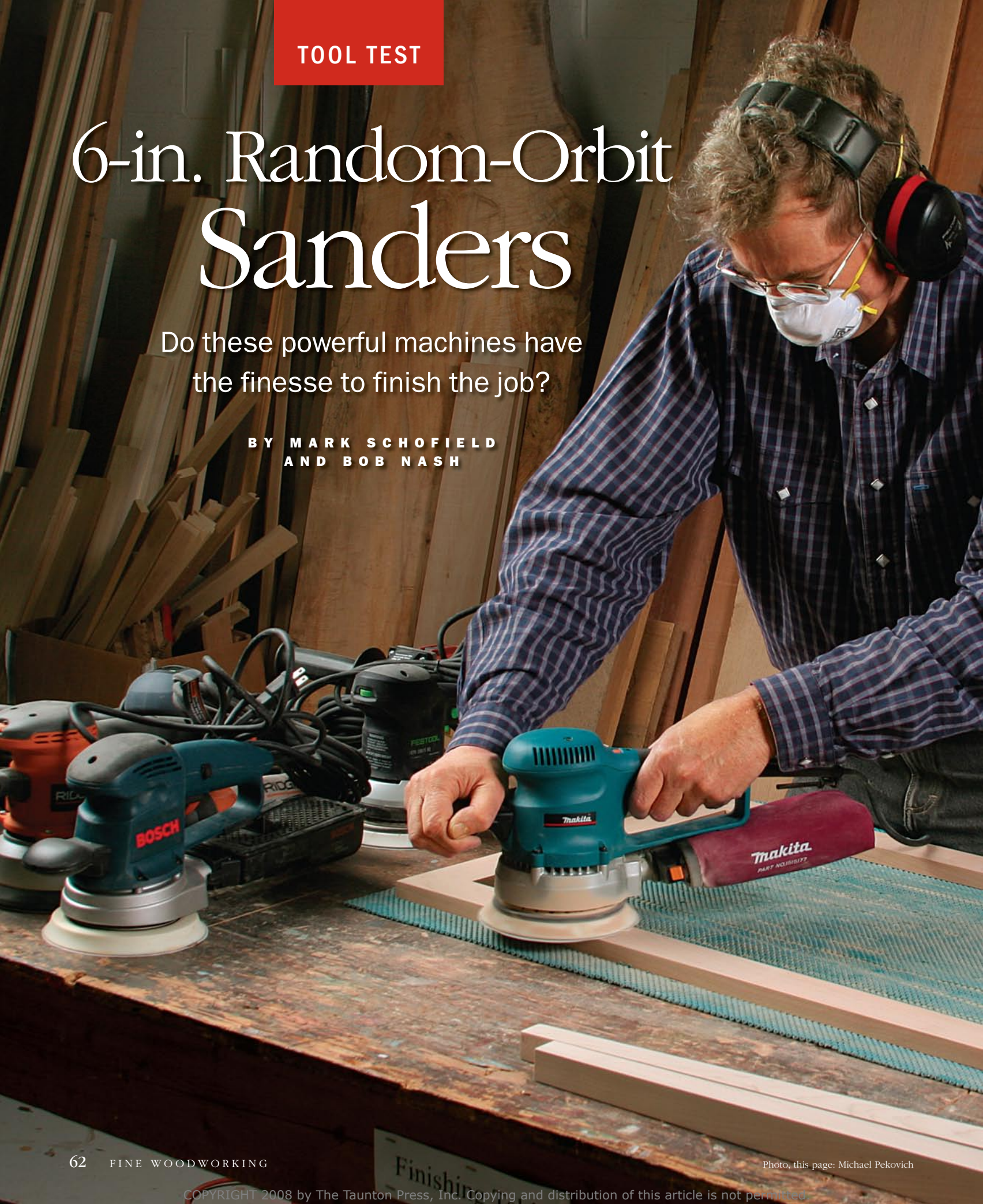
TOOL TEST

6-in. Random-Orbit Sanders

Do these powerful machines have the finesse to finish the job?

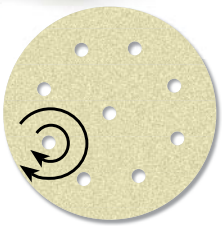
BY MARK SCHOFIELD AND BOB NASH



Photo, this page: Michael Pekovich

One inch doesn't seem like much, but when it comes to random-orbit sanders, it makes a large difference. For starters, the pad on a 5-in.-dia. sander is 19.6 sq. in., while that on a 6-in.-dia. model is 28.3 sq. in., giving you 44% more sanding surface. To drive this extra capacity, 6-in. sanders have more powerful motors, and many work in two modes—coarse and fine. The smaller sanders operate only in fine mode.

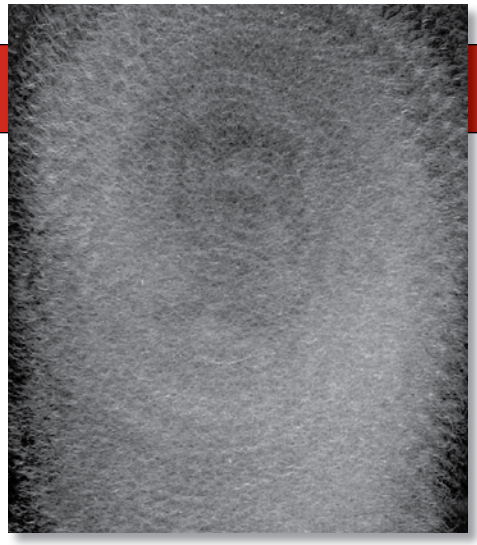
We wanted to find out what these larger sanders offer the typical furniture maker. Are the extra weight and cost justified by greater productivity? Can you easily control the tool when it's set on coarse mode, or will your crisp-edged workpiece end up looking like a piece of driftwood? How well do these tools deal with dust collection? What we discovered was a wide range of capacities and performances—far larger than the fairly homogeneous 5-in. sanders. Read on to see which model best suits your needs.

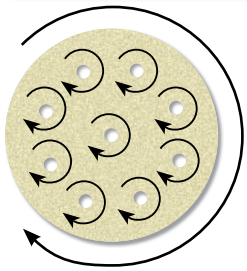


BIGGER ORBIT ...
Two of the sanders tested increase the rate of stock removal by increasing the diameter of the pad's orbit in coarse mode.

All offer random orbit

Like all random-orbit sanders, these 6-in. models have an eccentric spindle (the bottom end is offset from the top), rather like an engine crankshaft, attached to a balance weight that helps generate a centripetal (toward the center) force. The sanding pad itself rotates freely on the spindle, which you can verify by holding the running sander on its side and placing a small piece of wood against the disk; this will stop the pad's rotation, but not the orbit. When the sander is placed on the workpiece, friction between the workpiece and the pad causes the pad to rotate. It's the combination of the pad's rotation and orbit that creates an efficient, well-blended sanding pattern.





A random-orbit fingerprint. *The combination of an eccentric orbit and rotation of the pad creates the swirling, random scratch pattern.*

SOME GET MORE AGGRESSIVE

Of the six sanders equipped with a coarse mode, the Ridgid and the Metabo (left) achieve it by increasing the size of the stroke, or diameter of the pad's oscillation, from ⅛ in. to ¼ in. The larger the stroke, the more aggressive the action. Think about rubbing a bug splat off your windshield—the more tenacious the mark, the larger you tend to orbit the cloth. You can sometimes see the size of the stroke by putting a pencil dot on a sanding pad and then turning on the machine in random-orbit mode.

A greater increase in stock removal can be achieved by engaging a gearing mechanism. Instead of letting the sanding pad rotate freely, this mechanism allows the motor to drive the rotation, while keeping its orbital pattern. The Fein, Makita BO6040, Bosch 1250DEVS, and Festool RO 150 FEQ (right) all employ this combination of fast rotation and random orbit. It removes stock almost as fast as a belt sander or a grinder, but without the deep scratches, because the same piece of grit doesn't pass over the same section of wood even with the sander held steady.

... OR SET IT SPINNING
On other sanders, an aggressive rotary motion is achieved when a gear on the spindle engages a ring gear linked to the pad, forcing it to spin rapidly.

Let the sanding marathon begin

To test each sander's stock-removal rate, we used the same method Andy Engel employed to test 5-in. random-orbit sanders ("Random-Orbit Palm Sanders," *FWW* #185). We weighed an 8-in. by 24-in. cherry board on a scale accurate to 1 gram (28.35 grams = 1 oz.); then we sanded the board using a P100-grit hook-and-loop disk from Klingspor for exactly five minutes. Then we weighed the board again to

Thumbnail reviews

FESTOOL ETS 150/3 EQ

SINGLE MODE

This was the easiest sander to control, with no vibration or wobble, and one-finger control when using the onboard dust canister. With a vacuum hose attached, there was minor movement, but using a medium speed helped on narrow stock. Using the vacuum on minimum power reduced stock removal from 20 grams to 11, but the percentage of the dust collected by the vacuum rose from 93% to 100%. With its combination of ultra-smooth operation and good stock removal, the ETS 150 is our pick for best overall.

BOSCH 1250DEVS

DUAL MODE

Designed to be used only with a vacuum, this sander can be used in "turbo" eccentric-orbit mode for fast stock removal or in random-orbit mode for fine sanding. The turbo mode removed wood five times faster, but there was high vibration and wobble and it required the firm grip of two hands to keep control. Fine mode was much smoother, with only a slight rocking, but stock removal fell off sharply and the barrel required slight upward pressure to maintain full disk contact. The on/off switch is easy to use.

BOSCH 3727DEVS

SINGLE MODE

This sander operates in a fine, random-orbit mode only. With the onboard dust pickup, it was very easy to control, almost a one-finger operation. When sanding small surfaces, it worked best at medium speed (there was a slight up-and-down motion at full speed). The onboard dust canister was the most effective of all the canisters, picking up 86% of the dust. Full vacuum power sucked the machine to the wood (a problem), and minimal vacuum power reduced dust collection to 50%. For fine sanding, though, particularly if not attached to a vacuum, this machine deserves the best value award among single-mode sanders.

DEWALT DW443

SINGLE MODE

The loud grinding sound of this right-angle sander promised a high rate of stock removal. Instead, it operates only in fine mode with fairly modest stock removal, particularly when not attached to a vacuum. The on/off switch is awkwardly located on the barrel under your hand and it is hard to get your fingers between the barrel and the dust bag, which only managed to pick up less than half the dust. But when attached to a vacuum, not only did the rate of stock removal nearly double, but 97% of the dust was collected, second only to the Festool RO 150.

MAKITA BO6040

DUAL MODE

A right-angle sander with coarse and fine modes, the Makita is designed for use only with a vacuum, which may be just as well—it was the clear winner in the stock-removal test. In three timed sessions in coarse mode, it removed an average of 54 grams, nearly 70% more than the runners-up. But the BO6040 was hard to control even with two hands locked on, regardless of vacuum power. In fine mode, minimal vibration, wobble, and workpiece movement allowed one-handed operation. For fast stock removal, this is the best value among dual-mode sanders, even though the vacuum hose is a $54 accessory.

FEIN MSF 636-1

SINGLE MODE

With no speed control and an aggressive 5⁄16-in. stroke, this sander made us constantly fight for control. Even with two hands firmly on the tool there was a constant wobble. Considering the rough action, we expected the rate of stock removal to be higher than 18 grams (see test results, p. 67). On the other hand, the dust collection was pretty effective at 92% when attached to a vacuum (there is no onboard canister). Another drawback is the requirement to grease the eccentric head every 50 hours and the gears every 300 hours. None of the other sanders listed a similar maintenance requirement.

Photos, except where noted: Mark Schofield

FESTOOL RO 150 FEQ

DUAL MODE

The Festool Rotex can be switched from rotary motion for aggressive stock removal to random-orbital motion for fine sanding. Designed to be used only with a vacuum hose attached, it was quite a handful, particularly in rotary mode where even two hands couldn't prevent it from jumping and moving the workpiece. Even the random-orbit mode proved exhausting: The sander was noisy and rough-sounding, with a noticeable vibration that left our hands tingling. If you want fast stock removal, the Bosch 1250DEVS and the Makita BO6040 offer similar or better performance for half the price.

METABO SXE450 TURBO TEC

DUAL MODE

The Metabo changes from a ¼-in. stroke for fast stock removal to a ⅛-in. stroke for fine sanding. Changing modes involves pushing a button and turning the pad manually until you hear a couple of clicks. But there is no visual clue to which mode you are in and we found it difficult to tell one from the other, in part because neither was very aggressive. The Metabo had some of the lowest stock removal scores and the motor seemed to bog down if any more than light downward pressure was applied to the tool. The sander was easy to control, except in fine mode with the vacuum attached.

MAKITA BO6030

SINGLE MODE

The percentage of dust collected over the course of the three 5-minute tests fell from 79% to 50% using the onboard dust canister, for an average of 65%. When we repeated the tests, the percentage fell from 87% to 44%, for an average of 60%. We hoped a vacuum would give better results, but a hose made this sander nearly uncontrollable; it was sucked to the wood even with the vacuum at minimum power. For a fine-mode machine, this sander removes an impressive amount of wood, but it is troubling that so little of the dust can be collected.

RIDGID R2611

DUAL MODE

This is a close relative of the Metabo, with a similar dual-stroke random orbit and an identical weight, but there are some differences: Mode selection is done by sliding a button similar to the direction control on an electric drill, making a visual check easy, but the tool was not as smooth as the Metabo, with a slight wobble in the fine mode and considerable rocking and wood grabbing in coarse mode. The trigger-lock button for sustained operation was difficult to engage. The Ridgid boasts a soft start and a pad brake. Stock removal was faster than the Metabo.

see how much wood had been removed. We performed the test three times, each time with a fresh disk, and averaged the results.

Four machines have a fine setting only, one is exclusively coarse, and the remaining five were tested in both modes. All but one sander had variable speed control, but to maintain consistency, all the tests (see head-to-head results, pp. 66-67) were done with the sander at the maximum speed setting.

We also evaluated how effectively each machine collected dust, whether using an onboard system or hooked up to a vacuum. To test the former, we weighed the machine before and after each test, comparing the weight gain of the machine (and its dust cup/bag) to the weight loss of the board to calculate the percentage of dust that was collected. To see how well the sanders worked with a vacuum, we used a Festool vacuum with removable paper bags, weighing the bag before and after each test and comparing it to the change in the board's weight to calculate the percentage of the dust collected.

All this added up to 66 five-minute tests or 330 minutes of pure sanding pleasure. Not wanting to fight over this unique opportunity, the two of us intended to share the task. But we quickly found that the stock-removal rate varied considerably depending on an individual's sanding style, and in particular how much pressure he applied to the machine. To keep the comparison between different machines reliable, we decided to go with Bob Nash's lighter touch.

Can a big machine handle a narrow surface? A 6-in. sander might be perfect for flattening a tabletop, but how will it cope with narrow aprons or tapered legs? To find out, we also used each sander on a 2-in.-wide cherry frame and a maple leg that tapered from 2 in. to 1 in. We used both fine and coarse modes, at various speeds, with P100-grit and P180-grit disks. In general, the more aggressive the machine, the harder it was to control on a narrow surface. The best machines retained their fingertip control, while a two-handed grip with white knuckles couldn't

Head-to-head results

To test each sander's efficiency, we sanded a cherry board three times, five minutes each time. Holding the board in a jig minimized movement so that hand pressure could be applied evenly.

Noise test. *Nash used a decibel meter to measure the noise level produced by each sander.*

Stock removal. *Using scales accurate to 1 gram, a cherry board was weighed before and after each five-minute sanding test to calculate the amount of wood removed (above). To see how much dust was collected by the vacuum, it was weighed before and after each test (right).*

Onboard dust collection. *To determine the efficiency of the sander's onboard dust collection, the sander was weighed before and after each test.*

MODEL/SOURCE	STREET PRICE	WEIGHT (LB.)	MOTOR (AMPS)
BOSCH 1250DEVS www.boschtools.com	$250	5.3	6.5
AUTHOR'S BEST VALUE CHOICE **BOSCH 3727DEVS** www.boschtools.com	$150	5.2	3.3
DEWALT DW443 www.dewalt.com	$166	5.7	4.3
FEIN MSF 636-1 www.feinus.com	$440	3.7	3.2
AUTHOR'S BEST OVERALL CHOICE **FESTOOL ETS 150/3 EQ** www.festoolusa.com	$275	4.0	2.6
FESTOOL RO 150 FEQ www.festoolusa.com	$475	5.0	6.0
MAKITA BO6030 www.makita.com	$170	5.1	2.7
AUTHOR'S BEST VALUE CHOICE **MAKITA BO6040** www.makita.com	$250	5.9	6.6
METABO SXE450 www.metabo.us	$165	6.0	3.8
RIDGID R2611 www.ridgid.com	$130	6.0	4.0

control the worst. The results for each machine are described in the thumbnail reviews (pp. 64-65) and the above chart.

While the coarse mode is undoubtedly more aggressive, can you tell which mode was used after a finish has been applied? To see, we sanded some cherry boards up to P220-grit with machines in both modes. We then applied a pigmented oil stain to enhance any sanding marks, sealed it with shellac, and applied three coats of water-based polyurethane. Various editors looked at the results and admitted that the panels were almost identical. We then tried the same test with tight-grained hard maple, and here the coarse-sanded surfaces were noticeably darker, indicating a rougher surface. Finally, to see the difference under a penetrating oil finish, we sanded some cherry boards and applied three

SANDING MODES	NOISE (DB)	WOOD REMOVED (GRAMS)		DUST COLLECTED (%)		HANDLING	
		ON-BOARD COLLECTION	VACUUM	ON-BOARD COLLECTION	VACUUM	WIDE STOCK	NARROW STOCK
Coarse	97	n/a	32	n/a	92	Poor	Poor
Fine	93	n/a	6	n/a	84	Good	Fair
Fine	96	7	13	86	95	Very good	Excellent
Fine	96	5	9	48	97	Good	Fair
Coarse	95	n/a	18	n/a	92	Poor	Poor
Fine	86	9	20	82	93	Excellent	Excellent
Coarse	95	n/a	32	n/a	89	Poor	Poor
Fine	95	n/a	13	n/a	98	Fair	Fair
Fine	87	15	n/a	65	n/a	Very good	Poor
Coarse	96	n/a	54	n/a	74	Fair	Poor
Fine	94	n/a	11	n/a	87	Very good	Good
Coarse	90	6	8	62	88	Very good	Good
Fine	86	3	3	67	92	Very good	Good
Coarse	92	9	10	73	93	Good	Fair
Fine	92	5	5	78	88	Very good	Good

coats of Waterlox Original wiping varnish. The coarse-sanded surface remained noticeably lower in luster even after three coats. So if you tend to use oil finishes, you'll want to avoid a final sanding in coarse mode.

Which 6-in. sander is right for you?

If you handplane like Garrett Hack or wield a scraper like Phil Lowe, you probably don't need a 6-in. random-orbit sander at all. But if you favor a power sander for removing machine marks, eliminating tearout, and bringing boards flush, then it may be time to invest in a 6-in. model. The single-mode Festool ETS 150/3 EQ and Bosch 3727DEVS combine a good rate of wood removal, especially when hooked to a vacuum, with easy control on wide and narrow surfaces. You could rely on either of these tools as your only sander.

The need for a sander with a coarse mode is harder to justify. On the one hand, most do remove wood quicker than a fine-mode 6-in. or 5-in. sander, but with the most aggressive machines you will have a serious fight on your hands each time you turn them on. The Makita BO6040, the Bosch 1250DEVS, and the Festool RO 150 FEQ all offer a high rate of stock removal. But you are likely to reach for another sander to handle narrow or confined spaces. □

Mark Schofield is the managing editor and Bob Nash is the shop manager for Fine Woodworking.