Fine WoodWorking

Choosing and Using Belt Sanders

These aggressive tools are unmatched at rapidly flattening panels and shaping curves

BY SCOTT GIBSON

Different sizes for different tasks

4 IN. BY 24 IN.

If much of your work involves sanding flat panels, consider this size, the biggest available. Because of their weight, these machines require a bit more muscle to control them.

3 IN. BY 24 IN.

The narrower platen on these machines may provide more control than larger sanders (left) for even stock removal on flat panels.

Portable belt sanders have been a woodworking mainstay for more than 75 years, ever since Art Emmons invented the Take-About Sander for Porter-Cable in 1926. Cabinetmakers of the day forked over $130 to own one, the equivalent of nearly $1,300 today. The belt sander truly was a breakthrough. These machines rapidly flatten glued-up panels, remove mill and burn marks, and even out rail-stile connections on doors and cabinets.

The surge of random-orbit sanders in the mid-1980s took a bite out of the belt-sander market. Ever more powerful random-orbit sanders can remove stock almost as quickly, and they are less likely to gouge the worksurface. As a result, some furniture makers have all but abandoned their belt sanders. I won't argue with them. But when my belt sander succumbed to old age and frozen bearings not long ago, I started thinking about a replacement.

Belt sanders still have some advantages. Their ability to remove stock rapidly makes them the tool of choice for flattening glued-up panels or for knocking down the lip on a breadboard end. They strip layers of old paint, smooth curves, and scribe cabinets and countertops to uneven walls. Clamped upside down or on its side to the bench, a belt sander can be used to shape small pieces of wood or to grind a bevel on a plane blade. Try doing that with a random-orbit machine.

Wondering what the market had to offer these days, I borrowed a variety of belt sanders from four manufacturers. After looking closely at each tool, I found a lot has changed since I last bought one. There are more models to choose from, ranging from light machines with narrow (just over 1 in. wide) belts to behemoths with 4-in. by 24-in. belts, and they may be had with variable speed and optional accessories that increase their versatility.

With assistance from the staff of *Fine Woodworking*, I also evaluated seven 3-in. by 21-in. machines (see "Tool Test" on pp. 38-39) to compare their performance.

Choosing a size: Bigger is not always better

Portable belt sanders are grouped by the size of their belts. There are four common sizes—4 in. by 24 in., 3 in. by 24 in., 3 in. by 21 in., and 3 in. by 18 in.—as well as a narrow size that is more popular with those who work metal or glass.

The smaller the belt size, the lighter and more nimble the sander. But the smallest machines have less mass and small motors; consequently, they run at slower speeds and won't remove material as quickly as the larger machines.

The biggest seller these days, according to industry sources, is

3 IN. BY 18 IN.

Light and easy to maneuver, these entry-level machines are suitable for smaller projects, where big power and aggressive stock removal are not necessary.

3 IN. BY 21 IN.

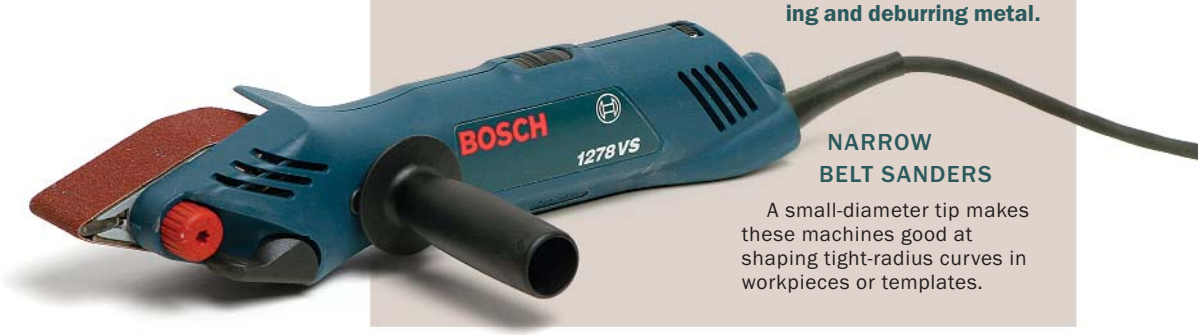
This is the best-selling type of belt sander, so we tested seven popular models head to head (see pp. 38-39)

Narrow belts for tight places

Bosch and Makita both make special-purpose sanders with very narrow belts that can reach into places inaccessible to conventional belt sanders.

Bosch's model 1278 VS (below) has a 1½-in.-wide belt and a roller tip that's only 5/16-in. in diameter. Belt speed can be adjusted from 590 to 950 ft. per minute, and the sander's triangular head has two steel platens.

Makita's model 9031 (above) has a 1⅛-in.-wide belt and a wider roller at the top that extends 6 in. (model 9032 has a ⅜-in.-wide belt). Belt speed can be adjusted from 656 to 3,280 ft. per minute. A handle on the end of the sanding arm makes it easy to steer or to apply pressure at the tip. The sander is popular in metal and glass shops, and because the belt can flex, it also can be used on irregular surfaces. These sanders are light and easy to maneuver, useful for spot sanding and deburring metal.



NARROW BELT SANDERS

A small-diameter tip makes these machines good at shaping tight-radius curves in workpieces or templates.

Photos, except where noted: Anatole Burkin; photos, this page and facing page (bottom row): Rodney Diaz

FLATTENING STOCK

Three steps to a flat panel. *Begin by sanding diagonally, using a 50-grit or 60-grit belt (1). Then sand with the grain (2), changing belts to successively finer grits. Keep a portion of the platen in contact with the panel as the machine nears the edge to avoid diving off the workpiece. Check your progress with raking light (3), which will help you see dips and scratches.*

the 3-in. by 21-in. sander, a tool designed to appeal to both professionals and occasional users. These sanders weigh as little as 7½ lb., making them much easier to use on vertical surfaces than 4-in. by 24-in. sanders, which may weigh twice as much. The 3-in. by 21-in. models also cost less.

Abrasive belts are cheaper, too, and over the life of a tool the savings will add up. Woodworker's Hardware sells a 120-grit 3-in. by 21-in. aluminum-oxide belt for $1.28, a nickel cheaper than a 3-in. by 24-in. belt, but 87¢ less than a 4-in. by 24-in. belt of the same grit.

The 3-in. by 18-in. models weigh only a third as much as many 4-in. by 24-in. models, making them extremely maneuverable and easy to handle. However, the motors on 3-in. by 18-in. belt sanders are proportionally smaller, and lower belt speeds mean these models won't remove material very quickly. Their very small bases, or platens, make them unsuitable for trying to flatten a large surface.

When the principal use for a belt sander is to flatten horizontal surfaces, it's hard to beat a 4-in. by 24-in. sander. At 13 lb. to 15 lb., these sanders are the heaviest of the lot, although Makita does make a lighter 4-in. by 24-in. variable-speed model that weighs

SHAPING CURVES

Stands, available as an accessory with some sanders, add versatility. *Inverted and with a fence in place, a belt sander becomes a stationary tool, ideal for shaping curved work.*

Concave curves are possible, too. *The nose of the tool allows for shaping inside curves.*

Shape cabinets scribed to fit uneven walls. *A belt sander makes quick work of shaping a cabinet to fit an irregular surface.*

Watch it on the Web

For more on using a belt sander, go to www.finewoodworking.com.

just over 10 lb. With their wide platens and robust motors, the larger sanders remove material in a hurry—sometimes too fast if you are not vigilant. Although expensive, Porter-Cable's model 503, a heavy-duty 3-in. by 24-in. machine, is an excellent alternative to the larger 4-in. by 24-in. models.

Variable speed is an option worth considering

A number of manufacturers now offer belt sanders with variable-speed controls, allowing belt speed to be slowed to a virtual crawl. Not all belt sanders have this feature—some of the larger ones still use simple on/off switches—and the control adds marginally to the cost of a new tool. But a variable-speed control makes a sander more versatile and less likely to damage delicate or heat-sensitive surfaces.

Belts traveling at lower speeds remove less material. Dialing a speed control back to its lowest setting makes the tool a good deal less terrifying when working on thin veneers, such as those found on plywood, the edges of a laminate countertop, or in any area where rapid stock removal is exactly what you don't need.

Slower speeds also produce less heat, so finishes such as paint and varnish are less likely to melt and fuse with the belt as they're being removed. The range of the variable-speed control is proportional to the capacity of the motor: The smaller the motor, the lower the potential speed.

Making sense of belt speed and amp ratings

Belt speeds top out at about 1,600 ft. per minute on large sanders with the most powerful motors. As motor capacity decreases, so

Sanding frames help with flat work

A sanding frame improves stability. *Several companies offer sanding frames as an accessory. The frame attaches to the base of the machine, providing a wider footprint to help avoid tipping the sander and gouging the workpiece.*

If you're not careful, a belt sander can produce dips, gouges, and deep scratches on a workpiece. Several manufacturers—including Bosch, Makita, Hitachi, and DeWalt—make sanding frames that fit on the bottom of the machine. These accessories are designed to make the sanders more stable and to prevent one side of the belt from digging into the surface of the wood.

Sanders are attached to the frames by means of a bracket and alignment pins that fit into slots cast into the sander's base. A height-adjustment knob controls how much material the sander can remove. Once the frame has been set up, inserting or removing the sander takes only a few seconds.

Although different in a few respects, the frames seem similar. Those from Makita and Hitachi have slippery plastic bases on the bottom. Bosch uses a series of short, stiff bristles to keep the frame off the work. Bosch also offers the most sophisticated system of aligning the sander level with the frame, a process that requires a little fiddling.

Sanding frames make big sanders even bigger and more unwieldy, and because the frames project beyond the edge of the tool, they limit how close the sander can get to an edge. If you are sanding flat panels on a bench, that's not a problem. I found that the frames did provide better control, helping me avoid tipping the sander and gouging the wood.

Designs of sanding frames vary. *Makita (left) uses a low-friction solid material that slides easily. Bosch (right) uses bristles to keep the frame from scratching the workpiece.*

TOOL TEST:
3-in. by 21-in. belt sanders

According to belt-sander manufacturers, the biggest sellers are the 3-in. by 21-in. models, so we decided to take a close look at what's available and give you an idea of which one is Best Overall and Best Value among that size. The good news is that we did not find any glaring performance problems, which made it difficult to pick clear winners.

The DeWalt had a lot going for it—an innovative design, aggressive stock removal, good ergonomics, and accessories—but we were disappointed with its dust-collection system. The Makita impressed us with its overall performance, coming in a close second for stock removal, and had excellent dust collection (though the bag occasionally got in our way). It's a toss-up, so we rated them both Best Overall.

If price is a factor, consider the Ryobi, which is a light machine but did a decent job at stock removal and performed very well at collecting sawdust. We rated it Best Value.

—Scott Gibson and Matthew Berger

BOSCH 1274 DVS

Compact, well-balanced machine with a convenient variable-speed control and comfortable front handle; fairly slow stock-removal rate; can sand flush to an adjacent surface on right side of machine.

CRAFTSMAN 315.117270

Large, easy-to-grasp lever made for smooth belt tensioning; variable-speed control was easy to adjust without releasing the trigger; dust bag is small and effective, but its rigid support arm sometimes got in the way.

MODEL	SOURCE	STREET PRICE
Bosch 1274 DVS	www.boschtools.com 877-267-2499	$170
Craftsman 315.117270	www.craftsman.com 800-697-3277	$99
AUTHOR'S BEST OVERALL CHOICE DeWalt DW433K	www.dewalt.com 800-433-9258	$190
Hitachi SB-75B	www.hitachi.com/hpt 800-829-4752	$160
AUTHOR'S BEST OVERALL CHOICE Makita 9903	www.makita.com 800-462-5482	$200
Porter-Cable 352VS	www.porter-cable.com 800-368-1487	$155
AUTHOR'S BEST VALUE CHOICE Ryobi BE-321 Type II	www.ryobitools.com 800-525-2579	$99

THE SCALE TELLS THE TALE

To rate stock-removal and dust-collection effectiveness (see the chart at right), each sander and sample board were weighed before and after a timed run. At the end, the difference between the weight of the board and machine (plus dust bag) indicated how much sawdust was collected, expressed as a percentage.

does the top belt speed. A difference in motor capacity of an amp or two won't affect performance very much. But you will notice a jump from a 6-amp motor to a 10-amp motor.

On flat work, such as when sanding a tabletop or smoothing floorboards, quick stock removal is an advantage, so consider a sander with a high belt speed. For scribing a countertop or cabinet to an irregular wall, ultrafast stock removal isn't the objective; instead, you want good control and the ability to work carefully toward the scribe mark.

For all of their advantages, big belt sanders sometimes can remove too much material. Some woodworkers avoid them because

Photos, this page (top): Rodney Diaz

DEWALT DW433K

Most innovative design of the machines tested; tool has three belt rollers, including a 1-in.-dia. wheel at the nose of the tool for scribing tight curves; fastest stock-removal rate, but dust collection was the least effective.

HITACHI SB-75B

Narrow steel belt-tensioning lever was stiff and uncomfortable to use; aggressive stock removal; sanded flush on right side, but the belt must be shifted off center due to an extrawide platen.

MAKITA 9903

Features a comfortable front grip; easy-to-use belt-tensioning lever; aggressive sander with excellent dust-collection efficiency; sanded flush on the right side of the machine; variable-speed control was easy to adjust.

PORTER-CABLE 352VS

Well balanced and comfortable to use; pivoting dust bag is convenient and equipped with a zipper; machine sanded flush to an edge; the speed control couldn't be reached without taking hand off the trigger.

MOTOR	NO-LOAD BELT SPEED	WEIGHT	STOCK REMOVAL	DUST-COLLECTION EFFECTIVENESS
6.6 amps	550 to 1,100 ft. per minute	7.1 lb.	56g	89%
8.5 amps	800 to 1,300 ft. per minute	11 lb.	71g	88%
8 amps	850 to 1,400 ft. per minute	12 lb.	110g	70%
8.7 amps	1,180 to 1,475 ft. per minute	9.7 lb.	96g	86%
8.8 amps	690 to 1,140 ft. per minute	9.5 lb.	102g	94%
8 amps	850 to 1,300 ft. per minute	10.75 lb.	79g	83%
6 amps	755 to 1,148 ft. per minute	7.9 lb.	77g	94%

RYOBI BE-321 TYPE II

A compact, well-balanced tool; belt-tensioning lever was comfortable to use; speed-control adjustment was easy to reach; dust bag is side-mounted and has a zipper.

a moment's inattention can damage the surface; however, a sanding frame can help (see "Sanding frames for flat work" on p. 37).

If possible, heft before buying

The incredible breadth of the Internet has made tool shopping easy, as long as you know exactly what you want. But there is no substitute for taking a sander out of the box and looking it over carefully before you buy it. Not everything is apparent in product photos or descriptions, and preferences will vary by user. For instance, I found swiveling dust-bag connections more convenient than those fixed in a single position. But dust connections on the top of the machine also make it more difficult to flip the sander on its back and clamp it to the bench. Those trade-offs are hard to weigh without handling the machine.

Overall ergonomics—such as how balanced the sander feels, where the power cord is attached, or whether the variable-speed control dial can be adjusted without taking your finger off the trigger—can prove important, and are difficult to judge without handling the tool. In the end, nothing beats a firsthand look. □

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Photos, this page: Rodney Diaz