

Boring Into Hole Saws

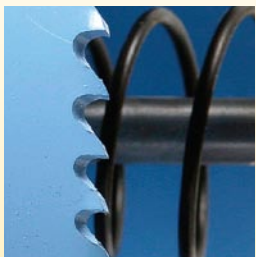
Bimetal saws are inexpensive and versatile, but don't overlook the specialty tools designed to make clean cuts in less common materials

BY MIKE GUERTIN

WHAT KIND DO I NEED?

BIMETAL

Bimetal hole saws have high-speed steel teeth fused to a carbon-steel body. The tooth is equally suited for cutting wood and metal, making this type of hole saw the closest thing to all-purpose.



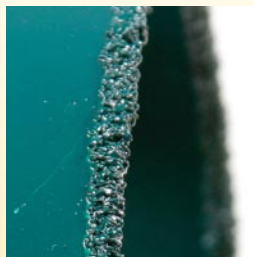
SHEET METAL

Made to cut thin stock, these saws have bi-metal teeth that cut a smooth edge and a spring to eject waste.



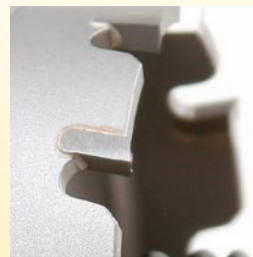
CARBIDE-TIPPED

Outfitted with heavy-duty teeth, these saws are perfect for cutting drywall, tile, fiberglass, and wood.



CARBIDE GRIT

These saws are best for cutting softer abrasive materials such as ceramics, fiber cement, plastics, and plaster.



TUNGSTEN CARBIDE

The industrial version of sheet-metal saws will cut up to 3/16-in.-thick steel and should be lubricated with cutting oil.



DIAMOND GRIT

The saw to pick for the hardest cuts in glass, concrete, masonry, and all tile. Water is the cutting coolant of choice.

On the face of it, there's nothing too complicated about hole saws: They chuck into handheld drills and drill presses to make ½-in.- to 6-in.-dia. holes. But after digging into the subject a little deeper for this story, I found that there is a dizzying array of boring tools designed to make holes in nearly all construction materials. So even though most bimetal, general-purpose hole saws work well for common tasks, don't overlook the specialty tools that might perform better for specific tasks. Also, keep in mind that there are a few styles of mandrels (sidebar right) that manufacturers use for their saws, and that there are pros and cons for each.

I recently examined the six categories of hole saws: bimetal, carbide-tipped, sheet metal, carbide grit, tungsten carbide, and diamond grit. Altogether, there are far too many to test, so I limited my trials to the bimetal saws from 14 different manufacturers. After all, bimetal hole saws are the most versatile and most common of the bunch. However, I've included a survey of the other five types to help you decide when a specialty saw might be a better alternative.

It's a dead heat once you remove the saws' labels

I tested 2½-in.-dia. bimetal saws from 14 manufacturers ("Sources," p. 56) to see if there were any appreciable differences that an average carpenter would notice. Cut speed and durability topped my list of criteria, so I set up a series of timed tests. I began by drilling five holes through 2x stock, then made a pass through 14-ga. sheet metal, followed by multiple durability cut tests through hardwood, drywall, and nail-embedded lumber.

Thirteen of the brands were virtually equal in performance; only the model from Ideal failed to cut through wood after cutting through sheet metal. Timed

tests showed no significant difference in cut speed through any of the woods. Even after eight successive cuts through sheet metal and cuts through six 0.148-in.-dia. nails, most of the bimetal saws lost only a couple of seconds in a repeat of the timed wood-boring test. I noticed a slight dulling of the teeth after cuts through sheet metal, but it didn't seem to affect cut speed on any of the saws.

One culprit affects speed of cut: the paint used to mark the saws. The heat of the cut seems to soften the paint, which then binds with sawdust and clings to the material being cut. Like barnacles on the bottom of a boat, the drag is evident. You have two options: Choose a hole saw with nongumming paint, or remove the paint. I ran all the hole saws through blocks of 2x stock 10 to 20 times, then scraped and sanded the gummy mess off the models that were impaired. Only the Bosch, the Vermont-American, the Craftsman, the Starrett, and the DeWalt remained gum-free and performed well on the cut-speed test without having their paint removed first.

Even though no hole-saw makers promote their saws for cutting through fiber-cement siding or tile backerboard, I figured that if these tools could cut steel, then they'd have no trouble cutting through fiber cement. I was wrong. Just one cut turned the teeth on every brand to toast. Most of them could barely make a second cut. Cutting fiber cement requires a specialty saw.

The extraction distraction and depth of cut

Plug extraction is always an issue with hole saws, but from what I can tell, it's more a function of the wood and the removal technique than of the specific saw. Wood resin, moisture, and grain seemed to have more to do with the difficulty of removing a plug than the design of the hole saw. The most effective solution I've found is to clear the cut a couple of times just before the hole saw punches through



Only a few of the hole saws tested sported a finish (left) that didn't impair the speed of cut.

MANDRELS

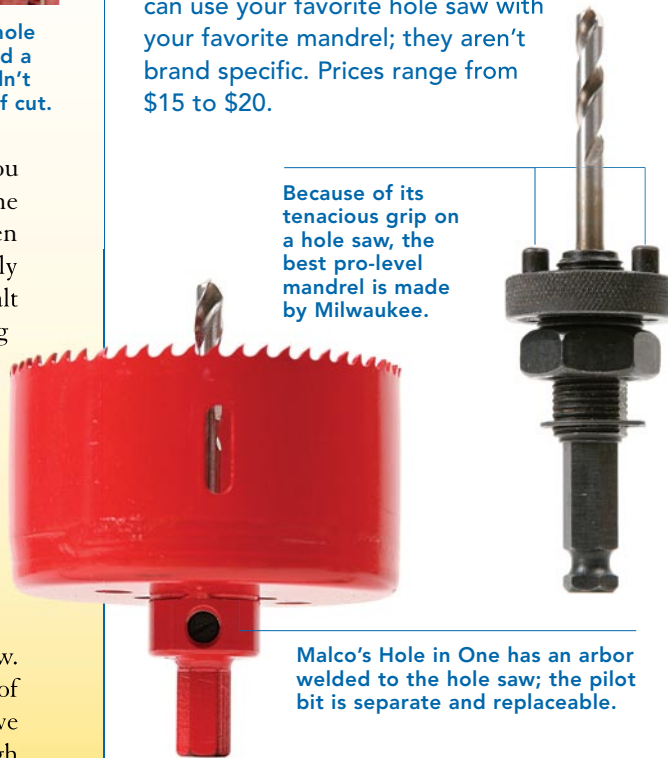
THE BAD, THE GOOD, THE IN-BETWEEN

Mandrels (also called arbors) typically consist of a pilot-drill bit that accepts a variety of different-size hole saws and is chucked into a drill. There are two basic types. The first is the simplest and most inexpensive design (right), consisting of a pilot bit attached to the saw with a wrench-tightened locking nut; these tend to come loose. The second type doesn't require a wrench and dominates pro-level hole saws. The hole saws have a threaded center hole flanked by a pair of smaller holes that receive the mandrel's hardened-steel pins. The mandrel's screw threads secure the hole saw, but the pins transfer the drill force. During the cut, this arrangement keeps the threads from becoming so overtightened that the mandrel can't be disassembled.

Not all pro-level mandrels work so well. Some result in a sloppy connection between the mandrel and the saw. When you're entering a cut, the sawteeth splay around the circle rather than track precisely. The good news is that the hole-saw thread and pin patterns are universal among all models, so you can use your favorite hole saw with your favorite mandrel; they aren't brand specific. Prices range from \$15 to \$20.



Because of its tenacious grip on a hole saw, the best pro-level mandrel is made by Milwaukee.



Malco's Hole in One has an arbor welded to the hole saw; the pilot bit is separate and replaceable.

the wood. Excess chips lock in the plug, so clearing them reduces binding.

In wet wood or wood with a lot of tearout, the extra plunges cut those feathery fibers. To remove an uncooperative plug, I find it faster to pop the mandrel off the saw and drive out the plug rather than fiddle with the slots in the hole-saw sidewall. Quick-release mandrels like the one on the Bosch speed the process of removing the mandrel by about four seconds.

Depth of cut is also an issue for some users who might want to bore through thick rough-sawn lumber in one pass, and it's tricky to determine. Actual depth of cut doesn't always match what's listed on the manufacturers' specs, which is usually the tip of the teeth to the inside of the backing plate.

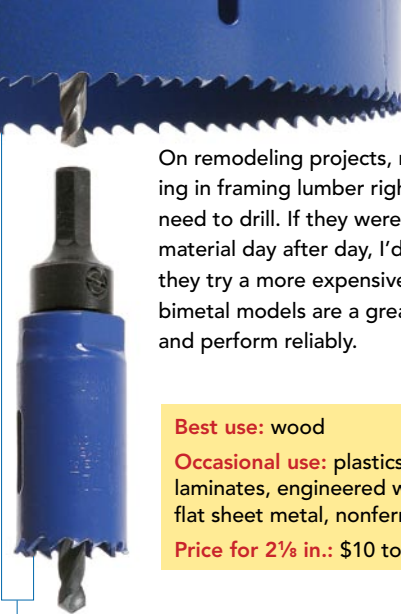
So with such little difference in performance among saws, how do you decide what to buy? Is it price? A survey of Internet retailers who sell 2½-in.-dia. bimetal hole saws shows a pretty tight price range, from \$10 to \$15. Because these aren't high-ticket items, the factor that tips the scales might be convenience: Whatever your local tool supplier stocks works best. Pair it up with your favorite mandrel, and start drilling. □

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BIMETAL

Bimetal is the term used for tools that have high-speed steel teeth fused to a carbon-steel blade or, in this case, a hole-saw body.

Manufacturers of bimetal hole saws design teeth so that cuts can be made in both wood and metal. A more aggressive tooth profile cuts through wood faster but bucks and binds when cutting through metal; finer teeth make smooth cuts through sheet metal but bog down in wood. Carpenters need to cut holes through a range of materials on a typical job. Plywood cabinets, sheet-metal baseboard heating panels, steel-clad exterior doors, aluminum radiant-floor pans, drywall, laminate countertops, wood flooring, and siding all call for fairly clean cuts.



On remodeling projects, nails are always lurking in framing lumber right where carpenters need to drill. If they were cutting the same material day after day, I'd recommend that they try a more expensive specialty saw, but bimetal models are a great all-around choice and perform reliably.

Best use: wood

Occasional use: plastics, plastic laminates, engineered wood, fiberglass, flat sheet metal, nonferrous metals

Price for 2½ in.: \$10 to \$15

HOLE-SAW BASICS: Bimetal, carbide-tipped, carbide-grit, and diamond-grit saws are generally available in diameters ranging from ⅝ in. to 6 in. Smaller sizes up to 1¼ in. typically require a mandrel with a ½-in. screw thread, while the larger sizes accept a ⅜-in. screw thread.

CARBIDE-TIPPED

These hole saws last longer and cut a little faster than their bimetal cousins. They also cut through abrasive materials like fiber cement, drywall, plaster, fiberglass, clay roof tile, tile backerboard, and soft wall tile. There are two types: multi-toothed, which resemble bimetal saws; and minimally toothed, which are fitted with one to four teeth. The latter type cuts a much faster, rougher-edged hole; they are great for boring through framing lumber. You'll need a more powerful drill to run them because the wider kerf causes more drag. These models power through abrasive material and won't slow down if you use them to cut wood later. You shouldn't cut sheet metal or nail-embedded wood with carbide-tipped hole saws; the teeth will snag, dull, and chip off. Saws available from Blu-Mol, Milwaukee, Starrett, and Lenox.



Best use: wood, nonferrous metals, plastics, plastic laminate, engineered wood, fiber cement, plaster, fiberglass, drywall

Occasional use: wall tile, clay tile, brick

Price for 2½ in.: \$15 to \$50

SHEET METAL

While regular bimetal saws punch holes in sheet metal, sheet-metal hole saws have thinner sidewalls and a special tooth design for smooth cutting. The available sizes are more limited than other saws, but these saws track truer, cut cleaner, and aren't as likely to damage surrounding metal. Blu-Mol and Bosch optimize their saws by molding a shoulder at the base to prevent punch-through after you finish the cut. They also include a spring that both stabilizes the hole slug during the cut (important to keep the pilot bit tracking) and pops it out of the hole-saw cylinder. These saws are also good for cutting nonferrous metal, stainless steel, and plastics. Saws available from Blu-Mol, ⅝ in. to 1½ in.; Starrett, ⅝ in. to 5½ in.; and Bosch, ¾ in. to 3 in.

Best use: thin stainless and regular steel, nonferrous metals, plastics

Price for 2½ in.: \$15 to \$20



SOURCES

Here's a partial listing of hole-saw manufacturers, representing the bimetal saws tested.

Blu-Mol www.blumol.com • **Bosch** www.boschtools.com • **Craftsman** www.sears.com • **DeWalt** www.dewalt.com • **Ideal** www.idealindustries.com
Malco www.malcoproducts.com • **Milwaukee** www.milwaukee.com • **Porter-Cable** www.deltaportercable.com • **Ridgid** www.ridgid.com

CARBIDE GRIT

Carbide-grit hole saws cut abrasive materials like fiberglass, tile, fiber cement, plaster, and drywall; they also cut through soft stone like marble, slate, and soapstone. In less abrasive materials like drywall and plaster, these hole saws last a long time. In harder materials, you might get only a handful of cuts before you need a replacement. Models come in continuous rimmed versions (RemGrit, Milwaukee) and segmented/toothed versions (Starrett, MK Morse).



Best use: plaster, drywall
Occasional use: soft stone, fiberglass
Price for 2 1/8 in.: \$35 to \$50

TUNGSTEN CARBIDE

Tungsten-carbide cutters aren't something you'll see on many residential job sites. But if you have to cut through thick (up to 3/16 in.) steel, cast iron, or other metal, or if you repeatedly have to cut through metal (like the side of an electric panel) and want to speed production with a tool that will last, you'll want one. These heavy-duty cutters have the same features as sheet-metal hole saws (slug springs, depth limit shoulder) but cut day in and day out for years. To prolong life and cutting speed, use cutting oil. Saws available from Blu-Mol, 7/16 in. to 3 in. dia.; Milwaukee, 1 1/16 in. to 3 in. dia.; and Starrett, 1 1/32 in. to 6 in. dia.

Best use: sheet metal, nonferrous metals, heavy-gauge steel (to 3/16 in.)
Price for 2 1/8 in.: \$45 to \$100



DIAMOND GRIT

These hole saws make fast, clean cuts in masonry and have a longer life span than carbide-grit saws. Saws available from Lenox, 7/8 in. to 2 1/2 in.; Starrett, 7/16 in. to 6 in.; and DeWalt, 3/16 in. to 1 in.

Best use: wall tile, roof tile, brick, soft stone, floor tile, concrete, glass, granite
Price for 2 1/8 in.: \$75 to \$100



One-trick hole saws

SELF-FEED MAYHEM

Chuck one of these onto a 1/2-in. high-torque, low-RPM corded drill, and brace yourself. Once the pilot screw starts, there's no stopping these wood eaters. Rather than sawing out the wood as other hole saws do, they peel it out and leave you with a pile of shavings. Fast and reliable for making large holes, these bits are found in plumbers' and electricians' tool kits. Keep a file or die grinder on hand when boring through framing lumber; these bits don't like nails. Milwaukee's Switchblade bits (above) have replaceable cutting blades that swap out in two minutes and can be resharpened later. Saws available from DeWalt, Milwaukee (photo above), Ideal; about \$30 for a 2 1/8-in. bit.



RECESSED-LIGHT INSTALLATION WITH A COOKIE CUTTER

A handful of manufacturers make carbide-grit hole saws in diameters matched to common sizes of recessed light cans. Saws available from Milwaukee, Greenlee, Lenox, and RemGrit (photo left); \$40 to \$85.



FIX THAT MISTAKE

Ever need to enlarge a hole and keep the same center? One way is to fill the hole with a plug to guide the pilot bit. Another way is to mount two hole saws on the same mandrel. Starrett's Oops Arbor looks like a regular mandrel but with an extra threaded shaft extension to hold the smaller saw. Bosch's HE1 uses a quick-change system and a stepped adapter that mounts two hole saws. The smaller saw serves as a pilot and tracks the old hole while the larger saw cuts. Unfortunately, nobody has invented a hole reducer. Saws available from Starrett (photo right), \$7; Bosch, \$15.

