieces are cut to size and finished on the ends.

*Pros:* Available in many colors; easy to maintain; durable; inexpensive.

*Cons:* Scratches and chips are almost impossible to repair; seams show; end finishing and front edge choices can be pricey.

## 6) Wood/Butcher Block

Wood countertops offer a beautiful warm look and are available in a wide range of colors and finishes. Hardwoods such as maple and oak are most often used as countertop woods.

*Pros:* Easy to clean; smooth; can be sanded and resealed as needed.

*Cons:* Can be damaged by water and stains over time; scratches, must be oiled or sealed according to manufacturer's instructions.

## 7) Stainless Steel

For a contemporary and industrial look in your kitchen, stainless steel is a good choice. It is heat resistant and durable. Because they're constructed

to your specifications, you can have a seamless countertop.

**Pros:** Takes hot pans; easy to clean.

**Cons:** Expensive; noisy; may dent; fabrication is expensive; you can't cut on it.

## 8) Soapstone

Soapstone is generally dark gray in color and has a smooth feel. It is often seen in historic homes but is also used in modern homes as both a countertop and sink material.

**Pros:** Rich, deep color; smooth feel; somewhat stain resistant.

**Cons:** Requires regular maintenance with applications of mineral oil; may crack and darken over time.

## 9) Marble

Marble is comparable to granite in price but usually requires more maintenance. While in the recent past it has not been used as often as granite, it is being used more and more. If not used in the whole kitchen, it can be featured on an island or at a baking center. Marble requires regular maintenance, as it easily stains. Some new sealers retard staining.

**Pros:** Waterproof; heatproof; beautiful.

**Cons:** Expensive; porous; must be professionally sealed; can scratch; may need resealing periodically.

## 10) Concrete

If you have countertops in unusual shapes, concrete may be a good choice, as they're often cast right in your kitchen. The high price tag may be beyond most people's budget.

**Pros:** Heat and scratch resistant; can be tinted; looks exotic and unusual.

**Cons:** Very expensive; cracking is common; looks somewhat industrial; porous; must be treated regularly with wax or sealant.

*From Coral Nafie, Your Guide to Interior Decorating.*

# TECHNICAL OVERVIEW

## IGNEOUS ROCKS

Igneous rocks are crystalline or glassy rocks formed by the cooling and solidification of molten magma. Igneous rocks comprise one of the three principal classes of rocks, the others being metamorphic and sedimentary. Igneous rocks are formed from the solidification of magma, which is a hot molten or partially molten rock material. The Earth is composed predomi-

nantly of a large mass of igneous rock with a very thin covering of sedimentary rock.

### **GRANITE**

The word granite comes from the Latin granum, a grain, in reference to the grained structure of such a crystalline rock. Granite occurs as stock-like masses and as batholiths often associated with mountain ranges and frequently of great extent. Granite is widely distributed throughout the Earth.

### **METAMORPHIC ROCKS**

Metamorphic rocks result from mineralogical and structural adjustments of solid rocks to physical and chemical conditions differing from those under which the rocks originally formed. The most important agents of metamorphism are temperature and pressure.

### **MARBLE**

Marble is metamorphosed limestone composed of very pure calcium carbonate. The softness of marble and its relative isotropy and homogeneity make marble very desirable for sculpture and building stone. Kinds of marble include Carrara (Italy), Pentelicus (Greece) and Proconnesus (Turkey). Carrara marble is prized for sculpture. Marble derives its name from the Greek marmaros, shining stone. This stem is also the basis for the English word marmoreal meaning “marble-like”. In folklore, marble is associated with the astrological sign of Gemini. Pure white marble is an emblem of purity. It is also an emblem of immortality, and an insurer of success in education.

### **SEDIMENTARY ROCKS**

Sedimentary rock is formed in three main ways—by the deposition of the weathered remains of other rocks; by the deposition of the results of biogenic activity; and by precipitation from solution. Sedimentary rocks include common types such as chalk, limestone, sandstone, and shale. Sedimentary rocks are composed largely of silica, with other common minerals including feldspars, amphiboles, clay minerals and sometimes more exotic igneous minerals. Sedimentary rocks are economically important in that they can be used as construction material.

### **TRAVERTINE**

Travertine is a form of massive calcium carbonate resulting from deposition by springs or rivers. It is often beautifully colored and banded as a result of the presence of iron compounds or other (e.g., organic) impurities. Travertine is actually a dense, closely compacted form of limestone.

Travertine is an excellent product for residential and commercial use and is becoming increasingly popular. Not only does it have the elegant look of marble, but once sealed, Travertine tiles require very little maintenance. Travertine is available in a number of finishes ranging from polish, cross-cut, regular-cut, honed & filled, honed & unfilled, tumbled, distressed-edge, patinato and unpolished to name a few. Travertine tile possess a wide range of colors and cover the spectrum from pure white to deep mahogany. Onyx marble, Mexican onyx, and Egyptian or Oriental alabaster are terms applied to travertine.

### **SLATE**

Slate is a fine-grained homogeneous sedimentary rock composed of clay or volcanic ash which has a high degree of fissility or slaty cleavage. This high degree of fissility makes the better grades of slates an extremely useful roofing material. Some of the finest slates in the world come from Portugal, Wales in the United Kingdom, Brazil and The Slate Valley of Vermont and New York.

### **LIMESTONE**

Limestone is a sedimentary rock, mainly composed of mineral calcite. The primary source of the calcite is usually marine organisms, which settle out of the water column and are deposited on the ocean floors. It is ordinarily white but may be colored by impurities like iron oxide making it brown, yellow, or red and carbon making it blue, black, or gray. Most limestone is formed by the deposition and consolidation of the skeletons of marine invertebrates; a few originate in chemical precipitation from solution. Limestone often tends to be more expensive than Marble, Travertine and Granite. It also tends to be very popular with many discerning Architects, Designers, Builders, and Consumers. More and more interior décor publications are emphasizing the use of Limestone and Travertine not only as a wise investment but also for the ease of maintenance and overall appearance.

### **SANDSTONE**

Sandstone is an arenaceous sedimentary rock composed mainly of feldspar and quartz and varies in color from grey, yellow, red, and white. Sandstone is often relatively soft and easy to work, making it a common building and paving material. Sandstone is clastic in origin. It is formed from the cemented grains that may be fragments of a pre-existing rock, or mono-minerallic crystals. The principle mechanism for the formation of sandstone is by the sedimentation of grains out of a fluid, such as a river, lake or sea.



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