

A man with glasses and a tan shirt is focused on using a Bosch fixed-base router on a wooden workbench. The router is blue and silver, with a black power cord. The background shows a workshop setting with various tools and equipment.

TOOL TEST

Midsized Fixed-Base Routers

Great combination
of power and
control

BY MARC ADAMS

A fixed-base router is an invaluable tool for woodworkers of every skill level. On its own or teamed up with shopmade jigs, this elegantly simple tool can drill, shape, size, plane, and cut wood similar to the way big stationary equipment can. If you don't already have a fixed-base router, you should get one.

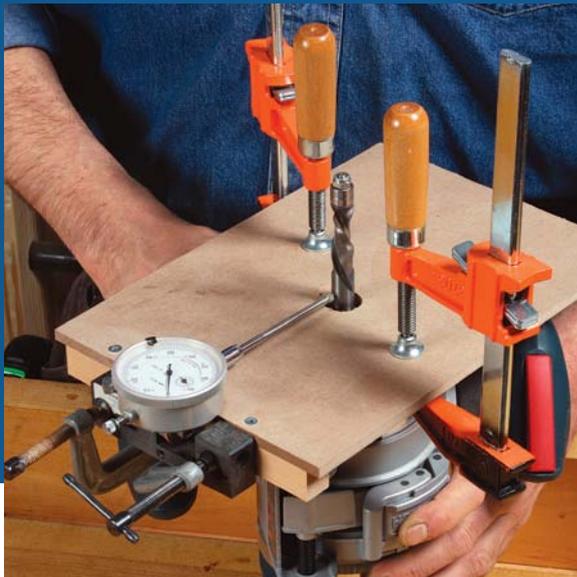
Go for a midsize model—larger than a trim router, which can be held in one hand, but smaller and lighter than a heavy, industrial 3¼-hp router. Rated between 11 and 15 amps, midsize models are plenty powerful for common tasks yet are still relatively compact. At \$120 to \$220, these routers are an excellent value.

Together with the three permanent instructors at my woodworking school, I tested eight midsize fixed-base routers, rated between 1¾ and 2¾ hp, with electronic speed control and including both ¼- and ½-in.-dia. collets, so you can use the full range of router bits. The speed ranges are similar, from 8,000 to 10,000 rpm up to 23,000 to 25,000 rpm.

Electronic motor control is a somewhat recent innovation, which helps the router maintain its rpm under load. It also allows soft start, which is a must-have in my book. Without it a router goes instantly from 0 to 20,000-plus rpm when you flip the switch,

Performance tests

Adams's staff used three tests to evaluate smoothness of cut. They also evaluated control and handling during two of them.



RUNOUT RESULTS

With a dial indicator touching the shank of a good router bit, the testers turned the collet by hand to check for wobble, or runout. The Bosch MRF23EVS had the least, just 0.001 in., but most of the others had less than 0.003 in., an acceptable amount.



TEMPLATE TEST

After roughing eight workpieces to the same shape, the testers loaded them all into this fixture, designed to remove about $\frac{3}{16}$ in. of material along a series of curves and straight lines. The Bosch MRF23EVS stood out again.

jumping in your hands. With soft start, the router comes up to speed gradually and smoothly. And if by accident you start the router while the bit is in contact with a board, it won't kick as hard.

All of the routers will work in a router table, but the Bosch, Ridgid, Porter-Cable, and Milwaukee routers offer through-the-base depth adjustment for that purpose. All of the models offer edge guides as accessories, but we didn't test them.

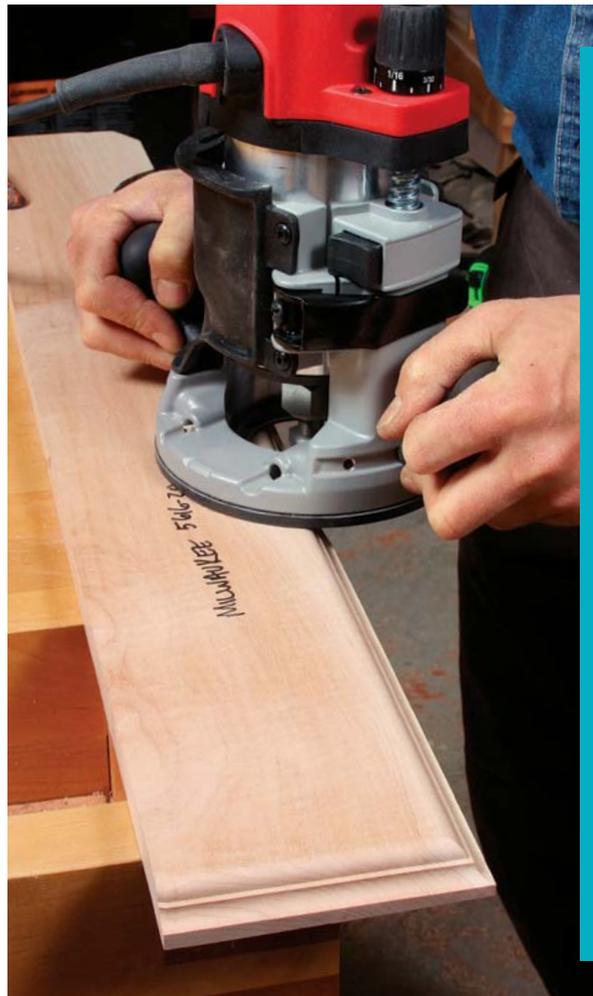
We evaluated the routers in 30 different ways, but boiled it all down to five ratings: cut quality, router accuracy, control and handling, bit changing, and visibility of cut.

Tough tests for cut quality

We started with the most important question: Can the router make smooth cuts in the toughest situations?

Our first test was for runout (wobble), which could come from either the motor or collet and create chatter and a bumpy cut. We put a good-quality, new $\frac{1}{2}$ -in. router bit into the collet, placed a dial indicator against it, and rotated the bit by hand.

To check for real-world runout, we did two cutting tests in hard maple. In both cases, we made cuts on long grain and end grain, using $\frac{1}{2}$ -in.-shank bits. We looked closely at the routed surfaces under a



BIG BITES

Adams and company used a new, high-quality router bit to make deep molding cuts along both long grain and end grain.



Harsh light. A raking light showed how smooth the cuts were. The Milwaukee (top) cut the smoothest, while the Hitachi's sample (bottom) was one of the bumpier ones.

Critical features

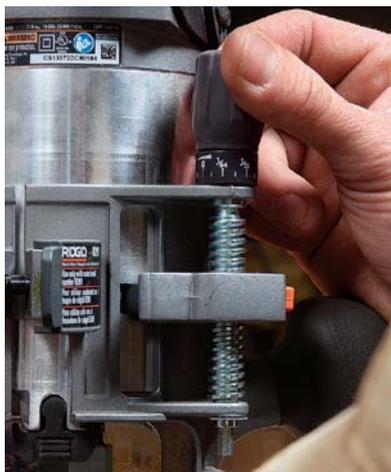
ACCURATE DEPTH ADJUSTMENT

There are two ways to adjust the depth of cut: Twist the base or use a rack-and-pinion mechanism. Both systems work well and include a scale, accurate on all but the Milwaukee.

Twist to change.
On routers like the Hitachi, you unlock a cam lever and twist the motor to change its depth setting.



Rack and pinion.
This type includes a micro-adjust dial. The Ridgid's scale was the most accurate.



Accuracy test. Adams's staff used this digital-caliper jig to see if a test pin, chucked in the collet, moved as much as each depth scale said it did.

CENTERED BASE IS BEST

If the baseplate is concentric with the bit, you can run the router against a fence in any position and get an accurate cut.

Most can be adjusted.
The easiest method is to use a centering cone. The Ridgid comes with this handy accessory, but it's not a pricey item for the others.



One can't. The Hitachi's baseplate was significantly off center, and its countersunk screws make adjustment impossible.

CONTROL MATTERS, TOO

To control these powerful handheld tools, you need grips that fit your hand, and an on-off switch you can reach easily.



Slick grips. While you can reach the switch on the Bosch 1617EVS without letting go of the handles, their round, slippery shape makes the router harder to keep level.



This Bosch is better. The Bosch MRF23EVS is heavy but has good balance and control, with grips that fit the hand and its trigger in one of the handles.

raking light, and also paid attention to the feel and control of the router when cutting.

In the first test, we ran an up-spiral, bearing-guided, flush-trimming bit against a pattern, trimming $\frac{3}{16}$ in. off the edge of a workpiece. All of the routers made smooth enough cuts in this test, but the Milwaukee's super-smooth cut was a standout.

The second test was tougher. We made a full-depth molding cut along the edges of a hard-maple workpiece, using a large, bearing-guided ogee bit. Even with this heavy cut, most of the routers were able to deliver a smooth cut without struggling.

We blended all of these tests into a single rating for cut quality.

Accuracy is important, too

A fixed-base router has only a couple of adjustments, the most important and frequent being the depth setting. Some routers employ a rack-and-pinion; on others you twist the base to move it up and down. Both systems work well, allowing fine, precise movements. All of the routers then lock the base with a cam device.

All of them also have some sort of scale to keep track of the depth, though not all woodworkers use these. Most of the scales were very accurate, but the Milwaukee was 0.025 in. off (almost $\frac{1}{32}$ in.).

Of course, many woodworkers will disregard the depth scale and simply set the bit to a mark on a workpiece or combination square. So we wanted to know if the depth setting changes when the cam lock



CLEAR VIEW OF THE WORK

For best control, you need to see the bit. Big windows and work lights help. With big ports and a bright light, the Bosch MRF23EVS also offered the best visibility, very helpful for stopped cuts like this big chamfer.



Quick and simple. The Milwaukee's base comes off quickly, and its two beefy wrenches are easy to handle.

BIT CHANGING SHOULD BE EASY

Adams says the older, two-wrench systems are easier to use than the newer ones, which employ a spindle lock and a single wrench.



A bit more trouble. On the Ridgid router, it can be a struggle to hold the motor and spindle lock tightly enough to resist the torque of the wrench.

How they stacked up



BOSCH MRF23EVS

Power: 15 amps
Street price: \$220

This is the heaviest and most powerful router in the test. With rack-and-pinion adjustment, it has good balance and control, with shaped handles that fit the hand. It was one of the smoothest cutters. A built-in work light is always on when the tool is plugged in, which helps with setups. On the downside, the base was a little tricky to remove for bit changes and the on/off trigger in the handle was awkward to use for those with large hands.



MILWAUKEE 5616-20

Power: 13 amps
Street price: \$210

This rack-and-pinion model made the smoothest cuts in our tests, and uses two hefty wrenches and collet nuts for the easiest bit changes. It is well-balanced and comes with a unique hand strap and rubber grip on the motor, which offers better control for some tasks. The control score was hurt a little by the Milwaukee's soft start, which was jumpy than some. The depth scale was inaccurate, but not all woodworkers use these.



DEWALT 618

Power: 12 amps
Street price: \$150

This simple, twist-to-adjust router has a lot going for it. Its depth scale is accurate. It has a gentle soft start, made smooth cuts, and is a very well-balanced machine with a low center of gravity. The grips give excellent control and the switch can be set up for left- and right-handers. The single-wrench/spindle-lock system makes bit changing more cumbersome, and you may need to drill out the 1 $\frac{3}{16}$ -in. base opening to accommodate larger bits.



BOSCH 1617EVS

Power: 12 amps
Street price: \$170

This router has a great soft start, is very well balanced, made very smooth cuts, and has an accurate micro-adjust scale on its rack-and-pinion depth system. It has two wrenches, and the base comes off easily for bit changes. On the other hand, the ball-shaped grips are slippery and the baseplate is black, which can hamper visibility.

is engaged. All of the cam locks shifted the bases the tiniest bit, but not enough to worry about. We factored those tiny amounts into the accuracy rating, too.

When you run the baseplate of the router against a fence, the precision of the cut can be affected by how concentric the base is with the collet. While none turned out to be perfectly accurate, all but the Hitachi are easily adjustable. Of course, you can always ensure a straight cut by keeping the same area of the base against the fence.

Control affects safety and accuracy

We evaluated how easy it was to control the router in a variety of situations: when picking it up and turning it on, when turning it off and setting it down, and most importantly, while making cuts.

One of my pet peeves is ball-shaped grips on a router; I prefer palm-shaped grips because they don't rotate in my hand. It's also better for the grips to be low and close to the center of gravity.

We also factored in the switch locations, and whether they can be reached without removing one hand from the handles. The Bosch MRF23EVS is the only model with its trigger in the handle, though it was slightly awkward for big hands. But we could also reach the switches easily on the other Bosch (1617EVS), as well as the DeWalt, Porter-Cable, and Milwaukee routers.

Creature comforts

One thing you'll do often is change router bits, and the easiest way is with two wrenches, set slightly apart from each other and squeezed with one or two hands. Unfortunately, some tool designers have adopted single-wrench systems, which force you to hold down the router and a spindle-lock button with one hand while pulling hard with a single wrench. I favor routers that still use two wrenches: the two Bosches, the Hitachi, the Makita, and the Milwaukee.

Although you can keep some of the bases on the router while changing the bit,

it is much easier to do it with the bases off and out of the way. So we gave extra points to bases that are easy to remove.

The tool designers have made it easier to see what you are doing. Most of these routers come with transparent baseplates, an improvement over the old-school black ones. Large openings in the base also help. We factored all that into a visibility rating, and gave a bump to the routers with an effective work light built in.

Most were solid performers

In the end there was no one perfect router, and seven out of the eight are certainly usable tools. We would be quickest to buy the Bosch MRF23EVS or Milwaukee 5616-20, so those are our Best Overall choices. The DeWalt was our pick for Best Value, edging out the Ridgid solely on price. □

Marc Adams School of Woodworking staffers Doug Dale, Mark Hedin, and Zane Powell contributed to this article.



HITACHI M12VC

Power: 11 amps
Street price: \$120

This twist-to-adjust router was the quietest in the test, and is the lowest priced. Other than that it had the most pitfalls of the lot. The soft start was jerky, the motor had a lot of vibration, and the grips were slippery. We also struggled to remove the router base and to get the bit to release from the collet. Last, the baseplate was significantly off center, and its countersunk screw holes made it impossible to adjust. We can't recommend this router.



MAKITA RF1101

Power: 11 amps
Street price: \$190

The Makita had very little runout and produced very smooth cuts. The twist-style base is very easy to attach and detach for bit changes, and the collet is tightened with two wrenches. However, the 1½-in. hole in the baseplate will need to be enlarged for bigger bits. Also, the router felt slightly top heavy, the grips were on the slippery side, and we had to let go of one handle to reach the on/off switch.



PORTER-CABLE 892

Power: 12 amps
Street price: \$180

The Porter-Cable's soft start works well, and the scale on its rack-and-pinion micro-adjuster is very accurate. Its variable-speed dial is the only one to list actual rpm, making it the most accurate. The base is easy to remove for bit changing, but the single-wrench system makes bit changes a little awkward. Also, this router had the most bit runout.



RIDGID R22002

Power: 11 amps
Street price: \$180

The rack-and-pinion-type base on the Ridgid was easy to remove, the micro-adjustment scale was the most accurate, and the grips offer good control. Also, it has a work light, its variable-speed dial lists actual rpm, and it comes with a handy cone for centering the base. However, with one wrench and a spindle lock, removing the bit was a little awkward. And while it made good cuts, the motor had more vibration than we would like.

MODEL	CUT QUALITY	ROUTER ACCURACY	CONTROL AND HANDLING	CUT VISIBILITY	EASE OF BIT CHANGES
Bosch 1617EVS	Excellent	Very good	Good	Good	Good
AUTHOR'S BEST OVERALL CHOICE Bosch MRF23EVS	Excellent	Excellent	Very good	Excellent	Good
AUTHOR'S BEST VALUE CHOICE DeWalt 618	Very good	Very good	Very good	Very good	Fair
Hitachi M12VC	Good	Fair	Fair	Good	Fair
Makita RF1101	Excellent	Good	Fair	Good	Good
AUTHOR'S BEST OVERALL CHOICE Milwaukee 5616-20	Excellent	Good*	Very good	Very good	Excellent
Porter-Cable 892	Good	Excellent	Very good	Very good	Very good
Ridgid R22002	Very good	Very good	Very good	Very good	Fair

*Excellent if you don't rely on scale for depth adjustment