

Granite Countertops

An experienced fabricator explains the process from the templating to the final setting of the slabs



Plywood templates minimize guesswork. **The location and shape of sinks and other openings are marked directly onto lauan templates. Back at the shop, dimensions from the templates are transferred to the stone slabs.**

For most of the past 20 years, my company has been taking the rockbound coast of Maine and bringing it into the homes we work on. Our specialty is granite, both rough and refined. We transform thin slabs of the material into beautiful, functional kitchen countertops.

Our shop is located in Orland, an area that once thrived on the granite industry. We're surrounded by such historic quarrying towns as Frankfort, Blue Hill, Franklin, Jonesboro, Mount Desert and Deer Isle, source of one of the most structurally sound granites available. Granite from Deer Isle was used in the memorial to Robert Kennedy at Arlington National Cemetery.

I started working in the masonry division at Freshwater Stone & Brickwork in 1987 as a mason's tender, later moved to the granite side of the business and now work as the company's manager. I have found that there is something sweet in the smell of freshly split granite.

Not just a pretty face—Granite countertops are so breathtakingly beautiful that many people don't realize what a practical choice they are. Granite is one of the hardest naturally occurring materials. It has a compressive strength of 19,000 psi (according to the nonprofit American Society for Testing and Materials). In other words, it takes 19,000 lb. of pressure in 1 sq. in. to break the material. A granite countertop will not scratch under everyday use; it can be used as a cutting board.

Dropping things on granite won't damage the countertop, but I sometimes hear from customers who say I owe them a new coffee cup or dinner plate. Granite also withstands intense heat, so you can take pots right from the stove and set them on the countertop without fear of leaving bum marks.

When submerged in water, granite will absorb only 0.4% of its own weight in water, quite low compared with other building materials. What this means to the homeowner is that granite is naturally resistant to staining. Spilled liquids bead right up. And polished granite doesn't promote bacteria growth. Warm, soapy water is all that's needed for cleaning.

Color Indicates composition— Granite is an igneous substance (formed by the solidification of molten rock) that contains mostly feldspar and quartz. The color in a slab of granite comes from minerals and organic matter, such as plant and animal life, present when the material was in the molten state. Shades of white and pink indicate a high proportion of feldspar. Gray stone contains a lot of quartz. High concentrations of biotite are present in black granite.



A diamond-tipped, water-cooled blade cuts the stone. Granite typically is supplied in slabs measuring 5 ft. by 10 ft. Freshwater Stone & Brick work uses an Italian-made bridge saw to cut the slabs into workable pieces. The sawblade's 48 teeth are embedded with industrial-grade diamonds.

Material accounts for about half of the cost—You can expect to pay at least \$65 per sq. ft. and as much as \$125 per sq. ft. for the finished product, installed. The slabs that we and other fabricators use to make countertops are roughly 5 ft. by 10 ft. and are sold by the square foot of surface area. The cost of raw granite slab stock ranges from about \$30 to about \$100 per sq. ft. Field measurements, templating, fabrication and installation charges will increase the cost by approximately 50%.

I often get requests for ballpark estimates for countertop jobs, which I refuse to give. I need a layout of the project in my hands, with all specifications noted, before I can begin an estimate. The cost of granite can be influenced by the location of the quarry, the thickness of the slab stock and the finish on the slab surface. For instance, domestic granites quarried in North America cost \$20 to \$50 per sq. ft. Imported granite from Africa is almost twice as much, due to shipping costs. The industry's standard thicknesses for granite slabs are 3/4 in. and 1 1/4 in. Thinner slabs are less expensive than thicker ones.

Templates made from Plywood —When the base cabinets have been installed and the granite slabs have been approved by the homeowner, it's time for the contractor to call us for field measurements and templating. This point is critical in a granite-countertop project. When we're working in stone, there is little room for error.

We make templates from the installed base cabinets using 4x8 sheets of 1/4-in. lauan plywood (photo p. 1; top photos p. 2). The templates are cut on site with a jigsaw to the actual finished dimensions. Notes written on the plywood signify overhangs, rough openings, centerlines, etc.

We usually have the granite hang 1 in. past the farthest point protruding from the face of the cabinets (photo bottom right, p. 2). This point may be a knob or a raised panel. Ultimately, the size of the overhang is up to the homeowner. I advise that extra support, such as knee braces, be installed by the cabinetmaker under overhangs of more than 12 in.

Fabricators take their own measurements—Our on-site measurements are taken by the same workers who make the countertops. This procedure ensures the workers have a complete understanding of each kitchen project.

More often than not, sinks and cooktops are centered on the underlying base cabinet, but sometimes the centerline must be adjusted to account for a kitchen window or an oddly placed upper cabinet. We discuss options with homeowners and contractors before granite fabrication begins.

We ask contractors to make sure that all appliances, including cooktops, sinks and faucet fixtures, are on site the day field measurements and templates are made. Contractors also should tell us about any special requirements, such as polished sink rims for undermounted sinks, centerlines for fixtures, etc. The templates are then taken back to the shop where the measurements are transferred to the granite slabs.

No limits on size and shape—Granite countertops can be fabricated to practically any specification. Any cutting, milling or shaping that can be done in wood or solid-surface material can be done in granite. It just takes more time.

First, the granite slabs are cut to length and width by our bridge saw (photo above). Made in Italy, our Achille MS stone saw (VIC International Corp., P.O. Drawer 12610, Knoxville, Tenn. 37912; 615-947-2882) cuts a granite slab as it lies flat on a stationary table. The saw's 16-in. dia. blade has industrial-grade diamonds embedded into each of its 48 teeth. The blade cuts through the stock as the drive motor and cut motor, both suspended from above, travel along a 4-in. by 4-in., 10-ft. long iron channel.

Grinders smooth the edges—Next, the edge of the stone is milled with a profile selected by the homeowner from samples at the showroom. All of our edge profiles are done by hand. Router bits that cut granite are available, but they're costly, and the edge they create still has to be hand-polished. We mill the countertop edges with electric grinders and pneumatic grinders, made specifically for the stone industry, that spin at 4,000 rpm. For rough-stock removal, we use a 4-in. dia. cup-shaped wheel faced with 60-grit, industrial-grade diamonds. Then the edges are shaped and polished with a 4-in. dia. diamond polishing pad mounted to a flexible-rubber disk. The polishing pads come in a series of seven grits.

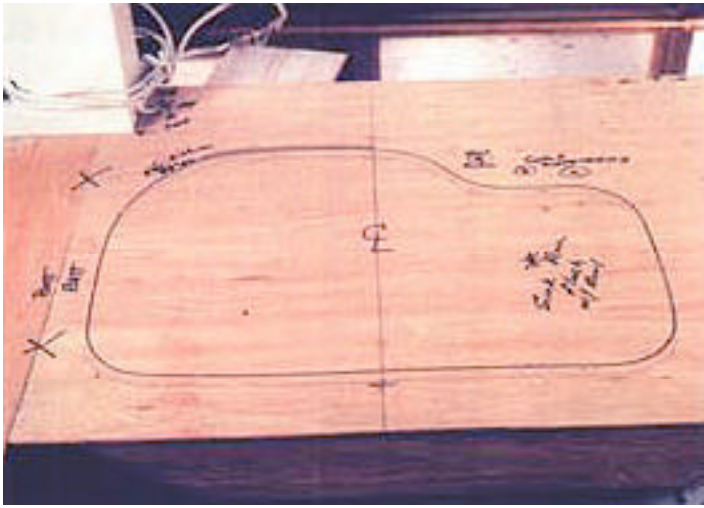
The diamond fragments on the surface of the pads are bonded in a resin-based matrix. The resin holds the diamond particles in place something the way grapes are held in Jell-O. At 4,000 rpm, the resin wears down and exposes the cutting edges of the diamonds.

Rough-opening holes for cooktops and sinks are cut either with a semiautomated router and a stone-cutting bit, or with a worm-drive circular saw with a water-cooled diamond blade (photos top left and center, facing page). The router bit in the semiautomated machine is similar to an edge-profiling pad in that it cuts with industrial-grade diamonds embedded in a silicon-carbide matrix. The machine allows us to cut any circular or oval rough opening in minutes.

Installing a sink with a 22-in. rough opening in a 25-in. deep granite countertop can be tricky. Sometimes we're able to reinforce weak areas by kerfing the bottom of the granite and epoxying in a length of 1/4-in. by 3/4-in cold-rolled steel (photo above right). In other cases, we have to cut the countertop off at the sink or cooktop opening. Then we fill in the space in front of and behind the opening with strips of granite, butt-jointed where they meet the main top.

Depending on the complexity of the project, the countertops usually are fabricated within three weeks from the day we make the template. Once fabricated and double-checked, the granite countertops are loaded onto an A-frame for transportation to the site. The sections of countertop are carried on edge, wrapped in padded blankets, strapped to the A-frame, then strapped to the bed of the truck. Transport of finished granite countertops is a skill in itself.

Silicone holds the counters in place—At the site, the granite pieces are unstrapped and carried on edge into the house, where they are tentatively set in place. If necessary, the counter-tops are leveled with hardwood or plastic shims. For the occasional on-site alteration, we bring along portable electric polishers, saws and drills. On-site cutting and polishing is loud and dusty. If possible, alterations are made outside.



Templets are cut with a jigsaw. **Scribing templates to match existing wall conditions is more accurate than relying on a list of measurements. Template sections begin and end in the same location where slabs of gran-**



Granite is hard but not unworkable. Granite countertops can be made to accommodate any kitchen sink or appliance. This sink opening was roughed out with a water-cooled circular saw and then rounded and



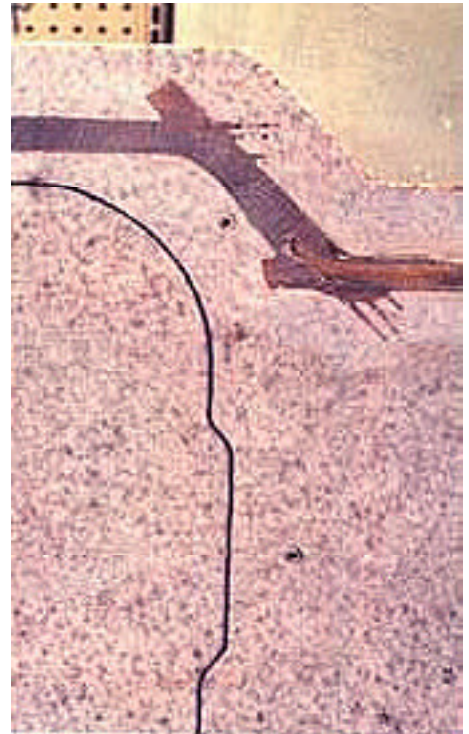
A material that combines beauty and practicality. **Granite is well-known for the complexity and depth of its color and its glass like finish. But it's also highly suitable for the demanding environment of a kitchen. It can't be damaged by moisture and is nearly impossible to stain, scratch or burn.**



Water keeps the blade cool. Countertop openings can be cut with a 7 1/4-in. worm-drive circular saw with a diamond-tipped blade. Cloth tape is applied to the stone so that layout lines will remain visible while the cut is made.



Easy does it. Once the cuts have been made, pieces of granite are carefully lifted out of the new openings. The tape is removed from the loose section to allow the suction-cup-based tool to grip the stone.



Steel supports vulnerable spots. To reinforce narrow sections of countertop, such as around a sink, strips of steel are glued into grooves cut in the back of the granite.

The countertops are adhered to the cabinets with construction-grade clear silicone (photo right). The same silicone is used at granite-to-granite butt joints, if there are any. The use of silicone allows some expansion and contraction of the house, the cabinets and the stone to occur without the joint's cracking. Backsplashes are adhered to the countertop and the wall using the same adhesive. The freshly adhered countertops should be allowed to set at least 48 hours before plumbing and electrical appliances are installed.

At the stock thickness of 1 1/4 in., granite slabs weigh 17 lb. per sq. ft. Yet this weight is distributed evenly over the base cabinets, eliminating the need for reinforcement in most cases.

Sealing provides added protection—After the countertops have been installed, they should be sealed with a silicone stone impregnator. This sealer soaks into the pores of the stone, bonding to the mica, quartz and feldspar, and filling the pores. The sealer should be applied with a clean cloth and allowed to set for 15 minutes before the excess is wiped off. Because granite is extremely stain resistant, the sealer basically is a precautionary measure. One application should last forever.

If a granite countertop is cracked or chipped, a stone epoxy tinted to match the stone can be injected into the crack and buffed smooth.



Silicone keeps the top from moving. Sections of countertop are adhered to the cabinets with silicone caulk. The same adhesive is used to glue backsplashes to the walls.