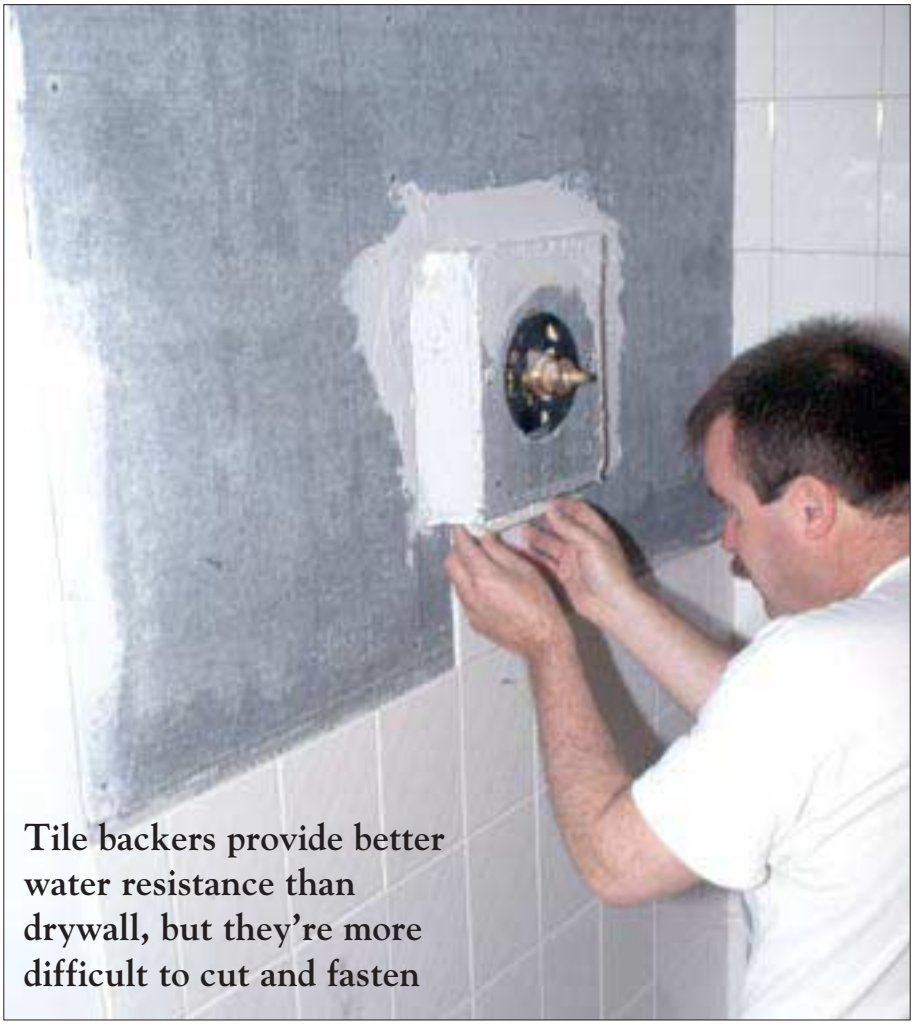
Working With Tile Backerboard



Tile backers provide better water resistance than drywall, but they're more difficult to cut and fasten

C. BATES

Backerboard is the generic term for the sheet material that's installed beneath ceramic tile. Although backerboard has been around for 25 years, it didn't hit the mainstream until the 1980s. Before then, tile was set on a mortar bed or on water-resistant drywall. A mortar bed is still the Cadillac of tile backers, but mortar beds are expensive to install, and it's hard to find someone who knows how to do them. As a result, they're usually reserved for high-end work. Water-resistant drywall, called green board because of its green facing paper, costs much less and can be hung by the drywallers. But while green board resists water better than ordinary drywall, it breaks down from regular contact with moisture. I've repaired many ten-year-old bathrooms in which the tiles had begun falling off after water penetrated the tiled surface and soaked the green board.

In this article, I'll discuss putting backerboard in a tub surround, but the same methods apply to floors and

by Rick Anderson

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Figure 1. *Backerboard can be scored and snapped like drywall (left). A carbide-tipped scoring tool (inset, left) will last longer, but the author prefers to use a utility knife because the cut is cleaner and more accurate. At door and window openings, a handsaw makes clean cuts (right). The saw teeth will dull quickly, however, so use a keyhole saw with replaceable blades.*

countertops. I know of three types of backerboard: cementitious backerboards, fiber-cement backerboard, and a non-cementitious product called Dens-Shield.

Cementitious Backerboards

Until recently, all backerboard was cementitious. Cementitious boards come in 1/4-inch to 5/8-inch thicknesses, in 2-foot to 4-foot widths, and in lengths up to 10 feet. Three-by-five-foot sheets, 1/2 inch thick, are the most common. They weigh about 3 pounds per square foot, or 45 pounds per sheet. Some have tapered edges, some have squared edges. The tapered edge serves the same purpose as the tapered edge on a sheet of drywall: It lets you tape the seam between the two sheets and still end up with a flat surface.

Vendors make much of the fact that their products can get wet without warping, buckling, swelling, delaminating, or blistering. What they're less vocal about is that cementitious board is still water-permeable. In the bathrooms I've repaired, no vapor barrier had been installed between the green board and the studs. Removing the green board exposed wet and rotting studs. If those bathrooms had been done with backerboard instead, there might have been no surface failures and no visible sign of water encroachment, but the framing would still have been soaked. That's why it's crucial to install cementitious backerboard over a waterproof membrane. I prefer 4-mil polyethylene, but many installers use roofing felt because they believe it allows the stud cavity to dry out if moisture gets inside.

Cutting sheets. Backerboard is cut like drywall — using the score-and-snap method. The installation instructions that come with backerboards say to use a straightedge and a carbide-tipped scoring tool. The scoring tool lasts longer, but I prefer a regular utility knife because it gives me more accurate cuts (see Figure 1). One blade usually does a 5-foot tub surround.

Other than having to make two passes per cut, I use the knife just as I would when cutting a sheet of drywall. To make a crosscut (along the 3-foot dimension), I use a T-square with 12 inches cut off the end. To make a rip (along the 5-foot dimension), I hold a tape measure on the edge of the sheet, place my knife at the desired width, and pull the knife and tape in parallel. I then snap the sheet in two and cut through the other side, using enough pressure to slice the fiberglass mesh. This usually leaves a coarse edge. A regular drywall rasp easily smooths this, though it too gets dull quickly.

I cut narrow strips (thinner than 5 inches) on an old table saw with a masonry blade. Since this technique makes a cloud of dust that's hard on both saw bearings and lungs, I keep an old table saw just for cutting backerboard and wear a good respirator when doing so. I run the sheet through with the blade raised 1/8 to 3/16 inch above the table, flip the sheet over, and rip the other side. (You can rip through in one pass, but shallow cuts are easier and make less dust. The backerboard sheet also won't bind against the rip fence in a shallow cut as it can with the blade set to full height.) I then set the sheet on edge and drop it on the ground. The thin strip breaks cleanly.

Some manufacturers recommend cutting backerboard with a carbide-tipped saw blade, but carbide blades make too much dust and sometimes lose their tips while cutting. Many installers have switched to dry-cut diamond blades. They cut faster, last longer, and make less dust than either a carbide or a masonry blade. A 4 1/2-inch dry-cut blade can be mounted on a standard angle grinder, and a 3 3/8-one on a Makita cordless finish saw.

Cutting holes. The fastest and neatest way to cut most small pipe holes is with a hole saw. I make the holes 1/4 inch bigger in diameter than the pipe (a 3/4-inch hole for a 1/2-inch-diameter pipe) so I'll have some play when hanging the sheet. If I

Figure 2. *Cut small openings for pipes by using a masonry bit to drill a series of small holes at the perimeter, then punch through with a piece of pipe.*

Figure 3. *For fastening, use backerboard screws with a special anticorrosive coating that holds up better than zinc. A series of ridges on the underside of the head cut a countersink, so the oversize screw head draws up flush to the surface without pulling through.*

don't have a hole saw, I mark small holes with the end of a piece of galvanized pipe (again, using a pipe 1/4 inch bigger than the pipe in the wall), then use a 1/8-inch masonry bit to drill a series of holes around the circumference, spacing the holes about 3/8-inch apart (Figure 2). I then place the end of my galvanized pipe on the circle, and beat it through with a hammer. I find a saber saw handy for cutting pipe penetrations that fall on the seam between two sheets. A bimetal blade works best.

Hanging. I'm often asked whether it's better to put the smooth or the rough side of the backerboard against the studs. I ran this question past one manufacturer and was told that it doesn't matter: The different textures are merely a result of the production process. However, backerboard manufacturers do say that their products must be hung on a minimum of 2x4 studs 16 inches on-center, and that steel studs must be 20-gauge or heavier. Studs should all fall in the same plane. If they don't, shim them — backerboard isn't as flexible as green board, so trying to pull its edge into a void with a screw is likely to fracture it.

Util-A-Crete, Wonder Board, Ultra Board, and Cemroc all require a 1/8-inch to 1/4-inch space between boards at all joints and corners. Durock requires no spacing, though it's essentially the same material. I've never seen a backerboard job where the installer intentionally left the recommended gap. Be aware, though, that ignoring the manufacturer's spacing guidelines will void the manufacturer's warranty.

Fastening. The most common way to fasten backerboard that I know of is with drywall screws. But drywall screws corrode readily in the alkali backerboard — even galvanized screws rust over time. And a drywall screw's head is too small, making it likely to pull through the board. It's better to use screws made specially for backerboard (Figure 3). U.S. Gypsum and Custom Building Products both carry these. They come with a special anticorrosive coating that's superior to zinc, and have wide heads and nibs on the underside to countersink them as they're installed. They go in easily and pull up flush to the surface without pulling through. Be careful when using an electric screw gun, as the high torque has a tendency to snap many of the screws. A cordless screw gun has less torque but still does the job.

Since backerboard is extremely brittle, it's best never to drive fasteners closer than 1/2 inch from the edges. Some manufacturers specify a full 1 inch. This can be tough to do on an inside corner. Screwing a 1/2-inch-thick sheet of backerboard to a 1 1/2-inch-thick corner stud leaves only an inch of bearing on the adjoining stud. The tendency is to angle the screws for the next sheet to make sure they bite, but angling a screw through

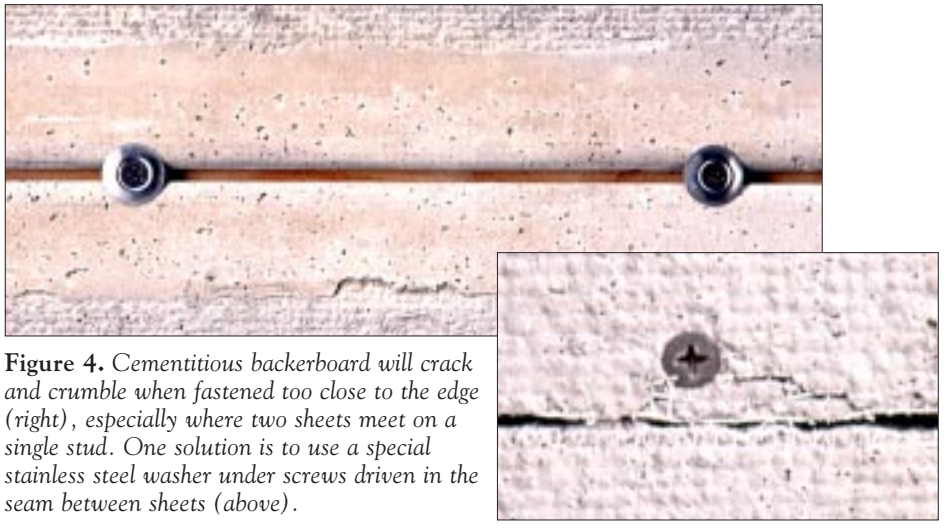
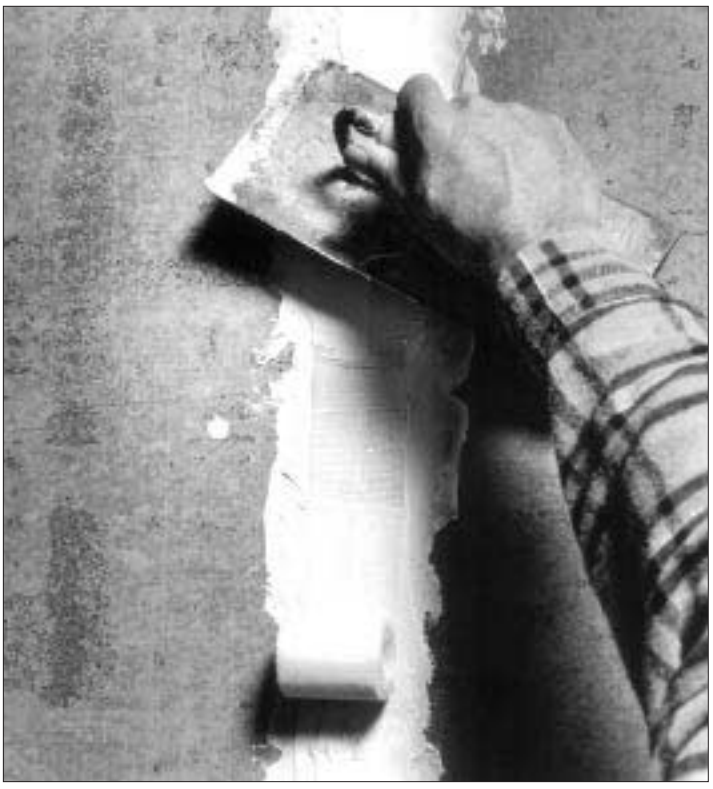


Figure 4. *Cementitious backerboard will crack and crumble when fastened too close to the edge (right), especially where two sheets meet on a single stud. One solution is to use a special stainless steel washer under screws driven in the seam between sheets (above).*



CUSTOM BUILDING PRODUCTS

Figure 5. *Seams in cementitious backerboard should be taped with fiberglass mesh bedded in dry-set or latex-modified Portland cement mortar.*

the edge of a backerboard nearly always fractures the edge. Once the edge has fractured, the screw loses its holding power. To prevent this, I always add a sister stud to inside corners. It provides plenty of nailing area and minimizes fracturing.

Fracturing is also a problem in vertical butt seams, where two sheets come together on a single stud. I avoid vertical seams in 5-foot shower stalls by hanging my sheets horizontally. If a vertical seam is unavoidable, I fasten the edges by driving a screw with a 3/4-inch stainless steel washer down the center of the seam (Figure 4, previous page). Custom Building Products markets a special stainless steel washer that's concaved to fit its screws.

All seams and angles must be taped with backerboard tape and dry-set or latex-modified Portland cement mortar (Figure 5). Backerboard tape is a fiberglass mesh with a special polymer coating that won't break down from the alkalinity of the backerboard.

Fiber-Cement Backerboard

Hardibacker is a hybrid made by James Hardie Building Products. It consists of Portland cement, ground sand, cellulose fiber, and selected additives. It's the same material used to make the company's Hardishake fiber-cement roof shakes, which means it's extremely water-resistant. In fact, Hardie says that you can install the sheets without a vapor barrier, though I recommend putting one behind it. Hardibacker has been used more than 30 years in Australia and in other parts of the world. According to the manufacturer, its resistance to moisture has been tested in humid jungle environments and in flood plains, where it's used to cover walls that will be submerged.

Because Hardibacker contains cellulose fibers, it's denser and less brittle than cementitious board. In fact, you can drive a screw 3/8 inch from the edge without fracturing. And because it's 1/4 inch thick, it weighs only 1.9 pounds per square foot — half as much as 1/2-inch backerboard. Though I haven't yet used Hardibacker, the manufacturer claims that it's easier to score and snap than traditional backerboards and leaves a cleaner edge. No spacing is needed between sheets. However, the framing needs to be shimmed with 1/4-inch plywood so that the face of the Hardibacker sits flush with the face of any adjoining drywall.

In my area, Hardibacker costs $10 for a 3x5 sheet. That's 67¢ per square foot — about the same as cementitious board.

Dens-Shield

Georgia-Pacific's Dens-Shield was introduced in 1987 and is still the only product of its type I'm aware of. It consists of a vapor-retarding fiberglass surface mat and a silicone-treated gypsum core. It looks like drywall and comes in 1/2-inch and 5/8-inch thicknesses and in 4x5 and 4x8 sheets. A 1/2-inch 4x5 sheet weighs only 40 pounds, and costs $20 (about $1 per square foot).

I used Dens-Shield on my last bathroom job and was impressed. It handles, cuts, and fastens just like drywall. The fiberglass mat is harder to cut than the paper facing on a sheet of drywall, but once scored it snaps just like drywall (Figure 6). The only difference is that the cut is crisper and more even. The one problem I found was that Dens-Shield's glass fibers produce the same itching problems as fiberglass insulation (although not to the same extreme). It's best to wear a long-sleeved shirt.

Pipe cuts are also a breeze. I make 1/2- to 3/4-inch pipe cutouts in Dens-Shield by marking the location, punching a drywall saw through, and spinning it around. For larger circular openings, I use a drywall circle cutter. The difference here is that the fiberglass mat won't tear like paper, so you have to score it on both sides. I mark the center of the cut with my T-square, then score the circle with the circle cutter. I then poke a drywall nail through the center hole made by the point of the circle cutter, turn the sheet around, and — using the nail hole as my center — score the other side with the circle cutter.

Hanging. Steel or wood framing should be spaced no more than 16 inches on-center for 1/2-inch Dens-Shield and 24 inches on-center for 5/8-inch Dens-Shield. You can frame 24 inches on-center with 1/2-inch Dens-Shield if you put blocking between studs 1 inch above the top of the tub and at the joint. Dens-Shield should be installed with the coated gray surface out (toward the tile). This surface has an additional polymer coating to act as a water barrier. No spacing is required between sheets.

Fastening. The manufacturer says to fasten the panels with 1 1/4-inch to 1 7/8-inch corrosion-resistant sharp-point drywall screws. Galvanized screws are best. Space them 6 inches


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Figure 6. *Scoring and snapping Dens-Shield leaves a very crisp edge. The material is also less brittle than cement-based backerboards, so it won't crack or crumble, even when cut into narrow strips.*

apart, driving them flush with the coated surface. Don't use backerboard screws or drive the drywall screw head through the surface, however, as this will break the water barrier. Dens-Shield is far less brittle than cementitious board. I had to cut a 7/8-inch strip to run from the tub to the floor. To my amazement, I was able to make the cut by scoring a sheet on both sides 7/8 inch in from the edge. I was even more surprised when I screwed it to the wall. The thin strip didn't fracture when I drove the screws.

After the walls are sheeted, you have to seal all water valves and faucets with a silicone caulk. This completes the water barrier, which is a real advantage over cementitious board. Having the water barrier on the surface lets you inspect it before setting the tile.

I also find Dens-Shield the best backerboard to use with mastic adhesive. Mastic has a lower installed cost than Portland cement mortars. Mastic isn't as water-resistant as Portland cement-based adhesive, but in all the tile repair jobs I've done, the mastic was in good condition; in fact, the tile often breaks before the mastic gives.

Dens-Shield shouldn't be installed where it will see continuous high humidity, as in a sauna, or extreme heat, as around fireplaces or steam rooms. Cementitious board is the right material for these applications. Georgia-Pacific says not to install a vapor retarder behind Dens-Shield, since any water that does get behind the sheets would then be trapped.

A contractor I talked to who has been using Dens-Shield successfully for several years says the only problem he has ever had was when the drywall finish crew taped the top edge of a drywall-to-Dens-Shield joint. Drywall taping mud does not adhere adequately to Dens-Shield. If thin-set mortar isn't available, you can also use a "hot mud" that dries by hydration rather than by evaporation. The two brands that I know of are Custom Building Products' Fix-All and USG's Durabond 90. ■

Rick Anderson is a remodeler in Bellevue, Wash.

Backerboard Manufacturers

Cementitious Boards

Cemroc
Eternit
Excelsior Industrial Park
P.O. Box 679
Blandon, PA 19501
800/233-3155

Durock
U.S. Gypsum
125 S. Franklin St.
Chicago, IL 60606
312/606-4000

Util-A-Crete
FinPan Inc.
3255 Symmes Rd.
Hamilton, OH 45015
513/870-9200

Wonder Board
Custom Building Products
13001 Seal Beach Blvd.
Seal Beach, CA 90740
800/873-7056

Fiber-Cement Boards

Hardibacker
James Hardie Building Products
10901 Elm Ave.
Fontana, CA 92337
800/942-7343

Noncementitious Boards

Dens-Shield
Georgia-Pacific
133 Peachtree St., N.E.
Atlanta, GA 30303
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