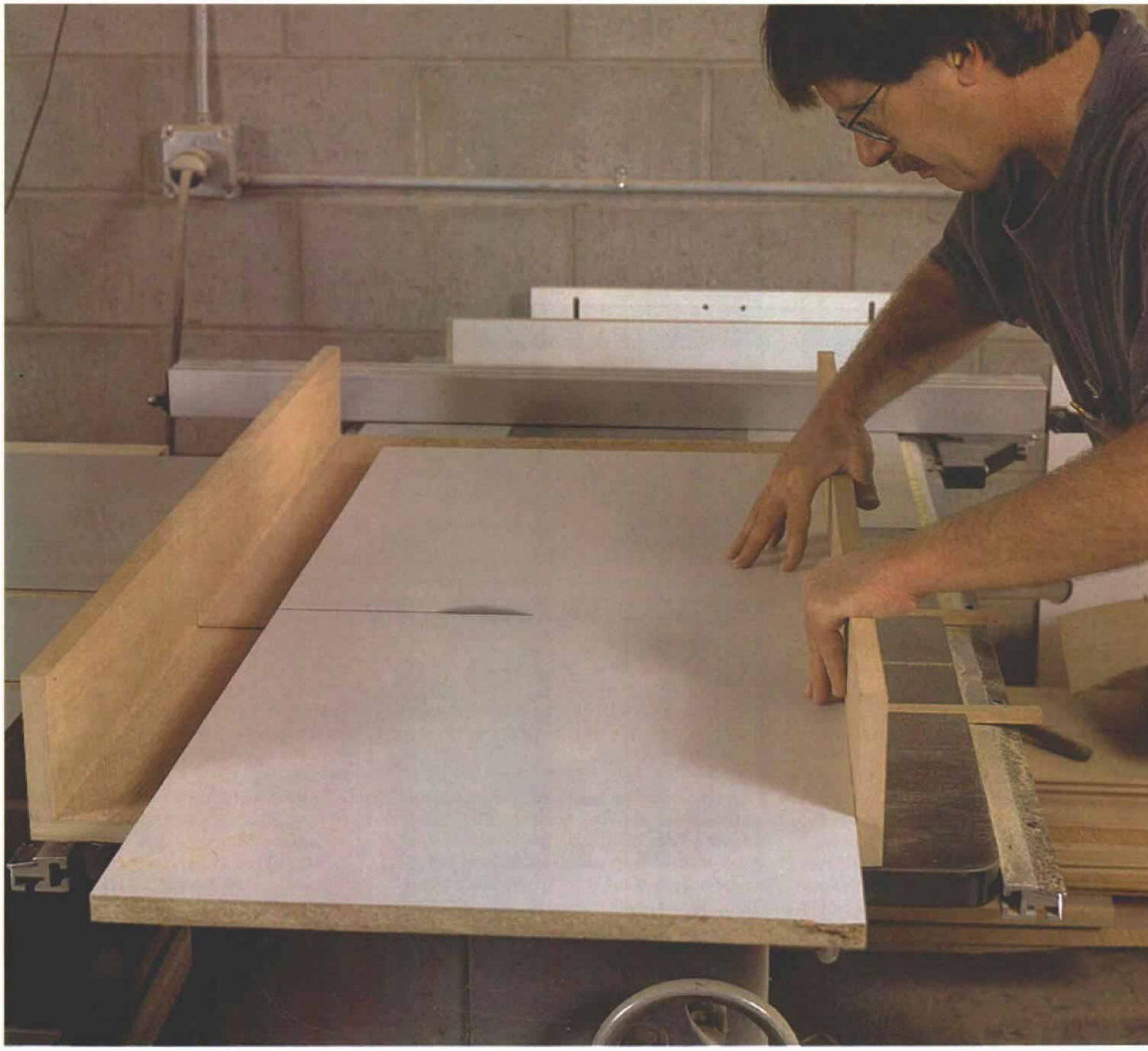
Working With Melamine

Laminate-covered substrate produces a bright, clean and washable cabinet at a lower cost than hardwood panels

by Rex A. Alexander



A crosscut box protects the finish and makes clean angles. Squaring off panels of melamine is clean and fast with a crosscut box. If a panel is too large, mark it with a square and carefully trim the edge on the table saw.

A few years ago, I remember, I was admiring the cabinets in my sister's new kitchen until I opened a cabinet door and saw melamine. My stomach turned. In those days—before I knew better—I tried to persuade any customer who specified melamine to use something else, usually a hardwood plywood with filled grain and catalyzed-lacquer finish.

Then one day a customer on a tight budget brought me his kitchen plans. The upper cabinetry would be open birch shelving; the base units would house drawers behind doors. With this design, I discovered I could use melamine on the interiors and shave $2,000 off the total kitchen price—in part because melamine is cheaper than hardwood plywood ($29 per sheet vs. $50 per sheet) but also because the finishing is already done, which cuts out a great deal of expensive sanding, and brushing or spraying.

Satisfying a customer with beautiful hardwood exteriors is one thing, but when I can add the surprise of a clean, washable cabinet interior at a lower cost than hardwood plywood or high-pressure laminate (HPL), my custom cabinetry becomes hard to resist. I sold the job and have used decorative laminated panels almost exclusively for cabinet interiors since.

What's exciting about this product for me as a contractor and cabinetmaker is that the decorative surface of this material is similar in characteristics and advantages to HPL, but I don't have to do any laminating. What's more, delamination of thermofused melamine is virtually nonexistent because there's no layer of adhesive to dry or deteriorate over time. Also, decorative panels are available in wood grains and in almost every color and texture that can be found on a string of HPL chip samples. Panels are also manufactured in thicknesses from ¼ in. to 1¼ in. and in sizes from 4 ft. to 5 ft. wide and 6 ft. to 18 ft. long.

Melamine's variety of colors, patterns and textures makes it useful for furniture and cabinetry in the home (photo right), office and even in some commercial applications. And when I think back to my sister's kitchen cabinets, I realize how confused I was about decorative laminated panels and the generic lumberyard term "melamine" that is used for them (sidebar p. 73).

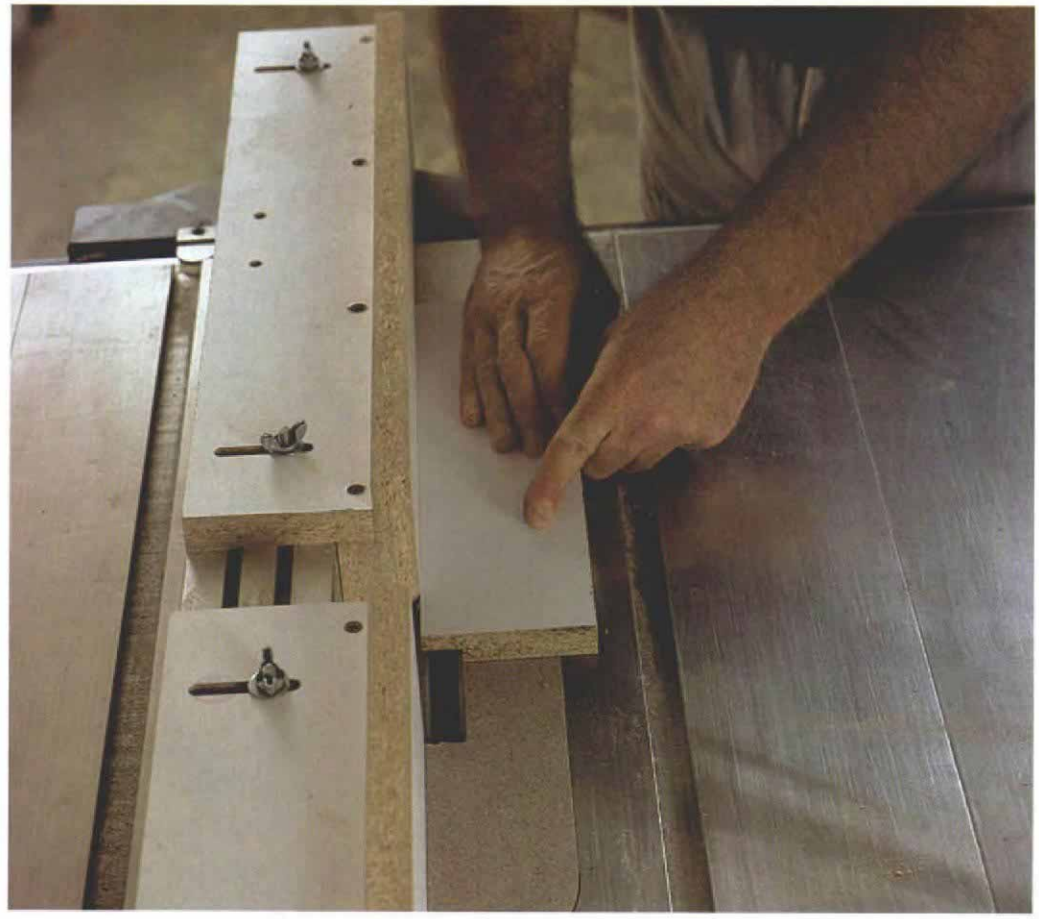
I consider thermofused melamine the best of the decorative laminated panels. It has a tough surface, good wear resistance and excellent water resistance. It also won't peel away from the substrate. Thermofusing gives it that hard, durable surface. And although some specialized techniques are needed to work with the material, it can be used in most home shops.

A durable, easy-to-clean surface. Melamine-laminated panels are easy to make into furniture or cabinets, such as this bathroom cabinet of melamine with a plastic-laminate counter surface. Melamine doesn't need finishing and can be machined with tools found in the standard home shop.

I was skeptical about melamine, so I did some tests—When I first started using melamine, I studied a brochure from a manufacturer that showed the different colors of melamine and listed some of the characteristics of the material. The brochure also included the performance standard for thermofused, or thermoset, decorative panels, but I was skeptical and performed a couple of simple tests. First, I placed a soaked washcloth on a thermofused surface. The next day, I was pleasantly surprised to find the washcloth dry, the water evaporated and the overlaid surface undamaged.

My next concern was about fasteners. I'd used particleboard before and wasn't pleased with the way it held a screw. Because the melamine I used had a particleboard substrate, I was afraid that if someone accidentally ran into an open door, the hinge might pop off. I consider the European cup hinge to be one of the best on the market, so I installed a set of 120° hinges to a door and side panel of thermofused melamine. After a lot of abuse that included running into the door and actually bending the hinge, I was pleased to find that the hinge's base plate hadn't budged. The overlaid surface actually strengthened the substrate.

Building upper cabinetry of ¾-in. thermofused melamine for the sides, top and bottom, and a ¼-in. foil-covered panel for the back posed another worrisome situation. Glue won't stick to melamine. I usually glue and staple a ¼-in. back to a cabinet and then glue two ⅜-in. by 3-in. strips



Cutting a rabbet exposes a gluable surface. The author cuts a dado on the top and bottom edges of side panels and on bottom and side edges of drawer fronts so that he can glue the exposed substrate.

of hardwood or plywood over the back at the top and bottom. These backs add support to the screws that hold the cabinet to the wall. However, the foil surface on the ¼-in. back wouldn't hold glue so I decided to test the strength of the foil back by stapling it every 2 in. to a piece of ¾-in. thermofused melamine, both with particleboard substrates.

I fastened a small hardwood strip to the foil back and clamped the melamine to the workbench with the foil and the hardwood projecting off at a right angle. Then I roped a 60-lb. toolbox to the piece and left for the weekend. Monday morning, the toolbox still hung from the piece, and the ¼-in. back and screw block were firmly in place. For an ultimate test, I added my 170 lb. to the mix by standing on the toolbox. The joint passed the test.

This brittle material is best sawn using a specialty blade—Thermofused melamine has a hard, brittle surface, so before cutting it, I make a zero-clearance throat for my table saw. I usually have sink cut-outs left over from a laminate-countertop job and cut one to fit the throat of my table saw. With the blade lowered, I slowly raise the blade through the throat ⅝ in. above the panel.

I've found that a Freud LU85 80-tooth precision cutoff blade or an LU98 80-tooth chip-free laminate blade (Freud, 218 Feld Ave., High Point, N. C. 27263; 800472-7307) works best. The LU98-80 is made especially for two-sided material. I feed the panel through the saw at about the same speed I'd rip hardwood. Both sides will have minimal chipping and usually none at all. A 4x8 sheet of ¾-in. melamine weighs close to 100 lb., so I get help maneuvering these panels around. I apply Johnson's Paste Wax to the table-saw table and outfeed table to minimize scratching.

To get clean right-angle cuts, I trim the panel pieces using a crosscut box on my table saw (photo p. 68). This box, which is simple to make, rides in the miter-gauge slots of the table saw. Not only is it safer to make crosscuts this way, but it also protects the melamine from scratches.

A router works like a joiner to clean up chipped edges—As I mentioned earlier, glue won't stick to the surface of melamine. So I join my cabinets with dadoes and rabbets, which expose the particleboard substrate and allow me to glue the joints. First, I make another zero-clearance saw throat for my table saw, this time for use with a carbide-tipped dado blade. I cut a ⅜-in. deep by ¾-in. wide rabbet into the top and bottom edge of each side panel of base cabinets (photo above) and a full dado for the bottoms of upper cabinets. This cut creates a recess under the upper cabinets for housing the undercabinet lighting I always recommend.

I assemble base cabinets after a careful check of all exposed edges for chips. Outside edges usually will be covered by another cabinet or by applied end panels, so chips there won't be seen. If I decide to use a cabinet side for an exposed end panel, I use a homemade router fixture that works as a joiner to clean any chipped edges (drawings and photo, facing page).

To make the fixture, I mount a 3-hp router under the extension table attached to my table saw. Using pieces of ¾-in. thermofused melamine, I build a pair of L-shaped brackets that fit over my Excalibur precision table-saw fence (Excalibur Machine Tool Co., 210 8th St. S., Lewiston, N. Y. 14092; 416-291-8190). Carriage bolts fit into slots that are machined into the top of the fence, and the L-shaped brackets fit over these bolts, with slots cut into the brackets to make them adjustable. Washers and wing nuts hold brackets in place and allow fence adjustments like the infeed and outfeed tables on a joiner.

A router delivers a constant speed of 8,000 rpm to 22,000 rpm, so you get a clean cut on figured wood, which makes this setup perfect for edging melamine. I use my router/joiner for cleaning up an occasional chip if the end panel will be seen or when I use melamine for doors and drawer fronts. Overcutting end panels, doors and drawer fronts 1/32 in. on each edge and then cleaning them up using this technique guarantees a perfect edge. I usually use a ¾-in. carbide-tipped straight bit in the router.

An electric iron welds the edge tape on melamine—Covering raw, exposed edges on this laminate is a quick, easy task that I do be-

fore assembling the pieces. I use either a preglued polymer tape, which makes an edge that matches the melamine, or preglued raw hardwood tape (both available from Direct Supply, 1055 36th St. S.E., Grand Rapids, Mich. 49508; 616-2454415). These tapes are applied with a regular household iron.

Setting the iron dial indicator between permanent press and wool, I keep the iron steadily moving so that the tape doesn't scorch. Polymer tape is easy to scorch, and I often drape a cotton cloth over the edge to prevent that from happening. After ironing on the tape, I quickly follow with a vigorous rolling with a J-roller (available from most woodworking suppliers that sell veneer) (photo top left, p. 72).

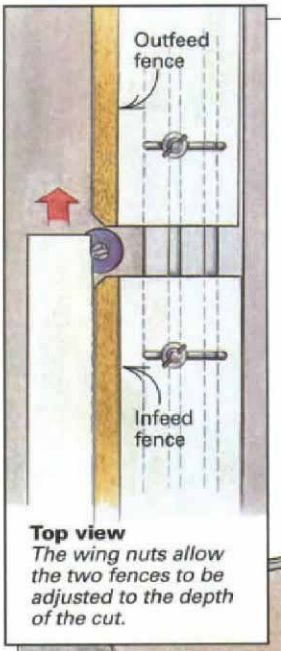
To ensure full coverage, the tape is wider than it needs to be, but trimming the excess is easy. I use a standard utility knife and then an edge-trimming knife (available from Trendlines, 135 American Legion Highway, Revere, Mass. 02151; 800-767-9999) (photo top right, p. 72). I suppose you could trim the edges with a block plane, but these edge-trimming knives are cheap and really do the job right.

I take extra care when filing or sanding the preglued edge because it's easy to go through to the substrate. If I discover small, serrated chips after I've ironed on the edge, I file or sand these even, down to the substrate. If a hardwood tape is used, these wood lines usually disappear when a finish is applied. They stick out like a sore thumb if a polymer tape is used, but a colored lacquer carefully applied to this line will cover the problem.

A brad-point bit works best for drilling melamine—Regardless of whether I'm using drawers or shelf pullouts, I next install all epoxy-coated drawer glides and hinge base plates. Installing all of the hardware before the cabinets are assembled sure beats wiggling around inside a base unit and fumbling with the drill, glide and screws. It's necessary to drill a pilot hole to accept a #6 flat-head wood screw, or the screw can pull loose. Without a pilot hole in thermofused melamine, the screw would wander. Also, screwing into the substrate without first drilling a pilot hole pulls out the material, leaving a crater.

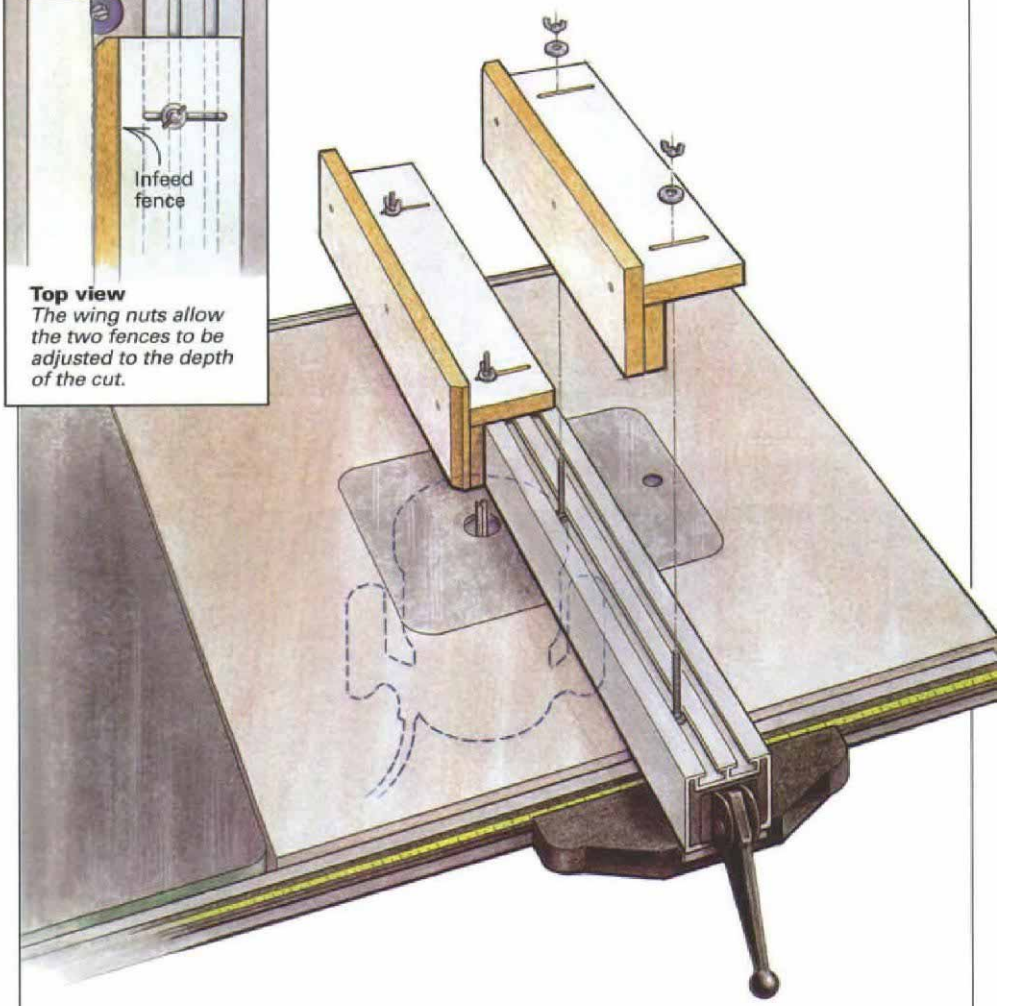
I use a hole-drilling template (available from most woodworking catalogs) and a high-speed steel brad-point bit to drill holes for the shelf supports. The brad-point bit I use is made from heat-resistant, high-speed tool steel and features specially ground, extra-long spurs (available from Woodcraft Supply, 210 Wood County Industrial Park, P. O. Box 1686, Parkersburg, W. Va. 26102-1686; 800-5354482). This bit actually scores the melamine before drilling into the substrate, which leaves a clean, chip-free surface for mounting a shelf support.

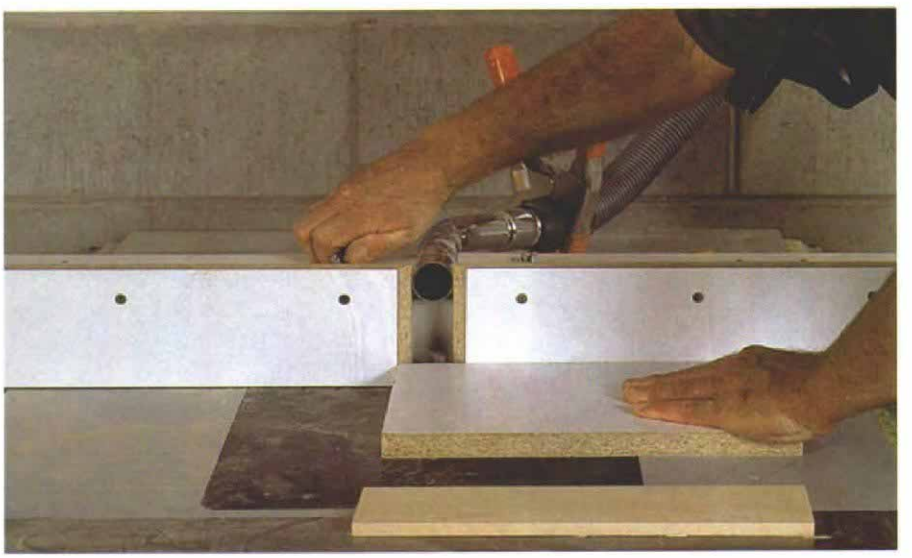
I have seen, time and time again, melamine interiors with adjustable shelves where the shelf clips work their way partially out of the hole and chip or disfigure the hole. With plywood cabinets I use a Knape and Vogt 346 steel shelf support with a ¼-in. steel pin that fits into the hole. I like this support because when the shelf is registered firmly against it, there's no way it can work



Top view
The wing nuts allow the two fences to be adjusted to the depth of the cut.

Fixtures turn a router into a joiner
A router with a carbide-tipped straight bit mounted to the extension table on a table saw works like a joiner with these two fixtures attached to the fence. The outfeed and infeed fences are offset the depth of the cut. Although the author uses an Excalibur fence, the rig can be modified to fit most fences.





Routing cleans up exposed edges. If an edge is exposed, this router and fence allow any chipped edges to be removed cleanly.

Drawings: Dan Thornton

Iron-on edge tape must be rolled, then trimmed. Raw edges of melamine are easily and quickly covered (photo right) using a roll of polymer tape and a household electric iron to melt the adhesive backing to the edge of the panel. Before the edge tape cools, it is thoroughly rolled with a J-roller and then trimmed (photo far right) with an edge-trimming knife that is made for shaving away excess laminate tape.

Rabbeted edges are glued and clamped. Glue doesn't stick to laminate, so the author rabbets, glues and clamps the pieces to get a tight, durable fit.

itself out. But these supports only come in metal finishes, and with melamine I want something white to match the interior. I used a Hafele white-plastic shelf support (Hafele America Co., 309 Cheyenne Drive, P. O. Box 4000, Archdale, N. C. 27263; 800-334-1873) with a grooved plug and spring clip. These supports fit snugly in the hole, and the spring clip locks the shelf in place.

Gluing and clamping hold pieces when screws won't do—With Titebond glue applied to each edge of the raw joints, I either pin, staple or drill a pilot hole and use drywall screws to hold my cabinets together. I have never had a problem with any of these fasteners. Occasionally, if I have a cabinet in which extra-heavy kitchen supplies will be stored or if I prefer not to use fasteners because of their exposed ends, I clamp the joint to ensure that there is a good bond (photo left).

Once the top, bottom and sides are together, I square the cabinet and attach a ¼-in. foil back to it by stapling it every 2 in., which is quicker and cleaner than rabbeting the cabinet to receive the back. I predrill holes every 3 in. along the top edge of the base units and install 2-in. drywall screws. This process reinforces the area where the cabinet is screwed to the wall. I use foils for backs because they cost less and work fine for low-use vertical surfaces. Handling foils can be tricky because sliding one panel on top of another could result in scratches if there's a foreign body between the panels. Decorative laminated panels should be given the same care as any decorative surface.

After the back is in place, I apply ⅜-in. by 3-in. hardwood or plywood strips along the top and bottom edges at the back of the upper units, gluing and screwing these strips in place every 3 in. after the backs are stapled every 2 in. This step adds more support to the installed cabinet. I've also used ½-in. melamine glued and screwed to

Holes in the laminate can be repaired. Screws can sometimes pull out of the material and leave a gaping hole like this one. It can be filled with a mixture of 5-min. epoxy and paint.

the backs of the upper units. However, the edges of this back have to be rabbeted first because glue won't stick to melamine.

Sometimes when I build bookshelves or when I think an upper unit needs more support, I install ¾-in. by 2-in. melamine strips on the inside top and under the bottom in the cavity I leave for undercabinet lighting. These strips can be screwed from the sides, top or bottom.

Dimples, scratches and nicks can be filled in or smoothed away—Final cleanup of a melamine cabinet is easily done with a mild, nonabrasive, all-purpose cleaner and a soft cotton cloth. Before using a cleaner, though, I first use compressed air or a vacuum brush to remove sawdust, metal filings or other particles from the cabinet's surface. Harsh chemicals should not be used on melamine.

Small scratches and minor blemishes usually show up at this point. These flaws usually can be treated with a light spray wax, which fills in scratches like car wax on a car. I've also used a maroon Scotch-Brite pad or 0000 steel wool for removing tougher scrapes. You should take care not to rub too hard, which leaves a dull surface.

Once in a while, a tool or some other object will accidentally dimple the surface. Using the wrong-size drill for a pilot hole will sometimes cause the screw to pull the material out, leaving an unsightly scar (photo above). Both situations can be neatly repaired using the appropriate universal color (which can be bought at any paint store or hardware store that sells paint) mixed with a 5-min. epoxy. After the epoxy cures, I take a very sharp cabinetmaker's chisel and pare the excess off level with the surface. Small chips on the edges can be removed this way, too. □

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Clearing up the confusion about decorative laminated panels

Melamine is a resin used to saturate special decorative paper, which is either laminated by hot-melt adhesive or thermofused to a substrate. Once cured, these processes produce a surface thinner than but similar to the plastic laminate used for kitchen countertops (called high-pressure laminate, or HPL).

Your local lumber dealer may use the term melamine to describe micropaper, foils or thermofused melamine (photo right). Each contains melamine resin in varying amounts; all are decorative laminated panels. A decorative laminated panel is developed when a substrate of particleboard, medium; density fiberboard (MDF) or plywood is laminated with a protective or decorative surface. How the surface is made and laminated to the panel distinguishes one from another.

Micropaper, or "rice papers," are low basis-weight papers that are top-coated with acrylic, polyester or other resins to improve strength. Basis weight is measured in grains per square meter before top coating (micropapers weigh 23g to 30g). The more resin added, the greater strength and wear characteristics. The paper is laminated to the substrate with hot glue and heat-cured in a drying oven.

Micropapers are available only in wood grains, are limited in their ability to resist water, "fuzz" when routed and aren't thick enough to cover substrate imperfections, so their uses are limited. However, micropaper is perfect for vertical surfaces, exhibits and displays, furniture and some cabinet interiors. Its low cost and wood-grain reproductions are inviting features.

A step above micropaper are foils, cellulose-paper overlays that have basis weights of 60g to 80g, generally are fully saturated with a resin system or urea formaldehyde, and cured using heat or light. Because the resin in the paper does not form an integral bond with the substrate, foils can't be considered low-pressure laminates. Resin-saturated foils have good wear characteristics, flexibility, a better ability to cover substrate imperfections, and good print and wood-grain reproductions. They're also available in solid colors. I use foils for the interior backs of cabinetry and occasionally for sides, tops and bottoms. Because foils do not repel water completely, I don't recommend them for sink-base cabinetry, bathroom vanities or high-wear horizontal applications.

Heavier thermofused melamine is available in a variety of basis-weight papers, ranging from 80g to 140g. It's made in a two-stage process that begins by submerging this special decorative paper in a clear, sticky liquid resin of melamine or polyester. It's flexed and bent to open the fibers and allow thorough resin saturation, then drawn through a dryer.

During the second stage, the resin-saturated paper is laid over particleboard, MDF or plywood and fed into a press where it's subjected to high temperature and pressure (around 350 psi, as opposed to HPL, which is pressed up to 1,400 psi), which permanently fuses the overlay to the substrate. Heat and pressure transform the resin back into a liquid so that it penetrates the fibers of the substrate. Once thermofusing is completed, the chemical change results in a hard, durable surface that won't melt.

Thermofused melamine can be found in most local lumberyards. If you have difficulty finding the product, the American Laminators Association (P. O. Box 2209, Seattle, Wash. 98111-2209; 206-382-1671) will direct you to the closest manufacturer. I store sheets of melamine flat in a clean, dry environment of normal temperature and humidity.—*R. A. A.*

Get a variety of finishes with decorative laminate. Decorative laminate, better known as melamine, is available in a variety of types, thicknesses and colors.