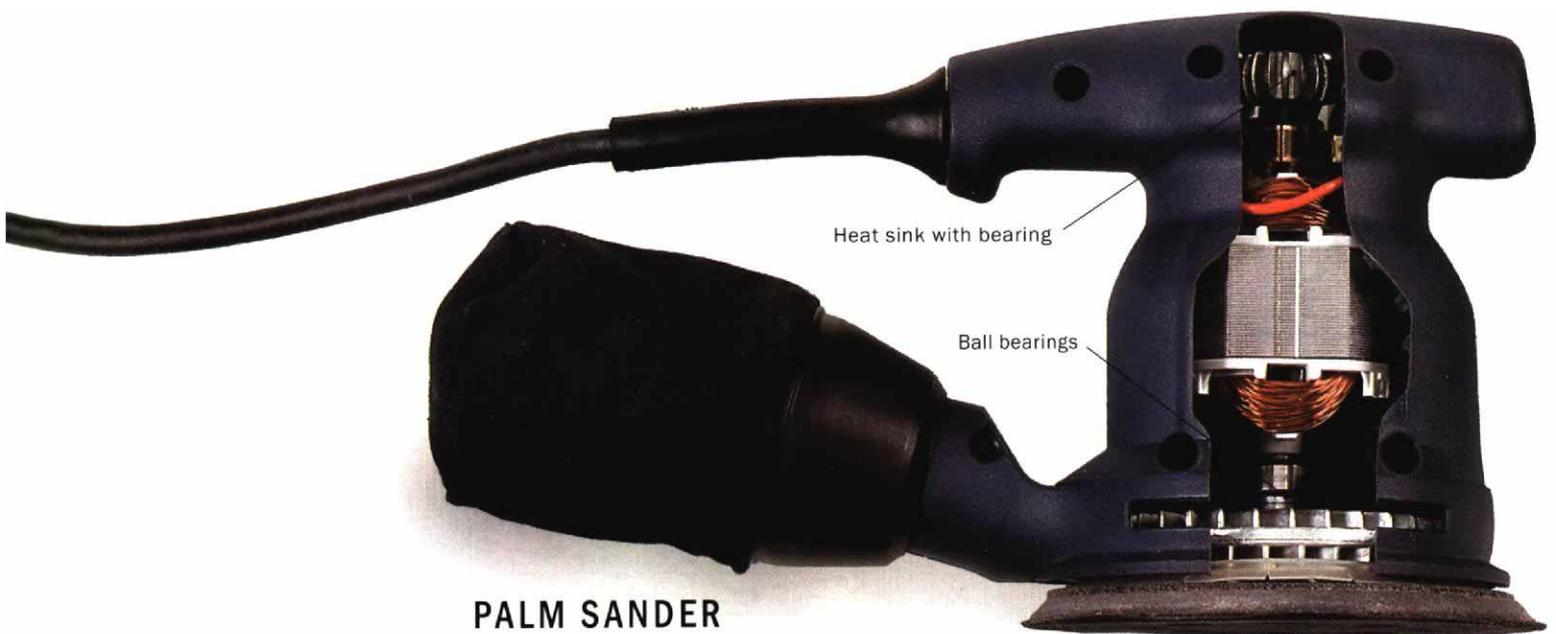


The Spin on Random Orbit Sanders

Recent innovations improve the machines that revolutionized sanding

BY LON SCHLEINING



PALM SANDER

When random-orbit sanders first hit the woodworking market, they offered some perks that you couldn't find in other machines. Eight years and many improvements later, they threaten to turn even the belt sander into an antiquated tool.

The classic example of a tough sanding job is a face frame where two pieces of wood come together at right angles. It's difficult, even in experienced hands, to sand a face frame well with any other portable sander. But with a random-orbit sander, even a novice can do a good job.

Whether you need an aggressive machine or one for finish-sanding, the right

random-orbit sander will make sanding an easier and more enjoyable task.

Over the last few months, I've used an array of the latest machines. I also took them to Cerritos College, where I teach woodworking, so the students and a few instructors could put the various machines through their paces.

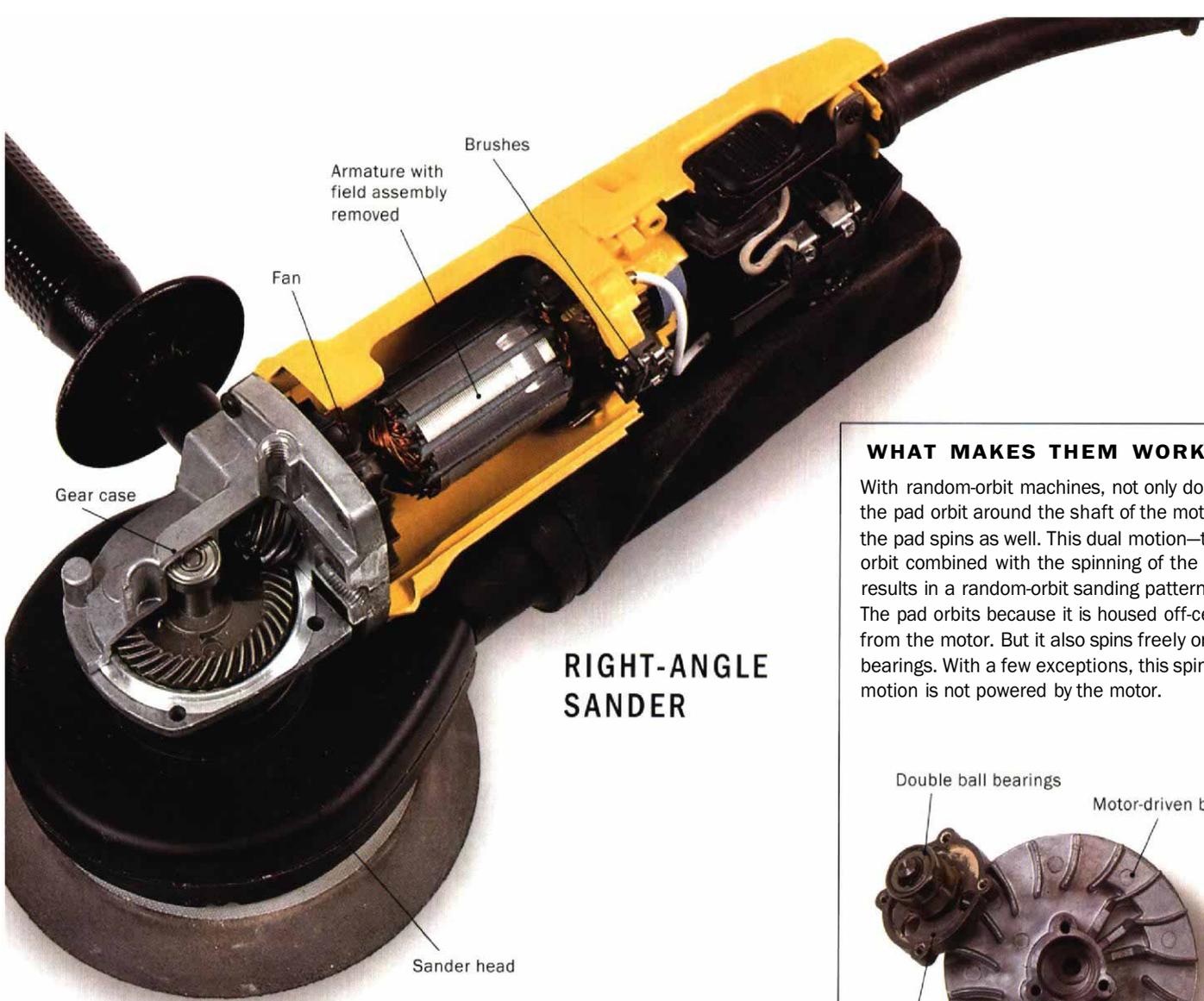
We all contributed our observations on such things as dust collection, noise and overall performance. We also evaluated all the advertised improvements—variable-orbit patterns, more power, less vibration, slow-starting motors and pad dampeners, which keep the sander from scarring the work—to see whether the bells and whis-

tles were real innovations or just gimmicks.

What we found was an amazing range of quality between essentially identical looking machines. There are some great values and some fine but pricey tools. There are also a few duds to steer clear of.

What is a random-orbit sander?

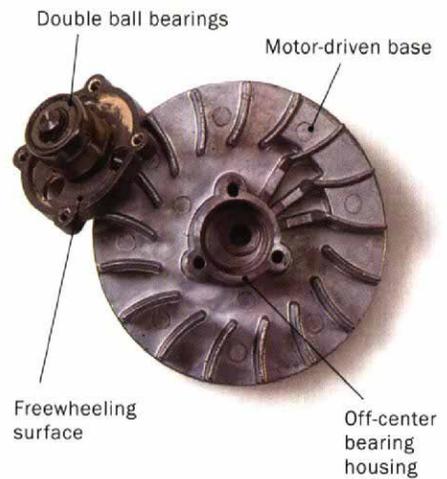
If you pick up a sander that has a square pad or a round pad that you cannot rotate, chances are it's a conventional orbital or finishing sander. On these sanders, the sanding pad is mounted slightly off-center on the shaft of the motor. When the motor runs, the disc orbits but does not spin. This pattern is consistent, producing a tell-tale



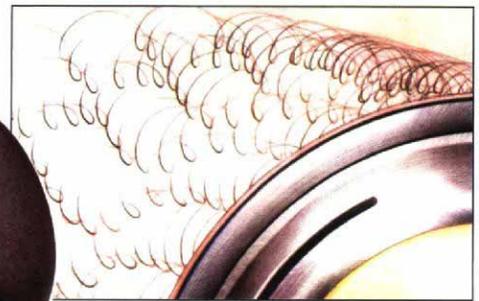
RIGHT-ANGLE SANDER

WHAT MAKES THEM WORK

With random-orbit machines, not only does the pad orbit around the shaft of the motor, the pad spins as well. This dual motion—the orbit combined with the spinning of the pad—results in a random-orbit sanding pattern. The pad orbits because it is housed off-center from the motor. But it also spins freely on ball bearings. With a few exceptions, this spinning motion is not powered by the motor.



The scratch pattern of random-orbit sanders is almost indiscernible on the face of the work.



Drawing: Bruce Morser



PISTOL-GRIP SANDER

PALM SANDERS

Palm sanders are light, familiar-looking tools designed for one-handed use. They are mostly used for fine sanding and finishing—where a delicate touch is needed and not much stock is to be removed. The best in this category is nearly a toss-up between the Porter-Cable 333VS and the DeWalt DW423. The DeWalt is more comfortable and quiet, but the Porter-Cable offers more power.

Ryobi RS 240 STREET PRICE: \$50

For the price, the Ryobi RS 240 palm sander has to be considered an entry-level sander. It performs pretty well considering the low cost, but it has severe vibration, not much power and poor dust collection. One innovative feature is the pressure-sensitive adhesive/hook-and-loop adapter. It sticks on like any other PSA disc and allows you to use hook-and-loop discs without buying another pad. It should work with any PSA pad.

DeWalt DW423

STREET PRICE: \$90

You could run this sander all day. It's a very quiet machine with a small profile that makes it easy and comfortable to hold. It's a variable-speed machine with a soft start and efficient dust collection. The only problems are that it is one of the most expensive palm sanders and could use a bit more power.

Bosch 1295DH

STREET PRICE: \$90

This sander has lots of power and good dust collection. At high speeds, it's capable of some aggressive sanding. It was the noisiest palm sander reviewed. The vibration is excessive, and the dampener barely works. The switch was awkward to use, and the machine became tiresome to operate after a few minutes.

Porter-Cable 333VS

STREET PRICE: \$80

The latest version of this sander is a smooth, well-balanced workhorse. It has variable speed and with 2.4 amps, a lot more power than the old model at 1.7 amps. The real innovation on this machine is that a groove milled into the pad allows you to use sanding discs of any hole pattern, without sacrificing dust collection.

Black & Decker R0100

STREET PRICE: \$40

A decent entry-level sander. It works almost as smoothly as some of the more expensive models. One nice feature is that it easily hooks up to standard vacuum hoses. But it could use variable speeds and a better dampener—it barely slowed the spinning of the disc.

Makita BO 5010

STREET PRICE: \$75

A real nice machine with plenty of power. It has very little vibration, an excellent dampener and good dust pickup. It's quiet and lightweight to boot. The only drawback is that it doesn't have variable speed.



MODEL	Black & Decker RO100	Bosch 1295DH	DeWalt DW423	Makita BO 5010	Porter-Cable 333VS	Ryobi RS 240
PAD STYLE (H & L= hook & loop)	5 in. 8 hole H & L	5 in. 6, 8 hole H & L	5 in. 8 hole H & L			
WEIGHT	3.5 lbs.	3.5 lbs.	3.2 lbs.	2.6 lbs.	3.5 lbs.	3 lbs.
AMPS	2	2.4	2	2	2.4	2.4
ORBIT DIAMETER	$\frac{3}{32}$ in.	$\frac{1}{16}$ in.	$\frac{3}{32}$ in.	$\frac{1}{8}$ in.	$\frac{3}{32}$ in.	$\frac{5}{32}$ in.
DECIBELS	88	89	81	84	87	88
SPIN CONTROL DAMPENER	Yes Poor	Yes Poor	Yes Excellent	Yes Excellent	Yes Excellent	Yes Good
SPEEDS (orbits per minute)	12,000	12,000, 14,000	7,000- 12,000	12,000	5,000- 12,000	12,500
DUST COLLECTION	Cloth bag Good	Canister Good	Cloth bag Excellent	Cloth bag Good	Canister Excellent	Cloth bag Poor

pattern of identical circular scratches on the surface being worked. A random-orbit sander starts with this same orbit mechanism but houses the pad on ball bearings so that the pad also spins (see the box on p. 59). This is how the random pattern is achieved.

Think of someone using a Hula Hoop. The person's hips are orbiting their body in a circular pattern like the pad on a conventional orbital sander. The Hula Hoop itself is like the pad on a random-orbit sander—it's being propelled by the regular motion of the person's hips, but the hoop is also spinning in a random pattern like the pad on a random-orbit sander.

With the pad both spinning and orbiting, the scratch pattern on the surface of the work is more random and less repetitious—almost imperceptible. Because of the sanding pad's unique motion, you don't have to worry about the grain orientation.

What to look for in a random-orbit machine

Within the general category of random-orbit sanders, there are three configurations: palm, pistol grip and right-angle sanders.

The palm sanders are very light, one-handed machines that are great for fine and finish-sanding. They are a pleasure to use, but they wouldn't be my first choice for aggressive stock removal.

The pistol grips are smooth running with the least vibration and generally a little more power. These machines are a good choice if you're looking for a sander to do a little bit of everything. I thought that they would be awkward to use, but some of the handle designs proved wonderfully comfortable.

Right-angle sanders were the first random-orbit sanders to enter the woodworking field. Based on the automotive trade's angle grinder, right-angle sanders are two-handed machines that are capable of removing a lot of stock quickly. But they are loud and can be hard to control—

Air-powered sanders

For those who have pressurized air in large quantities—at least a 5-hp compressor—pneumatic sanders are a light and affordable option. Their performance is as good as most of the electric models, and the cost is comparable. They have good dust-collection options, and many are quiet enough to run without ear protection. Their speed and power are easy to control.

The Dynabrade 57030 air palm sander is light, powerful and has as little vibration as any machine tested. Its small shape feels better in your hand than the larger Fein or the much larger electric palm sanders. Even without a dampener, this air sander is a fine machine, especially for its \$270 price. Fein also makes a vacuum (model no. 9-88-13) to accompany its air sander.



Not just blowing air. Pneumatic sanders are comfortable palm-style machines, with more power than their electric cousins.

PISTOL-GRIP SANDERS

Compared to palm sanders, pistol-grip sanders are generally heavier, more powerful tools designed for use with two hands. Some are more aggressive or have more features than the palm sanders, but others are just palm sanders with different handles. Bosch proved to be the pick of the pistol-grip litter, with Metabo coming in a pricey second.

Bosch 3725DVS

STREET PRICE: \$150

One of my students called this a "kinder, gentler sander." It has excellent dust collection, and the dampener works great. It has handles that allow a number of different grips. And the soft rubber coating on the top of the motor housing feels good in your hand. It's also light enough to be used in one hand like a palm sander. It is quiet, aggressive and has the least vibration of all of the sanders. With variable speeds, this easily is the most sander for the money.

Metabo SX E 450 Duo

STREET PRICE: \$190

Although expensive, this quiet, powerful and comfortable machine ran a close second to the Bosch pistol grip for smooth operation and sanding speed. Its unique feature is its ability to change from a wide, 1/4-in. orbit diameter for aggressive work to a smaller 1/8-in. orbit for finer work. This coupled with variable speed makes this the choice for fine work like sanding finishes. One problem is that it's a heavy machine for anything other than horizontal sanding.

Skil 7435

STREET PRICE: \$65

For the money, this sander is comfortable, easy to control and quiet. The adjustable front handle helps accommodate different hand positions. This sander also has a large bag for dust collection that stays out of the way and is easy to empty. If the bag is removed, the dust port is made to fit a standard vacuum hose.



Milwaukee 6020-02

STREET PRICE: \$160

This 6-in. European-made sander (as well as its 5-in. brother) is innovative in its design. It is lightweight and has a lot of power but little vibration. This is a comfortable machine to use. The variable-speed control on the trigger is handy. One drawback is that the 6-in. sander requires a unique hole pattern, so the discs might be hard to find.

Wen 18

STREET PRICE: \$60

A lightweight sander with good dust collection and a convenient variable-speed switch on the handle. The grip was more comfortable than most of the lower-end pistol-grip sanders, but it proved short on power and could use a spin-control dampener.

Craftsman 315.277170

STREET PRICE: \$70

The Craftsman, made by Ryobi, lacks the heft and performance of the more common commercial models. It is lightweight, and the dampener works well. It has ample power and good dust collection. But using it quickly becomes a chore, thanks to severe vibration.

MODEL	Bosch 3725DVS	Metabo SX E 450 Duo	Skil 7435	Milwaukee 6020-02	Wen 18	Craftsman 315.277170
PAD STYLE (PSA = pressure-sensitive adhesive)	5 in. 8 hole H & L	6 in. 5 hole H & L	5 in. 8 hole H & L	6 in. 16 hole H & L	5 in. 8 hole H & L	5 in. 8 hole PSA
WEIGHT	5.1 lbs.	6 lbs.	3.8 lbs.	5.1 lbs.	3 lbs.	3.5 lbs.
AMPS	3.3	3.8	2.8	4	2	3
ORBIT DIAMETER	$\frac{3}{32}$ in.	$\frac{1}{8}$ in., $\frac{1}{4}$ in.	$\frac{3}{16}$ in.	$\frac{9}{32}$ in.	$\frac{5}{64}$ in.	$\frac{5}{32}$ in.
DECIBELS	82	84	84	90	83	87
SPIN CONTROL DAMPENER	Yes Excellent	Yes Fair	Yes Good	Yes Good	No	Yes Excellent
SPEEDS (orbits per minute)	4,500- 12,000	4,000- 10,000	7,000- 12,000	4,000- 5,500	0- 12,000	14,000
DUST COLLECTION	Cloth bag Excellent	Paper bag Excellent	Cloth bag Good	Cloth bag Good	Canister Good	Membrane Good

too much machine for finish-sanding.

Besides what you'll use a sander for, there are a few features you should understand.

Dust collects through holes in pad—Most woodworkers I know are still using pressure-sensitive adhesive (PSA) sanding discs. But more and more woodworkers, myself included, are switching to the Velcro hook-and-loop pads. With PSA, taking the disc off the sander, even after brief use, usually means throwing it away—not necessarily because it is dull or clogged but because it's just about impossible to get it to stick again. But with hook and loop, you can easily go from one grit to another, and then reuse the discs. Before buying anything, make sure you locate a supplier for discs with the specific hole pattern you'll need.

No matter what disc you choose, dust is collected through holes in the discs and, with some models, through collection hoods or ports around the perimeter of the disc. They have an internal fan that vacuums up the dust and deposits it into a container attached to the sander. Some need an external vacuum hookup to work effectively. Others will operate with either a vacuum or collection bag.

I would definitely look for an efficient dust-collection system. The porous canister collectors work very well, as do some of the cloth bags. However, paper containers are the best; they let air flow but still keep the dust in the bag. Find a machine that has both a bag for dust and a vacuum hookup. You might not always want to use the vacuum, but you'll always want dust collection of some kind.

A good pad dampener can save your work—A pad dampener allows the pad to rotate but prevents it from freewheeling. A good dampener will enable you to lift the sander from the surface and place it back on the workpiece without hav-

Vacuum systems

I looked at three vacuum systems designed with sanders in mind. When the sander is turned on, the vacuum automatically starts. When the tool shuts off, the vacuum continues to run for a few seconds then shuts itself off. The Festo SR 201 EAS and Fein 9-88-13 (not pictured) operate this way with either air or electric tools. The Festo was the only one

tested with adjustable suction, and it proved to be useful. Without it, the Porter-Cable and Fein machines would suck so hard they applied too much sanding pressure.

If you're sensitive to dust, Festo is the machine to have. The only drawback is it was made specifically to fit Festo tools and won't work easily with most other machines.—L.S.



Dustless sanding. For better dust pickup, these dedicated sanding vacuums keep the shop from becoming a fog of dust

RIGHT-ANGLE SANDERS

Right-angle sanders are the most powerful, noisy and aggressive machines. They are definitely two-handed tools and are more difficult to control, but you do get used to them. Some remove stock as fast as a belt sander. The Festo Rotex RO 150 E angle sander costs more than \$500—one of the most expensive sanders in the test but also the one the author would most like to own.

Festo Rotex RO 150 E

STREET PRICE: \$512

At the turn of a knob, this sander goes from an aggressive but smooth sander into a machine so ferocious it is like having a well-mannered lion on a leash. Coupled with the Festo SR 201 EAS vacuum, this sanding system is as sophisticated as they get.

DeWalt DW443

STREET PRICE: \$150

The dust bag on this machine picks up well and stays tucked out of the way under the machine, but if you want to use this with a central vacuum system, you'll have to buy an adapter. This sander has a quality slow start and very little vibration. Buy some ear muffs; this is a loud machine. A fine tool for the price.

Fein Msf 636-1

STREET PRICE: \$500

This machine can be a handful, and you'll spend a lot of money for what you get. It is one of the noisiest sanders tested and has the most vibration as well. It has a considerable amount of power and is lightweight. The dust collection worked well. But because of its vibration, it's quite tiring to run this machine even for short periods of time. It sands quickly, but so do other less expensive machines.

Milwaukee 6126

STREET PRICE: \$140

This is Milwaukee's standard high-speed right-angle grinder with a random-orbit attachment. This machine would be a good buy for someone who does not already own a right-angle grinder. But you get a lot of noise, little control and no spin dampener. The \$50 random-orbit attachment will fit any $\frac{5}{8}$ -in. angle grinder and may be purchased as a separate accessory. A dust-collection kit is available.

Porter-Cable 7336

STREET PRICE: \$150

This is a lot of sander for the money. This machine is capable of aggressive sanding, but still manages to be the quietest of the right-angle lot. The dust setup would work with almost any vacuum system, but it's too bad the kit doesn't contain a dust bag for those times you don't want to use the vacuum.

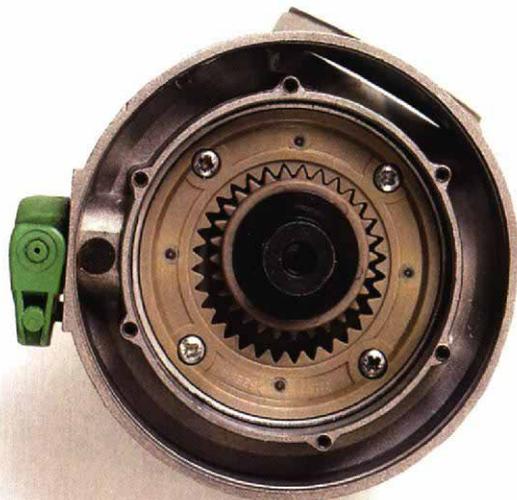
Bosch 1370 DEVS

STREET PRICE: \$260

This is a powerful and aggressive machine with impressive dust control. The soft start works well, and the pad will accommodate either six- or eight-hole discs. Although lightweight with two orbiting options, it is somewhat unwieldy to hold.

MODEL	Festo Rotex RO 150 E	Porter-Cable 7336	Milwaukee 6126	Bosch 1370 DEVS	Fein Msf 636-1	DeWalt DW443
PAD STYLE	6 in. Unique 8 hole H & L	6 in. 6 hole H & L	6 in. 6 hole PSA	6 in. 6, 8 hole H & L	6 in. 8 hole H & L	6 in. 6 hole H & L
WEIGHT	5 lbs.	5.7 lbs.	5 lbs.	5.3 lbs.	3.7 lbs.	5.7 lbs.
AMPS	4.2	3.7	5.5	5	3.6	4.3
ORBIT DIAMETER	$\frac{3}{16}$ in.	$\frac{3}{32}$ in.	$\frac{5}{32}$ in.	$\frac{11}{64}$ in.	$\frac{5}{16}$ in.	$\frac{3}{16}$ in.
DECIBELS	97	90	99	92	98	96
SPIN CONTROL DAMPENER	Yes Excellent	Yes Excellent	No	Yes Excellent	Yes Good	Yes Good
SPEEDS (orbits per minute)	4,000-11,200	2,500-6,000	10,000	4,800-11,000	7,500	4,000-6,800
DUST COLLECTION	Vacuum hookup	Vacuum hookup	Kit available	Cloth bag Good	Vacuum hookup	Cloth bag Good

Teeth that bite. Most random-orbit sanders rely on a counterweight to rotate the disc, but the right-angle machines from Festo and Bosch have a gear-driven option. The pad rotates in constant motion and isn't slowed by pressure applied to the work surface. The result is a more aggressive machine.



ing to wait until the pad stops spinning. Without a dampener, you either let the pad stop spinning completely or put scratches in your work.

It takes more than one speed—Variable speed is a feature I would look for. Even if you run the sander at full speed most of the time, there likely will be times when a slower speed will be useful, especially when sanding finishes.

Keep it steady—High vibration makes a sanding project much more tiring and stressful on hands and arm joints. The more well-balanced the machine is, the less vibration. Some of the smallest and cheapest sanders had the worst vibration, but most had acceptable vibration levels. Some, like the Bosch 3725DVS and the air-powered Dynabrade, had almost no perceptible vibration.

What to buy?

The sander you'd choose for your situation would probably be different from my choice, but here are my personal favorites from each category.

There were a number of really good palm sanders. The Porter-Cable 333VS, newly revamped with extra power, variable speed and a channel cut in the pad for the more common eight-hole discs, is a real workhorse. The canister dust collector on my old 333 still works as well as it did when new. That feature remains unchanged. For \$80, it's hard to go wrong with this one.

I loved the smoothness of two of the pistol-grip sanders, the Metabo and the Bosch 3725DVS. The Bosch pistol grip was the hands-down favorite with students. It was as smooth as glass, powerful, and because there was so little vibration, it was comfortable to use for long periods. It had great dust collection, and at about \$150, it's an excellent value. Though a bit on the heavy side, it is one sander I will miss and may have to buy.

As aggressive as some of the right-angle sanders are, there are times when they could take the place of a belt sander or even a large disc sander. At \$512, the Festo is pricey but worth the money if you have a use for it. I liked the Festo's ability to change from a *very* aggressive configuration back to a more controllable conventional random orbit simply by moving a lever. Coupled with an amazingly quiet, efficient and powerful triggered vacuum system, the Festo is now a must for my future boatbuilding projects.

No single sander will meet everyone's needs, but if you don't own a sander, you can't go wrong with a nice random-orbit palm sander with a dampener, good dust collection and a hook-and-loop pad. □

Lon Schleining works wood in Long Beach, Calif.