

Counter Tops Granite

Introduction

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 yet 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 turns make each specimen a natural work of art. It is cool to the touch, and presents an image of classic grace and beauty.

Granite, being an igneous rock (formed from volcanic activity), differs from marble, limestone, and travertine in that those are sedimentary stones composed mostly of calcite, a relatively soft and common mineral derived from animal skeletons and shells. Millions of years of compression and heat below the earth's surface turned them into stone.

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, but the most important are supply and demand. Supply is the affected by the accessibility of the quarry, the uniformity of the stone within the quarry, and the stone's workability. A granite 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, estimated at 1300 -1400 degrees F., 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 eroded, 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, which makes up about 60% of the earth's surface. 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, and these varieties are often given unique names. One coarse grained type, for example, is called pegmatite, which is often rich in rare elements such as uranium, tungsten, and tantalum.

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. The size of the slabs will vary from quarry to quarry, but are rarely more than 10 ft. long. It is cut and fabricated into countertops using diamond saw blades or drill bits.

Physical Characteristics

Granite is crystalline in structure, so it always has tiny pits or spaces between the various mineral crystals. They are not visible prior to polishing, and usually remain 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. They occur naturally and are considered to be part of the beauty of stone.

Granite is not recommended to customers who prefer surfaces that are perfectly uniform in color and pattern, those that are totally free of blemishes. For those individuals, engineered stone would be the preferred 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. This is most important in dealing with islands, since most people want an island with no seams. Therefore, it's important to know in what size a preferred slab is available before making a selection. The only way to know is to call the fabricator each time an order is placed because slab sizes can change.

Granite is very heavy. Most varieties are available in both 2cm (¾") and 3cm (1-¼") thicknesses with a tolerance of +/- 3 mm. 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 (1.18") thicknesses. Therefore, an 8 ft. top 3 cm thick will weigh between 144 and 152 lbs.

Granite is not always a uniform thickness. Customers should be aware that their slab may vary in thickness as much as a quarter inch over the length of the slab. The installer must compensate for these variations with additional support, as needed, at the time the granite is installed.

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. It can also break if it's dropped during installation. It is not flexible, and will crack if it is forced to twist or bend. Therefore, 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 resistance 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. There are lower grades available, but few are sold by reputable suppliers. The quality of the finished product lies more in the workmanship of the fabricator than in the product itself.

The Selection Process

Many customers are concerned about cost. As mentioned earlier, cost of the stone is affected by supply and demand. Once a customer finds a stone that will fit into the budget, the next step is to choose a color. But before this can be done, the buyer must decide whether the countertop will be the main focal point in the room, or another feature such as cabinetry.

Sometimes the customer may decide to mix and match countertop materials, with the outside counters being one material and the island being another. In some cases, an island may even be split into two levels, with granite installed on one side only.

Color and pattern

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.

Also, keep in mind that the veining in the granite can effect color perception. Sometimes two different grain sizes occurring in the same slab will appear to be of a different color. Mineral concentrations may cause patches that appear darker or lighter.

Consumers who are less acquainted with the material may expect the granite ordered to be identical to the sample they were shown. While the samples are intended to represent the quarry's product, each slab may differ slightly in color and veining. Indeed, even a single granite slab will have color variations from one end to the other. This lack of predictability gives the product its unique character and adds an element of nature into human-designed spaces. Indeed, each specimen is an original artwork.

For these reasons, we always ask our clients to examine the actual slabs of material from which their tops will be cut.

The sample in our showroom may differ from the slabs currently available at the fabricator's warehouse. They may have been mined from a different part of the quarry or they may have inclusions or color variances that give them a different appearance.

While color options are numerous, it's usually best to choose a specimen that is stocked locally because of the cost difference.

If a slab has to be special-ordered, the freight would be prohibitive and the lead-time could be several weeks. In addition, the customer would have to agree to accept the color and markings sight unseen.

Fabrication and Finish

Fabrication costs can significantly affect the final price. Generally, the more complex the shape of the project and particularly the shape of the finished edges, the higher the price will be. Fortunately, a single thickness plain polished edge makes an excellent appearance and most customers choose this standard, especially when using the 3 cm (1.18") thickness.

Occasionally, a customer will want a custom edge pattern, possibly to match the edge to detailing on the cabinetry, and this can also be done. But keep in mind that if the fabricator has to buy custom cutting bits, he will add their cost to the price.

Fabricators may sell finished pieces, but slabs are always sold intact. The price includes the cost of transportation, making field measurements and templates, cutting, polishing, delivery, and final installation. The total material required is determined by the layout and the amount of waste. The fabricator will try to lay out each job so as to minimize waste yet maximize the natural beauty of the veining and pattern.

Granite is usually polished to a high gloss finish. It is also available in a "honed" finish if desired, but this will increase the cost. Granite can be finished a number of styles:

Abrasive finish - flat non-reflective surface, usually recommended for exteriors

Acid Etched finish -rusticated through the application of abrasive or acidic agents

Brushed finish - brushed with a coarse rotary-type wire brush

Brush-hammered finish-varied texture, subtle to brushed by a mechanical process

Flamed/thermal finish-roughed by intense heat flaming to expose grains of stone

Honed finish - satin surface with little or no gloss

Polished finish -glossy, bringing out the full color and character of the stone

Sandblasted finish- matte textured with no gloss. Recommended for exterior use

Edges

Granite tops can be finished with one of several standard edges.

Sinks and Cooktops

Usually, a sink will be mounted somewhere on the top. Sinks may be the self-rimming type that are mounted on top of the countertop, or under mount sinks that are installed by clips attached to the underside of the countertop and having a finished bowl opening. Sinks may be stainless steel, cast iron, and synthetic stone, or a number of other materials.

When choosing a sink, it is vitally important to make certain that the sink will fit in the cabinet in which it is to be mounted. Keep in mind that the cabinet must always be wider than the sink, i.e. a 30" sink will not fit in a 30" cabinet. There must also be ample room available for the faucet of your choice and any other accessories you may select.

Due to their weight, an under-mounted cast iron sink cannot be anchored solely to the granite top, but must have a support frame built into the cabinet by a carpenter.

If a cook top is to be mounted in the granite, be sure that there is room inside the cabinet to hold the top and any pop-up vents that will be installed with it.

All of these items must be on the job site before a template can be made.

Note: In the case of both sinks and cooktops, allowances must be made for the thickness of a backsplash when measuring for the placement of these fixtures. If thicker granite is used, a wider space will be needed.

If the top is replacing an existing top, be aware of the differences in thickness of the two materials. Any upper cabinetry that currently rests on the existing top will probably not reach the granite, so adjustments will have to be made.

Installation Considerations

All ordinary cabinets with frames that are securely fastened to the wall will easily support granite countertops. The weight of an average person standing on the cabinet puts more strain on the cabinets than a granite countertop.

Counter tops are measured in much the same way as other solid surfaces. First, a template must be made to use as a pattern. For this reason, base cabinets must be permanently anchored in place before measurements can begin. They are to be installed only by the fabricator who will assume responsibility for a proper fit.

Improper installation of kitchen countertops may void the manufacturer's warranties and result in damage to your fine surface or other areas of your kitchen, such as cabinets, drawers, sinks, and fixtures.

Be sure to allow sufficient lead time for the project to be completed. It will take 3 to 4 weeks to complete the installation after measurements are taken. If anything goes wrong during the fabrication process, or if the top is damaged and has to be replaced, that time will be extended.

Because granite is usually sold in slabs no more than 10' long, most countertops will require at least one seam. And since granite is sold in rectangular pieces, using seams may also reduce the costs, as in an 'L' shaped corner. Sometimes a seam can be placed at a sink bowl to make it less conspicuous.

Seams will always be visible in granite. Their visibility is affected by the granularity, color and pattern of the stone. Seams on a small, uniform grain or dark color will not be as noticeable as they will on a larger variegated grain or lighter color. A dramatic pattern with swaths of color will similarly highlight seams more than a uniform pattern.

Seams are always made on a straight edge.

Although granite is very heavy, there could be some movement along the seam. To seal them, industry standards call for a small bead of silicone to be placed between the 2 surfaces to allow for natural expansion and contraction. This bead may be between 1/16" and 1/8" wide.

Individual slabs can vary slightly in their thickness.

If not corrected, this would result in an uneven seam, so the installer will install shims on the underside of the top to bring the upper surfaces flush. This is considered to be the proper technique for leveling the surface. Granite may or may not be installed over plywood; the fabricator will decide that.

In most cases, some type of back splash is used.

It can be the same granite used for the counters, ceramic tile, or some other product. It may be attached to the counter or to the wall, but in either case the seam between the counter and the backsplash will be sealed with caulk. The standard height for a backsplash is 4" although they're frequently made higher if the customer desires.

Remember that the thickness of the backsplash must be considered when taking surface measurements.

Most counters are installed with a standard overhang of 1".

This may be modified to suit personal taste, but it must be stipulated before the template is made.

Granite can be cantilevered up to 14" if it's a large piece with sufficient support on the fixed end. It should never be cantilevered where it might receive excessive stress, however, such as where someone may be tempted to sit on it or use it as a step stool to change a light bulb. In these cases, it must always be supported.

It's always best to assume the worst and add proper support on any extension over 6". An unsupported span of no more than 36" is usually acceptable as long as the stone is supported on both sides of the span.

Edges

A special edge (e.g. ogee) creates an additional installation challenge where two sections of granite meet in a corner. Additional labor is required to match the two sections.

If a laminated edge is chosen using 2 cm granite, and if it's to be mounted on frameless cabinets, or on framed cabinets that have upper retractable cutting boards, the granite will need to be raised ¾" to clear the laminated double edge that hangs down ¾".

Dishwashers should not be attached directly to the granite countertop, but be side-mounted to adjoining cabinets. Special brackets are available from the dishwasher manufacturer for this purpose. Drilling into the bottom of the stone can cause stress cracks and discolorations in the surface of the stone.

Preparing the site

On new construction, the base cabinets must be permanently anchored in place before a template can be made. On a remodel project, existing tops must be removed prior to measurement. Any sinks, faucets, cooktops, or any other item that requires a cutout or a hole in the top must be on site and readily available at the time the template is made. The fabricator may need to take some items with him to complete the fabrication.

Please note that any delay in acquiring the accessories may also delay the installation.

Under normal circumstances, the installer will not be responsible for connecting of dishwashers, cooktops, or plumbing.

Remember: do not make any changes to the design or specifications with the fabricator when he's taking his measurements because those changes may affect other elements in the overall design or may result in unexpected cost increases. All changes should be arranged only through your kitchen designer.

Once the installer takes his measurements and makes the template, no changes can be made. All cuts are final; it is impossible to re-attach a piece of granite that has been cut from the slab. Additionally, once the granite is glued in place on the cabinets, moving it is very difficult and risks damaging the cabinets.

Living with Granite

Unlike marble, synthetic and laminate countertops, granite countertops will not blister, scratch or chip under normal use. It is heat resistant, so a hot pot can be placed on it without using a trivet or pad. Its cool polished surface is ideal for rolling out pastry dough. Granite countertops are a beautiful, durable and cost competitive solution for countertops.

However, granite is subject to staining and etching if not maintained with sealers.

Granite is porous and It will absorb oils, such as cooking oil and grease, leaving a permanent dark spot unless it sealed. Hairspray leave a residue, and many common foods and toiletries contain acids and other ingredients that may etch or dull the stone surface.

Protecting the Surface

Granite is a natural stone product and has a certain degree of porosity. Therefore, after installation, it must be cleaned and sealed. Only impregnating sealers that are semi-permeable are acceptable. Impregnators do not cover up the natural beauty of the stone and do not wear off like a surface coating.

A word about Black Granite

Most black granites are very dense and uniform in appearance and in general are the least porous with the least water absorption values. They should not be sealed as they are usually moisture resistant. Your fabricator will advise you.

Re-sealing is necessary at least once every three years.

Any caulk around sinks, cooktops, and seams should also be checked periodically for signs of deterioration.

Preparing the granite for sealing:

All that's required is a thorough cleaning with mild detergent and water. Wipe off with a clean cloth and wait at least a couple of hours to let it dry completely.

Examine the surface for water spots

Water spots must be removed or sealing will make them permanent. Then simply spray on the sealer and wipe it off with a soft cloth. There is no scrubbing or buffing involved and a quart of sealant should last a lifetime.

Some food preparers have an instinctive aversion to the possibility of any chemicals coming into contact with food. While granite sealers leave only negligible surface residue and are not considered to be a health risk, those individuals may prefer to purchase a solid surface or engineered stone product that doesn't have to be sealed.

Make sure the top is clean before resealing.

While granite is ordinarily considered to be stain-resistant, foreign pigments or oils can be absorbed into the surface. This could cause discoloration. The sealer does not prevent this discoloration, but it slows it down to allow more time for clean up. If the top is sealed after staining, however, any foreign substance will be sealed in.

A few types of granite may show some moisture absorption if exposed for a period of time. For example, a puddle of water left on the counter for 30 minutes may show a dark spot when the water is wiped away. When allowed to dry, however, this spot will usually disappear.

Since granite was formed by extreme heat and pressure, it won't be affected by heat from a cook top or frying pan. An open flame placed under the granite has no melting effect and will not leave any burned or scarred marks.

Granite is most susceptible to cracks during shipping and installation. Once it has been properly installed, normal use will not harm it. Because of its crystalline structure, however, it can chip if it's subjected to blows by hard, sharp objects such as a meat cleaver. A trained professional can sometimes repair a chip with a granite dust and epoxy mixture, but no repair will be completely invisible.

Knives can be used to cut directly on the granite without harming it, but granite is harder than knife blades and will dull them very quickly. Always cut and chop on a wooden or plastic cutting board.

Keeping it Clean

Clean up generally needs only warm water and a mild liquid detergent.

Most general purpose cleaners will etch or damage the stone or degrade the sealer, therefore removing protective properties and becoming susceptible to stains.

Maintenance cleaning with a pH-balanced, neutral cleaner will help remove soils that normal dusting or damp mopping leave behind. It also helps keep your stone free of dust and dry, sandy soil to minimize wear patterns from everyday use on some softer stones

Specially designed cleaners for stone will also never break down the protective sealer. In fact, some cleaners contain protective properties which reinforce the sealer and prolong stain resistance.

For heavier cleaning jobs, using cleaners formulated for stone will effectively remove tough grime and messes yet be gentle on the surface.

Dulled or lightly scratched areas can be restored by using automotive rubbing compound and waxing with liquid wax. Some fabricators recommend giving the entire surface area a coat of an automotive type paste wax from time to time to help maintain appearance, but this is usually not needed.

The main problem with granite is that oils that can be absorbed and discolor the stone. If the surface appears to be discolored, a poultice is available for lifting oil stains.

If it is a color stain, bleach can be used, but remember that cleaning methods must be used consistently. Do not use bleach today, and then use an ammonia based product tomorrow.

Denatured alcohol will remove most adhesives and residue, and will not harm the finish, but acetone and lacquer thinner will damage the surface.

Scouring powders, abrasive cleaners and steel wool pads will scratch and dull the finish.

Cleaning products containing lemon, vinegar or other acids may etch the stone - this includes many common liquid cleaners such as Windex.

Never allow acidic foods such as lemons, vinegar (including salad dressings) or pineapple juice to remain on the surface of the countertop. They will stain and may etch the stone.

Use only sealers and cleaning products designed specifically for natural stone

Granite fabricators recommend using products from Stone Tech Professional for cleaning, sealing and maintaining natural stone countertops & grout.

(Examples: Marble, Granite, Limestone, Travertine, Slate, Terrazzo, Sandstone)

Sanitary

If bacterial contamination of the kitchen countertop is a concern, granite or stainless steel are good choices according to a recent study. This study was conducted by the Hospitality Institute of Technology and Management, a St. Paul, Minnesota-based organization that develops educational materials and research for the retail food industry.

The study measured the bacteria-resistance capacity of six common countertop materials. Each surface was contaminated with E. coli (nearly 2 billion of the microorganisms), washed and rinsed with soap and water and then sanitized with a vinegar-and-water solution.

Quartz Surfaces

Engineered Stone ... the beauty of granite without the maintenance!

For those who love the look of granite but are concerned about its drawbacks, quartz may be the answer. Unlike granite, which can be permanently stained by cooking oils and grease, or which can be etched by the acids in such common household products as hairspray and other toiletries, engineered stone is impervious to these hazards.

And while granite is subject to unpredictable variations in color or pattern between slabs, making matching of sections of a countertop difficult, engineered stone is uniform in color, pattern, and texture. It provides nearly all of the benefits of natural stone but with few of the drawbacks.

Engineered stone is the most durable surface material, combining the hardness and durability of quartz with the exceptional low maintenance qualities of man-made materials (resin).

Do consider using engineered stone for countertops, flooring, shower & tub enclosures, fireplace surrounds, wet bars & furniture.

Quartz

Quartz (Silica/Silicon Dioxide, SiO₂) is the most common mineral on the earth's surface. It is present in nearly every geological environment and is a component of almost every rock type and exists in an impressive range of varieties and colors.

Quartz ranks 7.0 on Moh's Hardness Scale, which is used to measure the scratch-resistance of a material. Only the diamond (at 10), topaz and sapphire (at 9) are harder than quartz. (Granite is ranked 6 on the scale).

Because quartz grows in clusters and does not form huge stone blocks like granite (which contains 40% - 60% quartz), limestone or other types of rock, it is not suitable in its natural state to make into countertops or other large slabs.

Engineered Stone

The process to convert quartz to a slab/countertop was patented by Breton an Italian company, and is used by all companies which manufacture engineered stone.

This manufacturing process uses raw quartz crystals ranging in size from coarse grains to the size of rock salt. Once the quartz is ground and selected, the crystals are combined with bonding agents (resin) and color, then heated and vibro-compacted to form an impenetrable surface.

The resulting slabs are a matrix of 93% quartz and 7% resin binders and pigments ... free of fissures and cracks, and impervious to water, moisture, or bacteria.

Industry-wide, all quartz countertops are made with 93 percent quartz or they cannot claim the hardness, durability, or impermeability of a true quartz surface. The prescribed mixture results in a product that is non-porous, exceedingly durable, and more than twice as strong as granite and less likely to break during fabrication.

The manufacturing process is a controlled process and quality-control measures exist for quartz that are not possible for natural granite countertops. The nature of the production process ensures that any sample slab will be identical in color and texture to the delivered product.

The engineering and finishing phases of quartz-counter manufacturing are virtually the same throughout the industry, companies can all offer limited warranties for up to ten years on their products.

Because they're man-made, these materials can be fabricated in large sheets (52"W x 120"L), which makes it easier to fabricate large islands in one piece. In addition, curves, circles and other shapes are possible.

Color and Appearance

To the untrained eye, quartz surfaces appear to be natural stone. What makes it different?

Natural rock is variable by nature ... colors and patterns may shift and change on a large slab. Surface pits are a mark of granite. Engineered stone on the other hand, displays a "consistent variability" or mottling in color and texture throughout a quartz countertop. Each slab looks the same, which helps minimize the visible seams that often plague granite countertop installations.

The actual appearance of the quartz surface varies depending on the size and mix of the granules. Smaller, finer crystals give a more uniform appearance, while larger ones provide a more mottled look.

Quartz surfacing is available in colors not found in nature, as the crushed stone is generally mixed with pigment. Take advantage, and choose a color that dazzles while still looking like stone.

In addition to granite, some manufacturers produce engineered stone that looks like marble, travertine, concrete, and other natural stone.

Since they are solid, the color and natural mottling from the quartz crystals runs throughout the material.

Slabs are fabricated into countertops with edge profiles that range from simple bevels to bullnose and ogee.

Because engineered stone is a natural stone product, seams are required for any application that is longer /or wider than the slab size.

These seams are visible, but are often less noticeable than a typical granite seam - where the seams may show changes in pattern and shade.

As with solid surfaces, integrated sinks are not available in quartz countertops.

Installation

Fabricating and installing a quartz countertop is not a job for the Do-It-Yourselfer. It takes a practiced professional, which is why many manufacturers train and certify their installers.

In addition to being extremely dense and strong, quartz tops weigh quite a bit more than granite. It is however, easier to cut, handle, and fabricate without damage than granite is. Trained installers can count on fewer broken slabs and less waste than in a typical granite installation.

Care and Maintenance

Because it is non-porous, quartz polished surfaces do not need to be sealed as do other stones to prevent staining.

Unlike granite, quartz surfacing is a nearly indestructible material. It is resistant to stains caused by wine, fruit juices, liquid food coloring, tea, nail polish and remover, and felt-tip markers. Its non-porous nature is also extremely hygienic, making it a food-safe choice.

Though the quartz surface can briefly tolerate moderate temperatures for a brief time, it can be damaged by high heat and prolonged exposure to heat. Use a hot pad or trivet when placing a hot pan on it.

No surface is indestructible, though. As with any other stone or surface material, strong chemicals and solvents such as Drano®, Liquid Plumber®, oven cleaners and floor strippers will damage the surface.

POLISHED SURFACES (high gloss)

Routine cleaning involves little more than soapy water or a mild household cleaner such as Formula 409®, Fantastik® or Windex®.

HONED SURFACES (smooth with more of a matte look)

A honed surface will require more daily maintenance than polished finishes.

Since there is more exposed surface area with honed finishes, metal marks, finger prints and other signs of daily living will show on honed material. Most of these marks can be easily removed with little effort and cleaning products such as Soft Scrub™. For tough stains, work the area with a Scotch Brite™ pad.

Solid Surface

not layered, not laminated - but a surface material that is solid throughout

Introduction

Solid Surfaces were born in 1967 when Dupont introduced Corian, a synthetic blend of natural minerals and high-performance acrylic, as a practical, inexpensive alternative to granite. The formula was modified in 1968 and has remained unchanged to this day.

Corian was first presented nationally as a commercial bath product at the National Association of Home Builders Show in 1971. Since then, it has become very popular for kitchen countertops, tub/shower surrounds, and architectural embellishments. A number of companies have since emerged with similar products.

Manufacturing Methods

Solid surface products are formed using two main components, a natural mineral, typically ATH (alumina tri-hydrate), serving as the filler, and an acrylic or polyester resin serving as a binder. ATH is a refined form of bauxite, a type of clay; it is resistant to damage by chemicals, oils, and water; it's stain resistant, fire retardant, translucent, and it resists impact damage, but it still remains machinable.

When a purely acrylic-based resin is used as a binder, the result is a thermoformable sheet that can be heated, bent into a new shape and cooled without any loss of performance. Polyester is used as a bonding agent, with a catalyst such as peroxide, when higher strength is needed.

The mixture is then combined with fillers and additives, and poured into open molds for curing. Castings may be cured in ovens or in open air, but the process is carefully monitored to prevent air bubbles from forming that would cause voids in the surface. Oftentimes this involves the molds being continuously vibrated while cooling.

Some brands use slightly different ratios of minerals to resin, but these differences are minor and do not affect the quality of the material. There are also minor differences in manufacturing techniques. For example, Corian® uses a chemical cure method while LG HI-MACS® uses what they describe as an advanced thermal cure method. LG HI-MACS® is produced in 9mm thickness material as well as 12mm and 6mm. Corian® is produced in 12mm and 6mm only. LG HI-MACS® also offers sinks in a wider range of colors.

Some manufacturers offer products with built-in anti-bacterial protection, designed to optimize levels of hygiene in healthcare environment.

Because solid surface is a mineral-filled material, there may be some slight color variation from sheet to sheet, and while these variations are usually only slight, manufacturers will not guarantee exact match to samples. Some suppliers will provide sequentially numbered sheets to be used in a single installation in order to ensure consistency in a project.

Manufacturers offer these products in several grade levels, which vary by the size of the mineral particles they contain. The higher the grade, the more they resemble granite, and the higher their price. Solid color styles are less granulated and do not resemble stone at all.

Solid surface tops are much lighter weight than granite or natural stone, with ½" material weighing only 4.4 lbs per sq. ft. They are warmer to the touch as well.

These products resist attack by acids, alkalis and water; they also will resist stains as well as the growth of bacteria, fungus, mold and mildew. However, stain-resistance is not absolute, especially in coordinating sinks, which may require frequent scrubbing to maintain their original color and finish.

Manufacturers' warranties generally range from 10-15 years, when properly installed by a licensed fabricator.

Fabrication and Finish

Solid surface products allow for much greater design flexibility than nearly any other material. Layouts that would be nearly impossible with most products are easily fabricated with solid surface.

Manufacturers' of solid surfaces take great care in controlling the quality of both the raw materials and the finished products. Fabricators must be certified by the manufacturer. This requires classroom training and specialized tools not available to the average tradesman.

Fabrication costs can significantly affect the final price. Generally, the more complex the shape of the project and particularly the shape of the finished edges, the higher the price will be.

Solid surface material is supplied to the fabricator in sheets that are ½" thick, measuring 30" x 12.5' or 36" x 12.5'. When used for countertops, the sheets are installed on perimeter framing support built up to 1 ½", and glued with small amounts of silicone sealant. The material must be reinforced with single-thickness wood or tubular steel cross-members every 18", but no substrate is used, and the cross-members need not match up with the sides of the cabinets.

All exposed edges are then layered with strips of surface material, while rear edges are built up with wood strips. A specially formulated adhesive is used for making joints, repairs, or custom edges.

Solid surface material has a sanded, matte surface when it is shipped from the factory. The fabricator applies the final finish that may range from matte to high gloss, depending on the customer's preference. Individual fabricators have their own brand preferences based on their experience and product workability. All solid surface measurements are taken from outside dimensions, with no deductions for corners. A template is made to use as a pattern. For this reason, base cabinets must be permanently anchored in place before measurements can begin.

Corner joints are normally squared rather than mitered to minimize wasted material and reduce the cost of labor. These seams should be placed at least 3" away from any corner or cutout. All joints should be reinforced with a 4" wide strip of solid surface material and supported by framing to minimize the risk of stress cracks. All cutouts should have rounded edges.

Seams are inconspicuous, giving the appearance of a solid, continuous surface throughout. Unlike granite or natural stone, seams in solid surface should not be placed at sinks or cooktops.

The Backsplash

Backsplashes up to 8" high can be bonded to the countertop by using this adhesive. Solid surface may be customized by adding grooves and recesses for drainage or to allow for storage of items such as soap bars or frequently used tools. Unlimited design capabilities are possible, such as: inlays, routed drain boards, unique edge buildups, different colored borders, coved backsplashes.

The Edges

Unlike plastic laminate, solid surfaces can have formed edges on all sides, which allows for natural designs with complementary edges, and unlike granite, their seams are virtually invisible.

Set on backsplashes in solid surface applications have a much lower risk factor than their laminate counterparts. Owing to the water resistant nature of the material itself, there is no threat of material damage.

Custom edges, such as edging to match the detailing on the cabinetry, can also be done. Keep in mind though, that if the fabricator has to buy custom cutting bits, he will add their cost to the price.

The maximum overhang for solid surface countertop depends on the weight that will be placed on the overhang, but any extension beyond 10-12 inches requires additional support.

Sinks and Cooktops

Solid Surface sinks and lavatories are sold in coordinating colors and are designed to be incorporated into the top as a continuous unit with no overhangs, rims, rough edges or obvious edge seams. These sinks are offered in matte or satin finishes only, and in a limited number of colors. But each manufacturer offers a different color selection, which increases the choices. (the most popular colors are white or off-white)

If desired, standard sinks (e.g. stainless steel) can be flush mounted on these surfaces or under mounted as they are in granite, but the vast majority of customers prefer the integrated look.

Due to their weight, an under-mounted cast iron sink cannot be anchored solely to the solid surface top, but must have a support frame built into the cabinet by a carpenter.

If a cook top is to be mounted in the solid surface, be sure that there is room inside the cabinet to hold the top and any pop-up vents that will be installed with it. Heat-conductive aluminum tape must be used for drop-in stoves and around heat sources to protect from thermal stress.

Keep in mind that the cabinet must always be wider than the sink or cooktop, i.e. a 30" sink will not fit in a 30" cabinet. How much larger the cabinet has to be, depends on the individual sink and the bracing method used for the cabinet. There must also be ample room available for the faucet of your choice and any other accessories you may select. Your designer will help you decide.

Any item that requires a cut in the counter, such as sinks and cooktops, must be on the job site before a template can be made.

The fabricator may give the customer a piece of matching material, e.g. from a sink or cooktop cutout. This should be kept in a safe place in the event that it may ever be needed to repair a damaged top.

Installation Considerations

Counter tops should be installed only by a fabricator who will assume responsibility for a proper fit. Improper installation of kitchen countertops may void the manufacturer's warranties and can result in damage to other surfaces or areas of the kitchen, such as cabinets, drawers, sinks, and fixtures.

Proper conditioning of the solid surface sheets, as well as any other materials used in the assembly, is necessary to minimize shrinking or expansion. All components should be conditioned to 65-75 degrees F with relative humidity below 45% for 48 hours before installation.

When countertops are installed between walls, 1/8" spacing should be allowed for dimensional movement.

Preparing the site

On new construction, the base cabinets must be permanently anchored in place before a template can be

made. On a remodel project, existing tops must be removed prior to measurement. Any sinks, faucets, cooktops, or any other item that requires a cutout or a hole in the top must be on site and readily available at the time the template is made. The fabricator may need to take some items with him to complete the fabrication.

Please note that any delay in acquiring the accessories may also delay the installation.

Under normal circumstances, the installer will not be responsible for connecting of dishwashers, cooktops, or plumbing.

Remember: do not make any changes to the design or specifications with the fabricator when he's taking his measurements because those changes may affect other elements in the overall design or may result in unexpected cost increases. All changes should be arranged only through your kitchen designer.

Be sure to allow sufficient lead time for the project to be completed. It will take 3 to 4 weeks to complete the installation after measurements are taken.

Physical Characteristics

Solid surface products are produced in a great many colors, and each manufacturer offers a unique palette across a broad spectrum, giving the customer the opportunity to match nearly any color scheme. Colors range from solid to granular, with the more granular styles more closely resembling granite.

Some manufacturers who make both solid surface and laminates offer colors that are designed to coordinate with each other, allowing the customer to mix and match countertops to achieve greater economy. The choice of manufacturer is generally a case of personal preference, not of quality. Pricing differences are not great.

Durable but not Indestructible

Unlike granite and natural stone, solid surfaces are homogeneous, with evenly distributed particles running throughout the thickness of the sheet, ensuring that the original color and texture remains consistent regardless of wear. Unlike natural stone, damaged sections are repairable.

Since their color goes all the way through, unlike laminates, minor scratches can usually just be rubbed out. If the scratches are too deep, a matching filler material is available that allows the homeowner to make nearly invisible repairs.

While it is possible to damage the surface, there is almost no damage that might be considered to be permanent, since the surface can be sanded and refinished.

For countertops with a gloss finish, it's best to contact the dealer or fabricator before attempting repairs.

- Solid surfaces require no sealer. But even though it is stain-resistant, some chemicals such as acetone, strong acids, chlorinated chemicals, or strong solvents such as paint remover can stain or damage the surface, with the extent of damage directly related to the duration of contact.
- Solid surface is not recommended where the countertop may be subjected to prolonged exposure to temperatures above 175 degrees. Extreme exposures and concurrent temperature contrasts will yellow the surface and could result in seam failure or surface cracks. Always run cold water when pouring boiling water into a solid surface sink.
- Do not place toasters, toaster ovens, electric fry pans directly over seams. The top will probably take the heat, but the seams could pop loose with excess heat. Hot pans and heat-producing appliances (frying pans, baking pans, electric skillets, crock-pots, coffee pots, etc.) must be placed on a trivet with legs.
- Do not use a solid surface top as a cutting board. The surface can be cut, and it will leave a white residue where the acrylic surface is broken. While the homeowner can usually sand these scratches out, in order to keep the repairs from showing unevenness in the finish, the entire top may have to be sanded. If the cuts are too deep, simple sanding cannot repair them and a professional service technician will have to be called in.
- Extended exposure to chemicals and solvents such as oven, metal, and drain cleaners can whiten, discolor or otherwise damage the surface, and can be difficult to remove.

Maintenance

A damp cloth and mild soap is usually all that is required to clean a solid surface countertop. Non-abrasive household cleaners such as Fantastik® and Formula 409® may also be used.

Surfaces with gloss and semi-gloss finishes may require more maintenance than matte or satin finishes, as will darker colors. Countertop Magic or Pexus are good polishes to use to enhance the shine.

Abrasive cleaners (such as Comet®, Soft Scrub®, Bon Ami®, etc.) should not be used on glossy surfaces except for removing tough stains, minor scratches and burns.

If you've chosen a matte finish, you can use an abrasive cleaner like Ajax® or Comet® and buff with a Scotch-Brite® pad using a circular motion. The same technique can be used for cigarette burns, minor cuts and scratches. If this is unsuccessful, hand-sanding with 400 grit sandpaper will usually work. If that fails, a heavier grit paper with an electric sander would be the next step.

- **Stains**

Troublesome spills and stains, like food dye, tea and fruit drinks can be removed with full strength bleach followed by a general cleaner flushed with water. Be sure and not let the bleach remain on the surface for more than five minutes.

- **Scorch Marks**

If a lit cigarette should come in contact with your countertop, a nicotine stain or a scorch mark can occur. Simply use an abrasive cleaner or buff in a circular motion with a Scotch Brite pad to remove.

- **Cuts / Scratches**

For superficial scratches, simply wet a #7448 Scotch Brite pad and rub in a circular motion, then clean with soap and water and let dry. If you want to add additional shine to your countertop, apply a non-wax polish cleaner to a dry surface and wipe clean.

If the cuts are deep and simple sanding cannot repair them, a professional service technician will have to be called in.

Concrete

Although concrete is a hardened mixture of water, cement, and sand or gravel, concrete countertops bear no resemblance to garage floors or roads.

Concrete countertops are made of cement, lightweight aggregates, and a other additives such as fiber reinforcement, silica fume pozzolan, and acrylic.

In order to prevent cracking, reinforcement such as structural steel, wire mesh, fiberglass, and/or fibers is used.

Depending on the installation requirements, more than one type of reinforcement may be used. In addition, concrete's flexibility makes it an increasingly popular choice for drainboards, and backsplashes in complementary colors and textures.

Concrete countertops are made by thousands of small independent fabricators scattered throughout the country. Each slab is hand cast so none will be exactly identical. Countertops are either pre-cast in a shop or built on site.

The contractor will use whichever method he/she is most comfortable with. There are no industry-wide standards and no two fabricators make it in the same way. The type, method and number of coats of sealer are unique to each contractor

Some contractors still form integrated sinks made of the same material as the top just as it has been done for many years, but the more common sink is a flush-mounted stainless steel or cast iron model.

Characteristics

- **Appearance**

Concrete countertops are a warm natural looking material. The surface of a properly finished concrete countertop is smooth and reflects light, although the use of chemical stains, coloring pigments, various aggregates, and epoxy coatings can give concrete the look, texture, and feel of quarried stone such as marble, granite, and limestone.

Veining, texture and color vary, and regular use imparts a warm patina to the surface over time.

The three most common types of finishes used for concrete countertops are:

- *Veined:*
A diamond-impregnated grinding disk zigzags across the slab, producing marble-like veining in the background. While gently textured, the surface is smooth enough to roll dough or write a letter.
- *Trowel:*
Obvious trowel marks and subtle variations of light and dark, resemble a European plastered wall. However, the surface is smooth and mostly monochromatic.
- *Terrazzo:*
Glass or marble chips are added to the background, creating a two-toned mottled effect. Again, the textured look is seen under a smooth top surface.

- **Available Colors**

Each Concrete countertop contractor offers their own unique selection of standard and premium colors. Numerous color options give homeowners broad choices for coordinating a surface with other colors and materials in a room. But asking the fabricator to try to match a color will always increase the cost, and color matching is not an exact science.

- **Seams are Visible**

Seams in concrete countertops are visible and look similar to the seams in marble or granite.

- **Must be Sealed**

In its natural state, concrete is porous and will stain. Concrete countertops are sealed with a surface sealer, such as epoxy, for water and stain resistance. Many contractors add conditioners to the concrete to make it less permeable and thus more stain resistant.

Many contractors recommend the application of a good water based liquid wax every nine months to a year.

- **Staining and Discoloration**

Staining and discoloration can occur if the sealer is compromised from cutting or the application of heat (such as hot pots and pans).

For those who want the look of concrete without worrying about stains, [solid surface](#) is the answer.

- **Durable but not Indestructible**

Concrete countertops often develop hairline cracks, which are too narrow to trap food and debris. The cracks tend to be non-structural and result from the natural shrinkage of the concrete.

Hairline cracks can be patched, but often look far more obvious than the cracks themselves. Most people prefer the aged appearance that this natural occurrence produces.

Depending on the density of the concrete, a blow from a falling heavy object may crack the surface or break off the edges. However, under normal use concrete countertops will last a lifetime.

- **Maintenance**

Cutting on the concrete countertop won't hurt the concrete, but will damage the sealer, which can allow water and stains to penetrate the concrete. Cutting boards should always be used when chopping or preparing foods.

Concrete is very heat resistant, but avoid placing hot pots or pans on concrete countertops since the heat can damage or discolor the sealer or wax . Always use a trivet or hot pad on the counter. Some contractors will insert trivets made of stainless steel, brass, or copper in the countertop.

Do not use abrasive pads or powders on sealed counters. Clean with warm water and a non ammoniated, nonabrasive cleanser, or a stone soap.

- **Bacteria Resistance**

A recent study conducted by the [Hospitality Institute of Technology and Management](#), a St. Paul, Minnesota-based organization that develops educational materials and research for the retail food industry measured the bacteria-resistance capacity of six common countertop materials.

Each surface was contaminated with E. coli (nearly 2 billion of the microorganisms), washed and rinsed with soap and water and then sanitized with a vinegar-and-water solution. The results are shown in the table below.

Surface Microorganisms Eliminated by Cleaning	
Stainless Steel	85,113,804
Granite	79,432,823
Laminate	498,884
Ceramic Tile	293,765
Concrete	32,810
Wood	2,080

Dr. O. Peter Snyder Jr., who conducted the study, says, "We hope our research will help consumers make healthy decisions when selecting a countertop surface for their kitchens."

- **Size Limitations**

The standard concrete slab thickness is 1.5", although 2" slabs are common.

A 1.5" thick standard concrete countertop has an approximate weight of 18.75 pounds per square foot. (Granite is approximately 18 pounds per square foot.).

Lightweight concrete is available that is just as durable as heavier concrete.

A standard 1.5" thick, ten square foot (2'x5') countertop weighs nearly 200 pounds. Many contractors use 10' long or 20 square feet in area as their maximum size for standard pricing. Larger sizes will require seams.

Standard cabinetry will support the concrete slabs as the weight of the countertops is distributed over a large area.

- **Must be Professionally Installed**

- **Expensive**

Concrete countertops are a custom crafted material for high end use. Costs for a standard 1.5" thick countertop, including installation can range anywhere from \$75 - \$200 per square foot, depending on the area of the country.

Irregular or curved shapes, 2" thick concrete, integral drain boards, custom edges, and backsplashes will increase the cost.

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