

Face grain

With the milled faces of each board oriented up, face-grain tops are typically the easiest to glue up. They are not the most durable or knife-friendly counters, but if wood grain and color are what you're after, this type of construction may be right for you. See this walnut top built on the following pages.



End grain

End-grain, or butcher-block, counters like this teak top are the most functional. Not only can they handle repeated chopping, but they're also self-healing. Maintenance is as simple as occasional applications of mineral oil. These busy-looking tops are the most challenging to build.



Making Wood Countertops

BY DAN VOS

Built well, they're both attractive and durable, so choose a species, construction style, and finish that fit the way you use your kitchen

Edge grain

Ripping flat-sawn stock into strips and gluing them up on edge creates a top that has less of the color and grain characteristics of a face-grain top, but more durability. As seen in this mesquite island top, it takes a lot of 1-in. to 2-in. strips to make an edge-grain top, so the glue-up is a bit more challenging.



STEP BY STEP

The most common thing I hear when people first see my wood countertops is, “Wow, that’s beautiful. But are wood countertops durable enough for a kitchen?” My answer is, “Mine are.”

Having made a career of building wood countertops, I’ve developed construction methods and finishing techniques that make them both durable and beautiful. Beauty comes from the nature of wood itself, from the way I orient its grain, and from the finish I apply to it. Durability comes from design and construction specifications appropriate for the use of the top. For instance, no matter how much you love the way that it looks, a face-grain pine top is not an appropriate chopping surface. Pine is soft, and face-grain construction is not durable enough to handle pressure from knives.

My shop is production-oriented with special tools and worksurfaces that allow us to build large, complicated countertops efficiently. But as you’ll see in the process of making the face-grain walnut island counter shown here, all you need to make a wood counter is a large worksurface, a jointer, a planer, a router, a random-orbit sander, and a handful of bar clamps. Before you jump into a countertop project, though, it’s a good idea to explore the aesthetics and durability of different wood species and three types of construction for wood counters. Then you can determine if a top like this one is right for you.

Choose a wood you like, and expect it to change color and move

I try to guide my clients toward a wood species and grain orientation that appeals to their aesthetics and also suits how they will use the countertop. Where nothing more than a tough chopping surface is what the client wants, I usually recommend an end-grain top of hard sugar maple (more on grain orientation later). When a homeowner wants visual interest, there are lots of wood species that make great face-grain or edge-grain tops. Among domestic hardwoods, cherry, walnut, beech, and oak are good choices; among tropical hardwoods, sipo, santos, African mahogany, and jatoba (Brazil-



MILL THE STOCK

For a standard 1½-in.-thick countertop, I start with 2-in. rough-sawn boards. I buy boards longer than I need and have enough material to make the blank wider than the finished top will be. Before choosing or arranging boards, I skip-plane each one (top board, photo left) to reveal its grain, color, and blemishes.



Prepare the surfaces’ mating edges. Use a jointer or a router and guide to create one perfectly straight edge. If you use the latter technique, rip the board on a tablesaw, removing just enough material to create a parallel straight edge. Flatten the board on a jointer, and plane it to within 1/32 in. of final thickness. The remaining 1/32 in. will be removed later when the blank is sanded.



Alternate bark up and bark down, if possible.

Lay out for looks first.

Pick the best face of each board, and lay the boards side by side. To help keep the top flat over time, try to arrange them so that they alternate bark up and bark down (drawing above). But don’t sacrifice a perfect face for a top that will be well fastened to the cabinets. Draw a triangle across all the boards to maintain the arrangement.

TIP

If the boards join nicely at the center but the ends are open, you need to get the edges straighter. If the opposite is true and you’re making a long top, you can rely on clamps to close a gap up to 1/16 in. Springing the joint in this manner builds stress into the top that actually counters potential wood movement.

GLUE UP THE BLANK



For most tops, I use Titebond II (or Titebond II Extend for a few more minutes of open time). On oily tropical hardwoods, I use West Systems Epoxy (105 resin and 205 hardener). Glue joints are generally stronger than wood, so I don't biscuit the tops for strength. Sometimes I use them for alignment. For tops wider than 36 in. or that use more than five boards, consider gluing up the top in two halves and then gluing the halves together. Leave the top clamped for at least four hours, preferably overnight.



Glue both faces liberally. Starting about 3 in. in from the ends, space clamps every 12 in. Top clamps will be placed between the bottom clamps after the glue is applied. Start with an outside board, tip it up, and run a glueline down the middle. You can't put on too much glue, but you can use too little. Use a solder brush to spread glue.



Add pressure a little at a time. Start by tightening the middle clamp just enough to hold the top together. Check the joints for alignment, and tighten the remaining clamps from the outside, bottom clamp first, then top, then bottom, and so on. Check the top with a straightedge between clamps. Cupping reveals uneven pressure. You'll need to loosen the clamps and start again. Scrape away glue squeeze-out with a putty knife.

ian cherry) are all stable and are all easy to work with.

I don't get caught up with the hardness ratings of various wood species, but I avoid some that are either inordinately difficult to work or are better suited to outdoor use, including cypress, cedar, and hemlock. Also, some of the superhard tropical woods, such as bloodwood and ipé, have problems with end-checking.

Bear in mind that wood can change color over time due to age, ambient conditions, or the type of finish you use. For example, the tung-oil-based finishes I use bring out amber tones in lighter woods, and they deepen and enrich darker species.

Once you determine which species to use, make sure to buy kiln-dried stock to minimize the potential for movement. I test one or two boards from every order to be sure the moisture content is between 6% and 9%. Still, every board and every top will move, especially across the grain. You have to take that movement into account when you build and install a wood top.

To balance the stresses between boards, it is a good practice to alternate the growth-ring pattern in the glue-up. It is also a good idea to turn boards frequently during the planing and jointing process. Working both sides of the boards before glue-up can remove some of their internal stresses and reduce their propensity to go their own way. If you have time, you also should acclimate the wood to the site before gluing up the counter.

To accommodate wood movement when installing wood counters, I fasten them through slotted screw holes. For tops held tight to a wall, you can use a matching back-splash to hide seasonal gaps or slot only the screw holes nearest the overhanging areas. The top should transfer most of its stress toward the path of least resistance.

Build it for the way you'll use it

When homeowners say they want a "pretty" wood counter, I usually end up building a face-grain top like the one featured here. The wide face of a board is where color and grain come alive. However, the cost of the rift-sawn, quartersawn, and flitch-cut stock that I commonly choose for these tops can be significantly more than what you would pay for suitable edge- or end-grain materials. Face-grain tops have pros and cons when it comes to durability. A teak face-grain top, for example, is an excellent choice for sink areas



SHAPE AND SAND THE TOP

I make the blank approximately 2 in. longer and $\frac{3}{4}$ in. wider than needed so that the first step out of the clamps is to cut it to size. Start by ripping one edge, and then use it as a reference to rip the top parallel and crosscut to square. Shaping and sanding require a series of sandpaper from 60 grit to 220 grit.



Make shapes and cut-outs with a template. First, use the template to trace the shape on the top. Rough-cut the shape with a jigsaw; then use the template again to guide a router and pattern bit to shape the top. Use the same process for sink cutouts, but work with the top upside down. This way, you can screw the template to the top.



Fill knots and blemishes with epoxy. After scraping away any loose material, use five-minute epoxy with a coloring dye (www.homesteadfinishingproducts.com) to fill knots and other blemishes.



Sand, then sand more. With 60-grit sandpaper on a random-orbit sander, correct any cosmetic defects, paying special attention to the joints. Use a straight-edge to make sure that the top is perfectly flat. Sand with 80-, 100-, 120-, and 180-grit sandpaper. Start sanding the edges once you've gotten to the 120-grit paper. Wet the top with mineral spirits to reveal remaining defects.



Profile the edges. Use a bottom-mount, bearing-guided router bit. Depending on the profile, you might need to make multiple passes. Sand the profile with 120- to 180-grit sandpaper. Soften or ease all sharp edges. Finally, sand the entire top to 220 grit.



Cut to length and width, parallel and square. With a circular saw outfitted with a high-quality blade and edge guide, rip one of the long edges. Measure across for a parallel rip. Repeat this process to crosscut the ends if they're being cut square.



FINISH THE COUNTER

For most tops, I use one of two tung-oil-based finishes: Waterlox or a 50/50 mix of pure tung oil and citrus solvent, shown here. No matter what finish I'm using, I coat all surfaces, including the bottom. While I work, the top rests on the tips of drywall screws driven through small plywood blocks placed atop the worktable.



Flood and wipe the first coats. A wood counter lets you know how much finish it needs by the way it absorbs (or doesn't). Most wood species suck up the first two coats, so start by flooding the top with a foam brush. After a few minutes, wipe off the excess finish.

because it likes water, but you'll cry wet tears on it the first time it's marked by a knife.

When I'm putting together a face-grain top, much more effort goes into pre-glue-up layout than with other kinds of tops. I skip-plane both faces of the rough boards to reveal flaws, color, and grain before choosing which to use. Then I carefully lay out the boards, keeping visual characteristics and internal-stress characteristics in mind until I'm satisfied with the balance of cosmetics and stability. Just prior to finishing, I spend extra time with face-grain tops, detailing small flaws with colored epoxy. Gluing up a face-grain top, however, is easier than gluing up edge- or end-grain counters because there are typically fewer boards to join.

Edge-grain tops offer the best combination of durability, beauty, and cost. When made from boards 1 in. to 2 in. wide, they can show a lot of color and a straight, elegant grain pattern, but when used for food prep and chopping, edge-grain tops scar and acquire a patina. The glue-up is more involved with edge-grain tops than with face-grain tops because there are more glue joints. Here, you can save money on lumber by starting with flat-sawn boards that will be ripped and can be oriented to reveal a rift-sawn or quarter-sawn face.

End-grain counters are the last word in chopping. They are resistant to scarring, are self-healing, are easy on fine knife edges, and soak up finishes like nobody's business. But end grain is a busy look. There are lots of glue joints and lots of growth rings. Performance comes at a price, too. Not only are these the most expensive tops I make, but because of the laborious construction process, they're also the most difficult to manage in the shop, being fussy to put together and somewhat brittle until installed. It doesn't matter what type of stock you use for an end-grain top as long as it is all the same. In this way, the individual pieces expand and contract similarly.

Be prepared to work quickly

I'm often asked what tools are absolutely essential, even for someone planning to build only one wood countertop. I think that a 10-in. tablesaw, a 6-in. jointer, and a portable planer are important to get the job done right. I assume that anyone planning to build a countertop has a router and a random-orbit sander. The number of bar clamps you need depends on the length of the top, but a general rule is one clamp per foot, plus one.



Wet-sand the last coat. When the counter stops absorbing the finish at a dramatic rate, likely by the third coat, apply the finish, and wet-sand it with fine foam sanding pads. Once you've sanded the entire top, wipe off the excess finish. Use a power buffer to bring the finished top to life.



Install it with movement in mind

- **Use slotted screw holes**

Fastening the counter through elongated screw holes in the bracing at the top of the cabinet allows the counter to move freely as the boards expand and contract.

- **Don't use adhesives unless you have to**

If you glue down the top, it won't be able to move and can crack. Bar tops set on pony walls or other narrow edges, however, may need adhesive to keep the top stable.

- **Support overhangs**

An overhang more than 4 in. on an edge should have support such as a corbel or a decorative or hidden bracket. Overhanging ends, on the other hand, need no extra support. In this direction, the wood countertop is inherently strong.

- **Site modifications need to be sealed**

If you scribe the countertop to fit tightly to a wall or cabinet or make a penetration for a faucet or sink on site, be sure to reapply finish to the cut area.

- **Keep water from getting trapped**

Standing water will eventually erode even the most durable materials. No matter what type of sink or faucet you install, make sure to apply a heavy bead of caulk between the sink or faucet and countertop.



I started making wood tops as an amateur woodworker, and the biggest mistake I made back then was not sufficiently planning for handling and working large boards and slabs. Today, I've tweaked my production shop to the nth degree. I have plenty of handling clearance, but I keep machines close enough to make it easy to move materials around. You might not have the luxury of a space as large as mine, but with careful planning before you begin to build, you can spare yourself a lot of unnecessary frustration.

The first steps require milling long boards with a planer and jointer and ripping them on a tablesaw or with a circular saw and straightedge. Here, dust control is an important consideration. For the remainder of the work, you need a well-lit open space, preferably a workbench, though you can glue up a top on the floor. The space should be easy to keep clean, within reach of an outlet, and easy to maneuver around from all sides.

Once you begin the glue-up, you have to work quickly. You only have about eight

minutes, so take the time to get the clamps spaced out and ready to use, and have glue bottles, brushes, and cleanup supplies close at hand. It's also a good idea to have someone available to help because a lot needs to happen during those eight minutes.

When the clamps come off, you'll have to manage the large, heavy blank. Consider making a simple cart with heavy-duty casters. You also should make screw blocks (3/4-in. plywood cut into 2-in. by 3-in. pieces, with a 1 1/8-in. drywall screw flush-set through one side). The screw blocks are used to raise the top above the worksurface to allow air to circulate, which helps to prevent the top from warping and cupping, and also to make it easier to apply finish to the edges.

Easily renewable finishes promise a long-lasting countertop

Like choosing a wood species and construction technique, I choose the most appropriate finish based on how the top will be used. For tough, hard, built-up protection, I use

Waterlox, which combines the amber tone of tung oil with hardeners to create a film on the surface of the counter. For tops that will be used for food preparation, I use a mix of tung oil and citrus solvent, which is food safe. This penetrating finish cures in the grain but doesn't build up on the surface. For smaller end-grain chopping blocks, regular applications of mineral oil are sufficient. These finishes are easy to repair and renew, which is the key to a long-lasting wood countertop, and both are water resistant.

Whichever finish I'm using, I work in a finishing room isolated from the dust and debris of the fabrication shop. If you don't have this luxury, make sure to clean the work area before finishing. And even though these finishes are safe, make sure you have adequate ventilation and wear gloves. □

Dan Vos owns DeVos Custom Woodworking (www.devoswoodworking.com) in Dripping Springs, Texas. Photos by Brian Pontolillo, except where noted.