

Tiling a Kitchen Counter

Start with a sturdy wood underlayment, and plan the layout to get cut tiles in the back

BY DENNIS HOURANY

It took two days to complete my first shower, including the time I spent at the library reading up on how to do it. That was 26 years ago. Since then, I've laid hundreds of tile floors and counters. My San Francisco-area tile contracting company often works in housing developments where a journeyman tilesetter with only one helper can set a tile counter in a single day. Even if you don't set as much tile as we do, installing a kitchen counter should be a straightforward and relatively speedy process.

Tile can be set on either a mortar bed or cement board (photos right). Around here, counters are almost always set on a mortar bed $\frac{3}{4}$ in. thick. I think that produces the best tile job—it's strong, durable and easily leveled. Whichever substrate you choose, the process of laying out the counter and installing the tile is identical.

Before you put down either cement board or a mortar bed, make sure you have a solid wood base on top of the cabinets. I use a $\frac{3}{4}$ -in. exterior-grade plywood (although you can also use 1x6 boards with $\frac{1}{4}$ -in. gaps between them). If you use plywood, it's a good

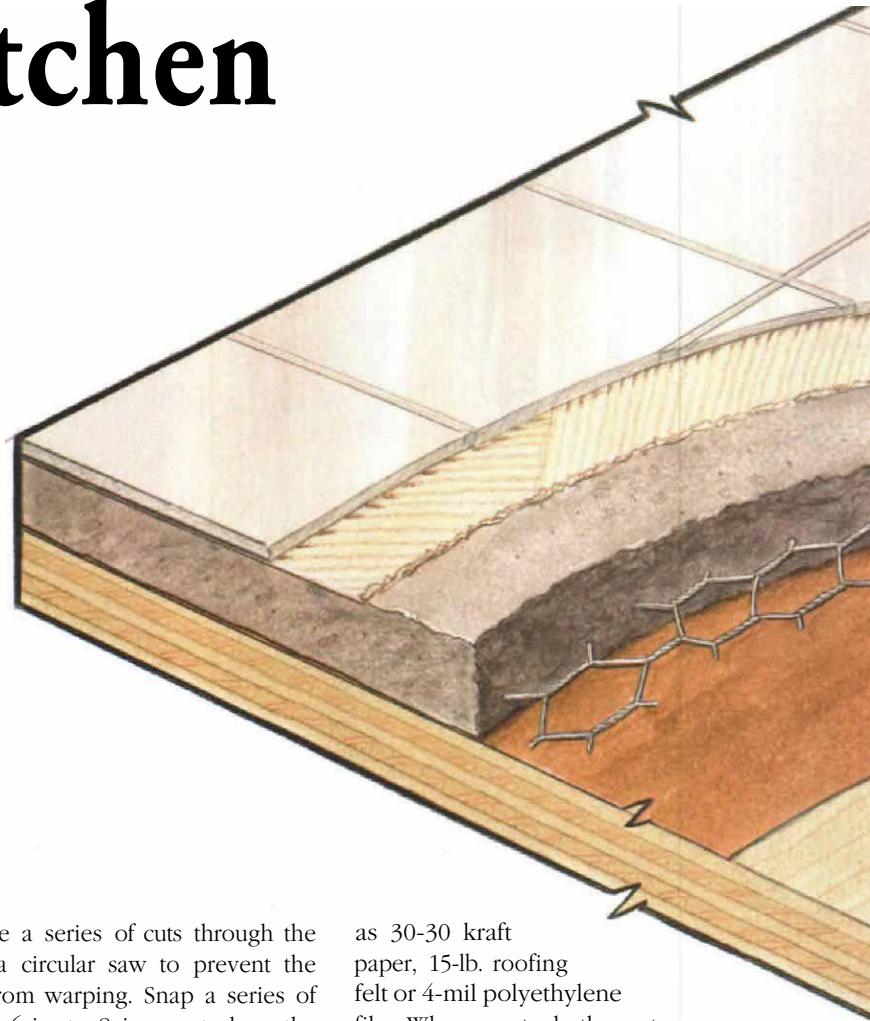
idea to make a series of cuts through the sheet with a circular saw to prevent the rough top from warping. Snap a series of parallel lines 6 in. to 8 in. apart along the length of the plywood, then make 6-in. to 8-in. long cuts along the lines, leaving 6 in. to 8 in. between them. Where overhangs are larger than about 8 in., you must provide adequate support—with corbels, for example—to prevent movement in the plywood that would crack the tile or grout.

Protect cabinets from moisture

Mortar is wet stuff, so we install a moisture barrier over the rough top of the cabinet. You may use an asphalt-impregnated paper such

as 30-30 kraft paper, 15-lb. roofing felt or 4-mil polyethylene film. When we staple the material to the rough top, we let it hang all the way to the floor to protect the cabinets as we install tile. Excess paper can be trimmed away later. Paper should cover all rough-top edges, including those around the sink cutout and any other openings. Seams should be lapped at least 2 in. If you are installing backsplash tiles over a mortar bed, extend the paper up the wall beyond where the tile will end to protect the wall. Or use masking tape to protect untiled areas of the wall above the backsplash.

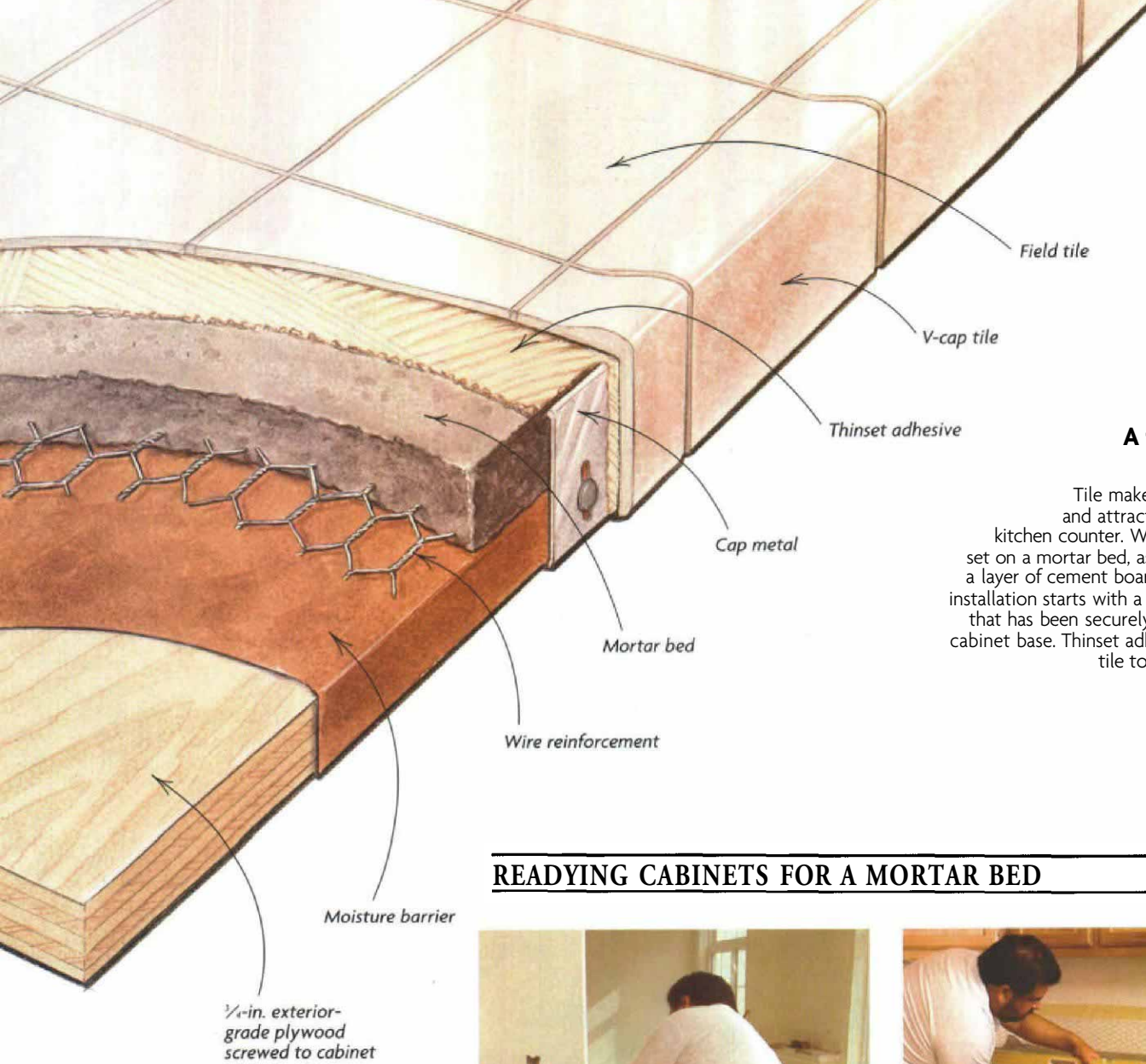
A mortar bed should be reinforced with some kind of metal lath. The kind approved by the Tile Council of America is a galvanized, expanded type that should weigh at least $2\frac{1}{2}$ lb. per sq. yd. We use 1-in., 20-ga. galvanized stucco netting or chicken wire. I like to run the wire on the deck and up the wall to within $\frac{1}{2}$ in. of where the tile will stop, provided the backsplash tile does not extend up the wall more than roughly 8 in. If your plan is to carry the tile all the way to the bottom of



DON'T GET HUNG UP ON THE SUBSTRATE

Dennis Hourany starts a tiled kitchen counter with a mortar bed [below left], but you don't have to. Cement board (below right) is another choice. For more on cement board, see the sidebar on p. 106.





A tile counter built to last

Tile makes a long-wearing and attractive surface for a kitchen counter. Whether the tile is set on a mortar bed, as it is here, or on a layer of cement board, a trouble-free installation starts with a wood rough top that has been securely fastened to the cabinet base. Thinset adhesive bonds the tile to the mortar bed.

3/4-in. exterior-grade plywood screwed to cabinet

READYING CABINETS FOR A MORTAR BED



Level the metal. Once the cap metal has been leveled, Grijalva drives the nails home. By keeping the top edge of the cap metal 3/4 in. above the top, he knows the counter will be thick enough at any point.



Getting the kinks out. To avoid kinks in the cap metal where it goes around a curve in the counter's edge, make a series of cuts in the top edge at the bend with a pair of aviation snips.

Cap metal supports the mortar. Elite Tile's Ernie Grijalva loosely nails cap metal to the edge of a counter. Moisture-resistant asphalt-impregnated kraft paper protects the plywood.

A second nail for insurance. Slots in the cap metal allow it to be adjusted up and down for level. Once leveled, the cap metal is anchored with a second nail driven right through the metal.

MIX TWO KINDS OF MORTAR



Deck mud is a dry mix. Add just enough water so that the mortar holds its shape when it is compressed into a ball.



the upper cabinets, then cut the wire at the juncture between deck and backsplash and install a separate piece of wire on the wall.

We staple the wire every 4 in. to 6 in. with staples at least $\frac{3}{8}$ in. long. After the wire comes cap metal, which supports the perimeter of the mortar bed and is used as a guide to screed the surface (center photo p. 101). Cap metal comes in a variety of shapes and sizes. We typically finish counter edges with a piece of tile called V-cap, which forms a 90° tile corner, so our cap metal is usually the J-cap variety. You can get cap metal at tile-supply houses or at some of the super hardware stores.

One big advantage of a mortar bed is that you can provide a level surface for tile even if the cabinets are not quite level—something that's harder to do when you're using cement board. So make sure the top edge of the cap metal is level before you are snugging up the nails and fixing the cap in place (photos right, p. 101).

Two kinds of mortar make a bed that can be tiled the same day

We use two types of mortar in a counter: fat mud and deck mud. Because it contains lime, fat mud is sticky enough to adhere to vertical surfaces. For most horizontal surfaces, we use deck mud, a much drier mix, not as susceptible to shrinking or cracking.

Fat mud (no, I'm not sure how it got its name) is a mixture of 5 parts plaster sand, 1 part portland cement and 1 part type-S or comparable lime. These three ingredients are mixed thoroughly before clean water is added. Consistency is crucial. If the mortar is too wet, it won't stay on the trowel. If it's too dry, it won't stick to the wall. We mix a batch of this mortar first, but before applying any of it, we install wooden screed strips on vertical surfaces to determine the depth of the mud bed. Make the strips $\frac{1}{2}$ in. thick and nail them right to the wall over the wire. We use $1\frac{1}{2}$ -in. drywall nails, which are easy to pull out later; avoid nailing the screed to a stud. Screed strips should be placed near edges and at intervals so that you will be able to span the distance between them with a straightedge.

We work fat mud firmly into the chicken wire on all vertical surfaces. This is called a scratch coat, and it's essential for getting the rest of the mortar bed to stay put. We bank fat mud against all the cap metal along outside edges, from the top of the metal down to the deck at about a 45° angle. Finally, fat mud is used around all deck penetrations, such as the sink cutout, because it holds its



Fat mud for edges and vertical surfaces. Grijalva's helper, Martin Arellano, builds a layer of fat mud along the edge of the sink cutout. The limed mortar sticks to surfaces and holds its shape.



With both types of mortar in place, Grijalva uses an aluminum straightedge to screed the countertop. One end rides on a piece of cap metal that has been leveled and tamped in the mortar.

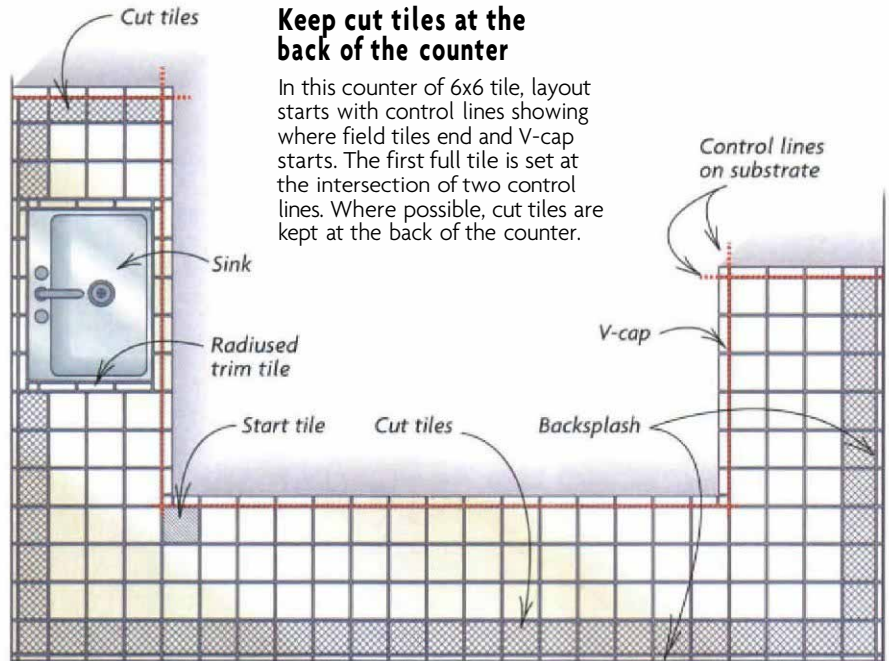
TILE-LAYOUT BASICS



Ready for layout. With the mortar bed tamped and leveled, a piece of V-cap is used to set layout lines. Grijalva uses a utility knife to mark the inside edge.



Snap lines around the perimeter. After marking all counter edges with the V-cap, Grijalva and his helper snap chalklines. These control lines are essential for setting straight courses of field tile.



Keep cut tiles at the back of the counter

In this counter of 6x6 tile, layout starts with control lines showing where field tiles end and V-cap starts. The first full tile is set at the intersection of two control lines. Where possible, cut tiles are kept at the back of the counter.



Keep grout lines straight. When turning a corner, a framing square prevents wandering grout lines. If tile is being set over a mortar bed before it is cured, be careful not to mar the surface.



A straightedge makes diagonal cuts easier. Grijalva lays dry tile on the mortar bed, then marks the tile with a straightedge. After the tiles have been cut, thin-set and tile are brought to the layout line.

shape there better than deck mud (photo bottom left, facing page).

After troweling a generous layer of fat mud on the backsplash area, we use a length of straight aluminum or wood to screed the surface, then fill any low spots and screed again. At this point, we remove the screed strips that were nailed to the wall and gently fill in the voids with mortar. Any excess may be cut away once the mortar has firmed up.

Deck mud is used to fill in the remainder of the countertop. It consists of 5 parts sand and 1 part portland cement. Mix these ingredients thoroughly before adding water—and remember to keep the mix dry (top photos facing page). It should not ooze through

your fingers. Trowel and pack down the deck mud over the deck to an elevation slightly higher than the cap metal.

We do not use wooden screeds on the countertop. Instead, we use a level to create several flat spots and then tamp in lengths of cap metal to guide the aluminum straightedge. Locations for these screed pads are somewhat strategic. They need to be placed at all turns in the counter as well as at intermediate locations to allow the straightedge to cover the entire countertop. The cap metal at the edges of the counter also acts as a screed. Once you have spread enough mortar on the top, use a straightedge to screed off the excess (photo bottom right, facing page),

fill the low spots and screed again, then remove the cap-metal pieces used as screed pads. A wooden trowel will not bring water to the surface as a metal tool will, although one last pass with a flat-edged metal trowel leaves a smoother finish.

A few fundamentals help to make tile layout less complicated

Laying out individual tiles so that the job is aesthetically pleasing as a whole is no easy feat, especially in those kitchens where counters wrap around corners or make angled jogs. It is virtually a given that tiles will have to be cut somewhere. The trick is in making the cuts where they are least obvious and

INSIDE ANGLES CALL FOR MITERED EDGE PIECES



Use scrap to find the inside corner. Mitering the two pieces of V-cap meeting in this 45° corner will make the neatest job. To start, Grijalva uses two offcuts to establish the corner, then measures for the first mitered piece of V-cap.



Eye the cut on a tile saw. By aligning one pencil mark on the slot in the saw's sliding table and the other mark with the blade, you can make an accurate miter cut on a tile saw.



Smooth edges for a seamless job. For all exposed edges that must be cut, a tile saw followed by a pumice stone gives a much smoother finish than a snap cutter. Use a snap cutter where tile edges will be buried.



One down, one to go. This piece of mitered V-cap fits the space perfectly, but it's safer to dry-fit both pieces before applying any mastic.



Now fit the second piece. With the first mitered section in place, Grijalva can mark and cut the second piece of V-cap. The result is a neat, well-fitting corner.

making the tile pattern as a whole pleasing to the eye.

A few fundamentals will help. First, try to lay out the counter so that no tile you set is less than half its original size. Second, never break, or interrupt, grout lines unless you are using two different-size tiles or unless you can dramatically improve the layout by doing so. Grout lines generally should be continuous as they move from the countertop to the backsplash or up other vertical surfaces. Although it's a matter of personal preference, I look at countertop penetrations such as a cooktop or sink as unavoidable interruptions in the tile job as a whole—not something the tile layout should be maneuvered around.

We begin setting tiles immediately after the mortar bed has been leveled and tamped. But first, we mark out reference lines along the edges of the counter to indicate where the V-cap starts (photos left, p. 103). I start with full tiles on as many of the leading or open edges of the counter as possible (drawing p. 103). Open edges are those that do not abut a restraining edge, such as a wall or a raised counter. Cut tiles should go to the back. In many of the kitchens we do, L- and U-shaped counters are common, so we are careful to start the first full tile as shown in the drawing. This layout ensures the greatest number of full-field tiles and the fewest disruptions in the overall pattern.

It would be impossible to cover all the layout problems you may have to wrestle with. For this reason, consider using a story pole, which you can make yourself. Lay tiles in a row on the floor with the desired grout spacing. Place a length of wood alongside these tiles, and mark it where tiles fall. You can place the story pole at any point on the area to be tiled and see right away what your cuts will look like. If you're tiling for someone other than yourself, it may be best to involve him or her in layout decisions, and a story pole can be a big help in explaining the options. You also can simply lay out tiles to test a pattern, but a story pole is faster. You may find that starting the tile in a different spot yields the best overall countertop pattern with the fewest awkward cuts.

Sinks can be handled in several ways. One option is to set a self-rimming sink on top of the field tile once the counter is done. For a neater appearance, set the sink in the mortar bed before field tile is laid, then use trim tiles with a radiused edge as a border.

Field tiles are set in an even layer of thinset adhesive

The adhesive used to bond tile to either a mortar bed or cement board is called dry-set

mortar or thinset. We use basic thinset on ceramic and other pervious tiles. Latex- or polymer-modified thinset is a good choice for impervious tile such as porcelain. Instructions printed on the bag will tell you which size notched trowel to use and tell you how to apply the thinset. It is crucial to follow the instructions exactly. You should mix only enough thinset that can be tiled over within 15 minutes. Don't let it skim over.

The only spot where we don't use thinset is on the edges where V-cap tiles are installed. We have seen these tiles crack when thinset is used, possibly because the thinset makes a rigid bond that's tough on the 90° edge of the V-cap if there's any flex in the rough top. We now use premixed tile mastic for these edge pieces. Mastic stays more pliable than thinset, and the edge tiles don't crack.

Thinset should not ooze up more than two-thirds of the way into the grout joint. If that seems to be happening, you may be using a trowel with too deep a notch, or you may not be applying a consistent amount of thinset. When you get too much thinset in a joint, simply rake it out.

We start with a full tile at the intersection of control lines on the countertop. Many tiles are produced with spacers, called lugs, on the edges. You can set the tiles together or space them farther apart, but never wider than the thickness of the tile so that the grout won't crack. To help keep the joints consistent if the spacing is greater than the lugs provide, you can use plastic spacers available where you buy tile. But don't count on spacers to keep the lines straight—that is what control lines and straightedges are for. A framing square helps to keep tiles aligned when turning corners (photo center, p. 103), and aluminum angle stock is invaluable for staying on track—we keep several different lengths on all our jobs. A good alternative is a straight piece of wood.

Some counter shapes require a number of tiles to be cut on a diagonal at the counter edge (photo right, p. 103). In these situations, we lay these tiles out dry (no thinset) so that they can be marked with a pencil and straightedge. Once the tiles are cut on a tile saw, the thinset can be troweled on and the tiles set in place. Inside corners and curved edges can be tricky, but they are easily managed with a little care (photos facing page).

A tile saw is indispensable. Rent one if you can't find a friend who will loan you one. A saw produces a clean cut that needs only a little touchup with a pumice stone. Snap cutters are faster, but the edge isn't smooth

SPECIAL PIECES

Don't forget these when you buy your tile. Specially shaped tile pieces make fast work of inside and outside corners.

Inside corner at top of backsplash



V-cap outside corner



V-cap inside corner



These will help, too. Plastic wedges sold by tile suppliers make it easy to get the top edge of the backsplash to line up perfectly.

RADIUSED CORNERS NEED SPECIAL FITTING



Rounding the bend. Grijalva pencils in the line where a field tile will have to be cut to fit a radiused corner. He cuts the curves on a tile saw by nibbling to the line. Pie-shaped pieces of V-cap, cut by eye and tested until they fit, complete the corner.





Wait a day before grouting. Once the thinset has cured, mix grout to a creamy consistency and force the material into the gaps between tiles with a hard rubber float. Work the float at an angle.



Keep the sponge clean. A tile sponge cleans up the residue. Be careful not to dig out any grout, and rinse the sponge frequently.

enough to be shown on the finished counter. We use snap cutters when the edge will be buried, such as at the back of the counter where the backsplash hides any roughness. And when you pick up your tile supplies, make sure you ask for plastic wedges and corner pieces (top photos, p. 105).

Grouting is the final step

Grouting is easy if you follow two simple rules. First, use the proper tools—a smooth, hard-rubber grout float and top-quality hydro sponges. Second, and most important, follow the grout manufacturer's instructions. Even the best tools can't salvage a job when the grout has been mixed or applied improperly. Tile adhesive should cure for at least 24 hours before grout is applied. Before getting started, remove any loose material from the joints. You also may want to apply a grout release to the surface of unglazed tiles to prevent staining.

Grout stays workable for about two hours. You should stir the grout mix periodically as you work, but do not add any more liquid to it. If the grout becomes too stiff to work,



A final polish, and the job is done. Arelano uses a generous pad of clean cheese-cloth to remove the haze left by the tile sponge. The surface polishes quickly.

throw it out and make a fresh batch (for more on grout, see "What's the Difference?" on p. 142).

Once the grout is mixed and you've removed any debris from the joints, use the hard-rubber float to force grout into the joints (photo top left). Work diagonally using enough pressure to ensure the joints are filled. Then remove excess grout with the edge of the float. After allowing the grout to set up for 15 minutes or so, wet and ring out a sponge and wipe the tile diagonally (photo bottom left). For your final pass, use each side of the sponge only once before wringing it out. You can use a soft, dry cloth to polish off the haze that forms after about 40 minutes (photo above right). Misting the grout with water several times a day for two or three days will increase its strength and prevent cracking. But wait ten days before applying any grout sealer—an important step that increases water and stain resistance. □

Dennis Hourany has been a licensed tile contractor for 22 years. He owns Elite Tile in Walnut Creek, California. Photos by Scott Gibson.

Cement board is a quick alternative to a mortar bed

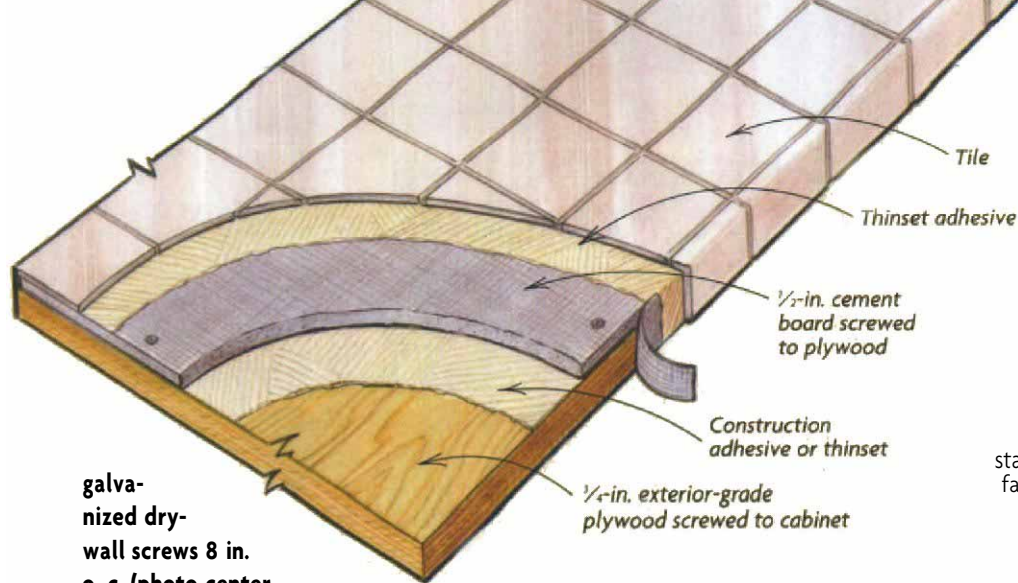
by Scott Gibson

In Dennis Hourany's part of the country, the West Coast, a mortar bed is usually specified as the substrate for a tiled kitchen counter. But tilesetters in other regions may prefer a cement-board underlayment, such as Durock (U.S. Gypsum; 800-874-4968) or WonderBoard (Custom Building Products; 562-598-8808). These panels, made of portland cement and reinforcing fiberglass mesh, speed up preparation of the tile substrate considerably.

For Tom Meehan, a tilesetter in Harwich, Massachusetts, cement board is the substrate of choice for kitchen counters (drawing facing page). It bonds well with the thinset adhesive used to set the tile, and it can be installed quickly.

Cement board is fairly easy to cut (photos left, facing page). Treat the material like drywall—score a line with a utility knife a few times, snap the board along the line and then cut the back of the board along the break. You can get a smoother cut with a circular saw and carbide blade, but be careful. Breathing the dust is unhealthy. Meehan suggests cutting the board outside and making sure you wear a respirator.

Before installing the cement board, Meehan screws down a layer of $\frac{3}{4}$ -in., exterior-grade plywood on the top of the cabinet. Screw heads should be flush with the surface. Next is a layer of thinset mortar or construction adhesive (photo top right, facing page), followed by $\frac{1}{2}$ -in. thick cement board. If you're using construction adhesive, work quickly because it begins to skim over in about five minutes and loses its pliability. Meehan presses the cement board into place and jiggles it gently to even out the adhesive beneath it. The cement board is attached with $1\frac{1}{4}$ -in.



galvanized dry-wall screws 8 in. o. c. (photo center right). You may want to drill pilot holes.

If kitchen cabinets already have laminate counters that are structurally sound, you can leave them in place and put down 1/4-in. or 1/8-in. cement board right on top of the laminate. Laminate should be scuffed with a 50-grit sandpaper first. The total substrate should be no less than 1/4 in. thick.

Edges can be handled a couple of ways. In the installation featured here, Meehan brings the cement board flush to the edge of the plywood and then finishes the edge with a layer of thinset and fiberglass mesh tape (photo bottom right). Another approach is to finish the outside edge with a vertical strip of cement board, and then apply a layer of thinset and mesh tape.

Cement board is available in thicknesses of 1/4 in., 5/16 in., 7/16 in., 1/2 in. and 5/8 in. Sheets may be 32 in., 36 in. or 48 in. wide.

Although Meehan thinks cement board is best, another possibility is a material called Dens-Shield (Georgia-Pacific Corp.; 800-284-5347), which was recommended recently by a number of Fine Homebuilding readers on "Break-time," the magazine's Web discussion group (finehomebuilding.com). Georgia-Pacific says Dens-Shield is one-third lighter than portland-cement backer board and is more water resistant than cement-board products. The company says the board has a proprietary heat-cured surface with a silicone-treated core embedded with glass mats.

—Scott Gibson is senior editor of Fine Homebuilding.

Cement board makes a good bond with thinset adhesive

Applying 1/2-in. cement board over a layer of 3/4-in. exterior-grade plywood makes a stable substrate for a tiled kitchen counter. It's faster to install than a traditional mortar bed.



1. Score cement board with a knife. Tilesetter Tom Meehan uses a utility knife and a straightedge to score a piece of Durock cement board.



4. Bond the cement board to the counter. A bead of construction adhesive may be used to bond the cement board to the rough top.



2. Score the back, too. After snapping the cement board along the score line, Meehan cuts through the back of the sheet, like working with wallboard.



5. Screws hold the cement board down. Galvanized drywall screws 8 in. o. c. keep the cement board in place while the adhesive sets up.



3. The board should break cleanly. Once fibers on the back of the board have been severed, the sheet should break cleanly along the score line.



6. Finish edges with thinset. Fiberglass mesh tape and a thin layer of thinset adhesive finish the edges. This substrate is now ready for tile.