

Tool Test

CYCLONE

Dust Collectors

The latest models are better and cheaper than ever. *by David Munkittrick*

There has never been a better time to buy a cyclone dust collector. The new generation of cyclone machines is more powerful, more effective, more convenient—and less expensive. It is now possible to get a very fine 2-hp cyclone for less than \$750. You can thank a competitive field and a growing demand from woodworkers for driving the innovations and prices.

For this test, we looked at all the 2-hp and 3-hp cyclones we could get our hands on. Many of these machines are newly designed. Some were so new the manufacturer couldn't get a stock model to us in time for testing (see "Others You Should Know About," page 91).

ADVANTAGES OF A CYCLONE DUST COLLECTOR

PERFORMANCE AND FILTRATION

The cyclone is a two-step mechanical separator that, unlike a single-stage collector, drops solids from the air stream before they get to the impeller or filter (Fig. A, page 86). This allows the filter to run clean for long intervals. A clean filter allows greater airflow. Compare that to a single-stage collector in which the collection bag doubles as a filter and constricts airflow as the bag fills.

Because cyclone impellers handle relatively clean air, they can be designed to maximize airflow. A single-stage impeller, on the other hand, must be built to withstand the impact from debris; efficient airflow is secondary.

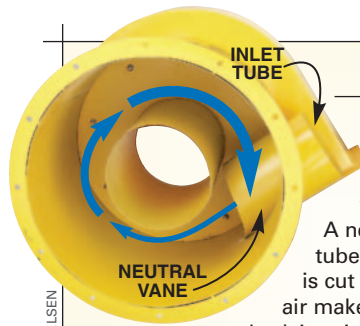
Cyclones tend to have larger impellers and inlets than single-stage collectors do. That makes cyclones better suited for central dust collection systems with large-diameter multiduct runs.



THE NEW-GENERATION CYCLONES

BOOSTING PERFORMANCE

A cyclone collector is a deceptively simple-looking machine. Hidden inside the best machines is some clever engineering that enhances airflow and increases separation performance. Separation performance is simply a measure of how much debris falls out of the air stream into the collection barrel compared with the amount sent to the filter.



SHAWN NIELSEN

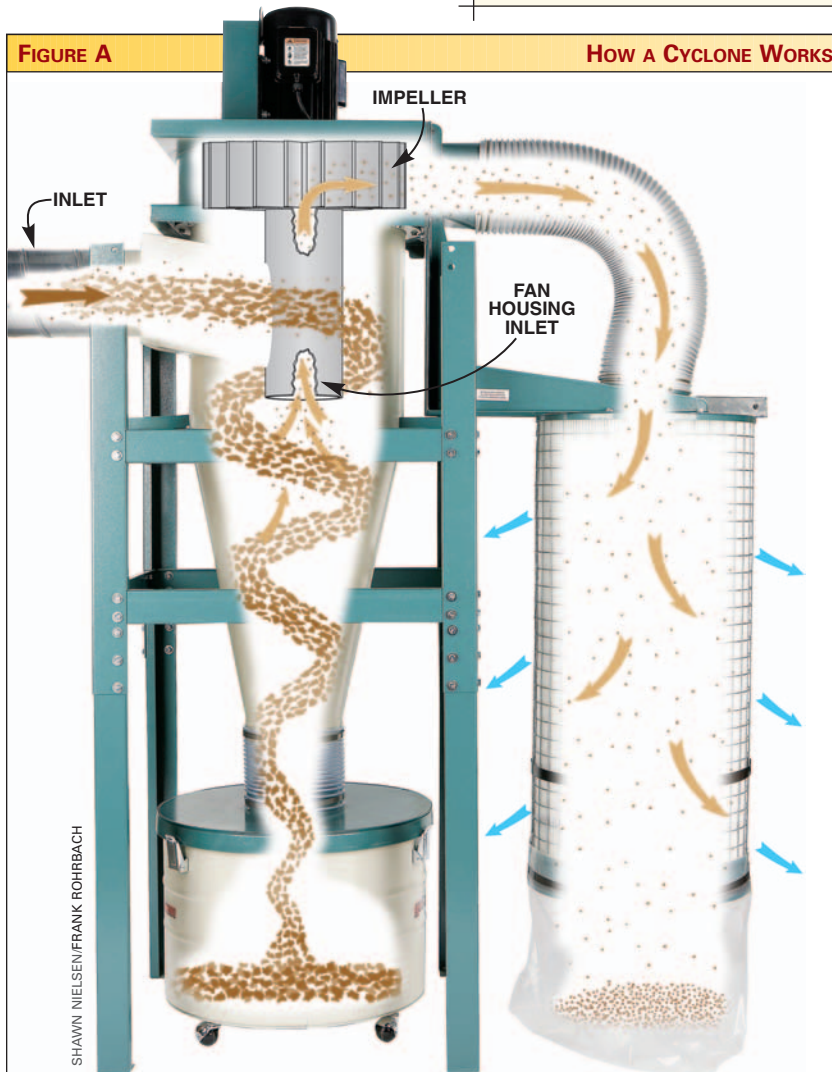
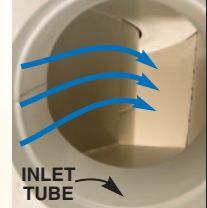
Improving Airflow

A neutral-vane design smoothes the airstream inside a cyclone. The result is better airflow and more efficient separation of woodchips and dust from the air.

A neutral vane is basically an extension of the inlet tube into the cyclone body. Normally, the inlet tube is cut flush with the interior wall of the cyclone. As the air makes its first circuit around the cyclone, it smashes back into itself. That results in turbulence that, in turn, causes drag on the airflow.

Oneida's patented neutral-vane design (above) was the first on the block.

Grizzly's patent-pending internal air ramp (right) functions like a neutral vane. It directs the air stream downward as it enters the chamber.



SHAWN NIELSEN/FRANK ROHRBACH

A cyclone is a two-stage dust collector. During the first stage, the collection stream enters the cyclone at the inlet and debris is flung to the outside of the canister, where it spirals down into the collection drum, just like water draining out of your bathtub.

The fan-housing inlet tube begins the second stage. The tube hangs down in the middle of the cyclone body clear of the spiraling debris stream. The relatively clean air is pulled into the impeller, then pushed through the filter. The filter scrubs out the remaining fine particles. Dust that doesn't lodge in the filter media is collected in a separate bin, bag or barrel beneath the filter.

NEUTRAL-VANE DESIGN

The best-performing cyclones have what's called a neutral-vane design (see "Improving Airflow," above). Machines with a neutral-vane design seemed to push a whole lot less dust through their impellers and filters (see photo, page 87). This allows the use of highly efficient cartridge filters that would quickly plug with the dust sent through a machine without a neutral-vane design.

HIGH-EFFICIENCY IMPELLERS

Backwardly inclined impellers (see photo, below) reduce noise and improve airflow and static pressure performance. A cyclone separates most of the debris before it hits the impeller, so manufacturers can use an impeller designed for maximum airflow. Not all manufacturers take advantage of this fact. Some use standard single-stage collector's impellers, which are designed for impact resistance as well as airflow.



Impellers with backwardly inclined fins move more air with less noise than straight-finned impellers do.



SHAWN NIELSEN

The best machines can ingest a barrel-load of sawdust and only leave a spoonful of very fine dust in the filter collector. The cyclones in our test that had the best separation performance all also had a neutral-vane design.

CARTRIDGE FILTERS AND SHOP SPACE

Cartridge filters not only do a better job of filtering the small stuff; they take up less shop space as well. The compact cartridge filter combined with a smaller drum allows manufacturers to build a cyclone that fits under an 8-ft. ceiling. That's really good news for basement or garage shop owners. Smaller drums are also a lot easier to manage when full.

MOTORS

A class F temperature-rated motor is best for a dust collector. A dust collector motor runs longer and works harder than any other tool in your shop. Whenever any tool is used, your dust collector is running. And unlike your table saw, it's under continuous load, so excessive heat can be a problem.

Motors with an F temperature classification can really take the heat; they're rated to handle 311 degrees Fahrenheit. A class E motor has a lower temperature classification of 248 degrees Fahrenheit.

RECOMMENDATIONS

The 2- to 3-hp cyclone dust collectors we recommend are Oneida's Gorilla line and Grizzly's new generation of cyclones. Both manufacturers offer machines that incorporate a neutral-vane or similar design, cartridge filters, backwardly inclined impellers and class F motors. They both have high airflow performance (Fig. B, below). Very simply, they are fabulous machines at excellent prices.

We are also impressed with the new JDS cyclones and Penn State's new S series cyclones.

FIGURE B TEST RESULTS COMPARISON

AIRFLOW TEST RESULTS: HOW MUCH SUCTION DO THE CYCLONES HAVE?

Judging how hard a dust collector sucks is more difficult than you might think. Horsepower of the motor doesn't tell you enough. The usual way of showing performance is with a fan curve, which shows the amount of air moved, in cubic feet per minute (CFM), as the static pressure in the ductwork increases. (You can think of static pressure as the resistance of your ductwork.) At a given static pressure, some machines will move more air than others will.

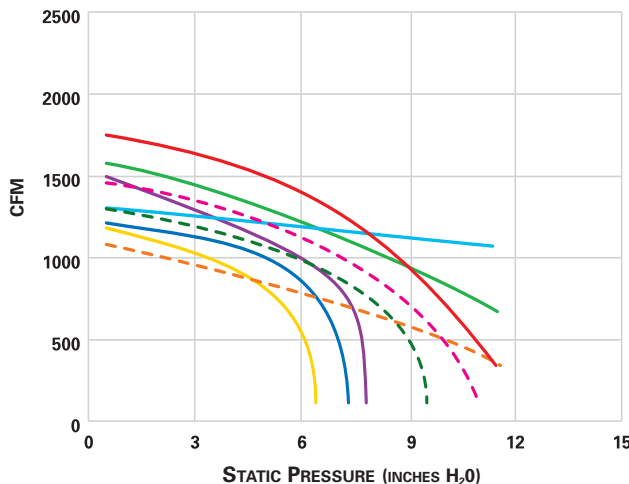
Unfortunately, there are several ways to measure the airflow and produce a fan curve, and manufacturers who provide this information often don't say how their tests were done. We tested dust collectors for this article using one commonly used approach and present the fan curves in the graph below, at left. Fan curves available from manufacturers are presented below, at right. They are sometimes quite different from ours, presumably because different testing methods were used or the machines have changed in the meantime.

Manufacturers are constantly working to improve their fan curves, and although CFM is important, designing your system to lower static pressure is just as important—and often neglected.

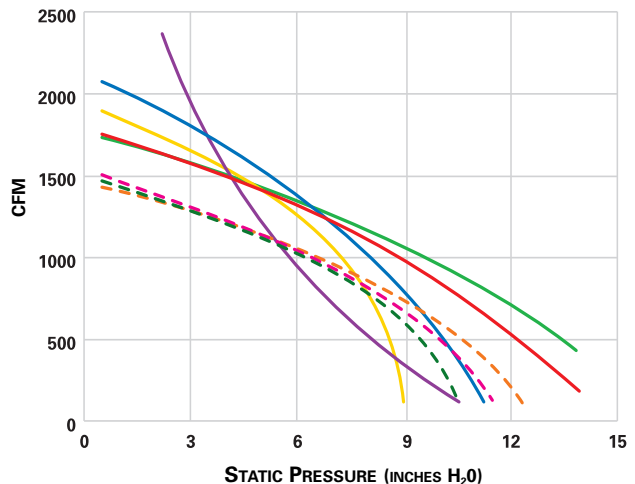
- Penn State 2.5hp
- Oneida 3hp
- - Oneida 2hp
- JDS 3hp
- Grizzly 3hp*
- - Grizzly 2hp*
- General 3hp
- Delta 3hp
- Bridgewood 3hp

* see Note, page 89

AW TEST RESULTS



MANUFACTURERS' TEST RESULTS



Oneida 2-hp Dust Gorilla, \$745 2-hp Super Gorilla; \$895 3-hp Super Gorilla, \$1,195

Oneida's specialty is cyclones. Dust collection is all the company does and cyclones are the only type of dust collectors it offers. Its new Gorilla line delivers top performance at a competitive price.

Height less than 8 ft.	✓
Neutral-vane design	✓
Cartridge filter	✓
Backwardly inclined impeller	✓

Separation in each model is excellent, with only a trace of dust ending up in the filter bin after the cyclone sucked up a barrel-load of shop dust. A high-quality pleated filter catches 99.9 percent of particles from 0.2 to 2 microns in size. Third-party filter ratings are available on Oneida's Web site, as is a host of other useful information.

Oneida's Super Gorilla line is the exact same cyclone as the Dust Gorilla with two upgrades: a U.S.-made Baldor motor and a higher-grade, longer-lasting filter material. The Super Gorillas and Dust Gorillas still have the same filter performance, because Oneida uses more square feet of the less-expensive filter media to make up the difference. All Oneida's filters can be cleaned by backwashing them with compressed air.

In addition to being backwardly inclined, Oneida's cast-aluminum impellers have airfoil-shaped fins for added air-flow performance.

Oneida adds a foam silencer that greatly reduces exhaust noise. Its cyclones are still primarily made in the United States.

Pros

- Free ductwork design is available from staff engineers.



- Collection bin under filter seals well and is easy to take on and off. Plastic bags can be used in the bin for easy disposal.
- Optional Bag Gripper (\$140) allows use of a plastic bag in collection barrel.
- Optional floor stand (shown), \$160, has a small footprint.

Cons

- No protective metal cage surrounds the Super Gorilla filter.

Manufacturer	Model	Price	HP, rating	Inlet dia.	Neutral vane design	Backwardly inclined impeller	Cartridge filter
Delta	50-901	\$2,150	3 hp, class F	8"	N	N	N
General International	10-810	\$1,449 (bag), \$1,999 (cart)	3 hp, class E	8"	N	Y	Y (Opt.)
Grizzly	G0440	\$745	2 hp, class F	7"	Y	Y	Y
Grizzly	G0441	\$1,195	3 hp, class F	8"	Y	Y	Y
JDS	2000CK	\$995	2 hp, class E	8"	N	NA	Y
JDS	3000CK	\$1,495	3 hp, class E	8"	N	NA	Y
Jet	JC-3BF	\$1,300	3 hp, class A	8"	Y	Y	N
Jet	JC-3CF	\$1,700 (cart)	3 hp, class A	8"	Y	Y	Y
Oneida	Super Gorilla	\$895	2 hp, class F *	7"	Y	Y	Y
Oneida	Super Gorilla	\$1,195	3 hp, class F *	8"	Y	Y	Y
Oneida	Dust Gorilla	\$745	2 hp, class F	7"	Y	Y	Y
Penn State Industries	Tempest 1425S	\$845	2.5 hp, class E	7"	Y	N	Y
Penn State Industries	Tempest 1535S	\$995	3.5 hp, class E	7"	Y	N	Y
Wilke Machinery	Bridgewood CDC3	\$675	3 hp, class E	8"	N	N	N
Woodtek	961-948	\$1,400	3 hp, class E	8"	Y	Y	N

NA Not applicable Opt. Optional * Made in the United States ** Floor stand option available

Grizzly G0440, 2 hp, \$745 G0441, 3 hp, \$1,195

Grizzly has produced a really great new line of cyclones. The icing on the cake is the built-in remote-control magnetic switch with timer. This convenience feature is worth more than \$70 and is exclusive to the Grizzly cyclones.

Height less than 8 ft.	✓
Neutral-vane design	✓
Cartridge filter	✓
Backwardly inclined impeller	✓

The Grizzly cyclones have a ramped inlet design that acts like a neutral vane. As a result, they achieve excellent separation and airflow performance. A mere spoonful of fine dust enters the filter bag from each barrel-load of shop dust.

Grizzly's cartridge filter material captures 99.9 percent of particles 0.2 to 2 microns in size. Independent performance rating tests for the pleated filter material can be found on Grizzly's Web site.

Grizzly offers a built-in filter brush that moves up and down inside the filter like a chimney sweep's brush. This bonus feature makes filter cleaning convenient and fast.



Pros

- Free ductwork design is available.
- Remote-control magnetic switch is included.
- Collection barrel rides on casters.
- Sturdy metal floor stand is available (shown) for \$170.
- Gasket on filter bag flange prevents dust leaks.

Cons

- Plastic bag on the filter is more cumbersome to take on and off than a bin would be.

Note: Grizzly has recently redesigned its cyclones with new filter brushes and with new impellers designed to boost CFM performance. Unfortunately, the new models were not available for our test; however, they will be on the market at the time of publication.

Collection drum type	Dimensions (W x D x H)	Floor stand or wall mount included	Contact
55-gal. drum, not included	76-3/4" x 35-5/16" x 122"	Floor stand	(800) 438-2486, www.deltawoodworking.com
55-gal. drum, not included	64" x 55" x 94" (118" with bag)	Floor stand	(514) 326-1161, www.general.ca
35-gal. steel drum	59" x 37-3/4" x 93-1/4"	Wall mount **	(800) 523-4777, www.grizzly.com
35- and 55-gal. steel drums	60-1/4" x 38-3/8" x 93-5/16" (109-1/8")	Wall mount **	(800) 523-4777, www.grizzly.com
Basket w/35-gal. plastic bag	51" x 34" x 72"	Floor stand	(800) 480-7269, www.thejdscompany.com
Basket w/55-gal. plastic bag	52" x 33" x 87"	Floor stand	(800) 480-7269, www.thejdscompany.com
55-gal. drum, not included	78" x 44" x 94" (110")	Floor stand	(800) 274-6848, www.jettools.com
55-gal. drum, not included	78" x 44" x 94" (110")	Floor stand	(800) 274-6848, www.jettools.com
35-gal. fiber drum	50" x 24-1/2" x 91"	Wall mount **	(800) 732-4065, www.oneida-air.com
35-gal. fiber drum	48-1/2" x 26-3/8" x 93"	Wall mount **	(800) 732-4065, www.oneida-air.com
35-gal. fiber drum	50" x 24-1/2" x 91"	Wall mount **	(800) 732-4065, www.oneida-air.com
26-gal. fiber drum	48" x 20" x 94"	Wall mount **	(800) 377-7297, www.pennstateind.com
26-gal. fiber drum	48" x 20" x 94"	Wall mount **	(800) 377-7297, www.pennstateind.com
55-gal. drum, not included	65" x 36" x 121" with filter bag	Floor stand	(800) 235-2100, www.wilkemach.com
38-gal. fiber drum included	52" x 30-1/2" x 94"	Floor stand	(800) 645-9292, www.woodworker.com

Other Models We Tested



JDS 2000CK, 2-hp, \$995
3000CK, 3 hp, \$1,495

Height less than 8 ft.	✓
Neutral-vane design	
Cartridge filter	✓
Backwardly inclined impeller	NA

The JDS cyclones are so new that we were only able to test the 3000CK.

Separation is good on the JDS. The 2 qt. of fine dust in the filter bag were far less than the gallons of dust in the some of the other cyclones' filter bags.

The JDS comes with a plastic bag to collect under the cyclone. An interior metal frame fits inside the bag and keeps it from being sucked into the cyclone. Bags are a real boon for people who put their wood dust out with the trash.

Pros

- You can use plastic collection bags under the cyclone.
- The 2-hp unit is only 6 ft. tall.

Cons

- Getting the frame out of a full 55-gal. bag of dust takes some twisting and tugging.



Penn State 1425S, 2-1/2 hp, \$845; 1535S, 3.5 hp, \$995

Height less than 8 ft.	✓
Neutral-vane design	✓
Cartridge filter	✓
Backwardly inclined impeller	

With the new S series, Penn State Industries continues to make significant improvements to its line of cyclones. The 1425S we tested had excellent separation, with only a trace of dust remaining in the filter bins. In the higher static pressure range, its airflow performance was better than that of many 3-hp models. Penn State's cartridge filter is free standing. The filter collection bin cannot be removed for clean-out. Instead, a blast gate is set in the bin so you can vacuum out the bin. For this to work well, you'll need to have a high-quality shop vacuum that won't send all that fine dust back into your shop.

Pros

- Free duct design service is available.

Cons

- Filter bin clean-out is awkward.



Bridgewood CDC3, 3 hp, \$675

Height less than 8 ft.	
Neutral-vane design	
Cartridge filter	
Backwardly inclined impeller	

Wilke Machinery's Bridgewood model is a solid, classic design at a great price. The price gets even better when you consider it includes the tripod floor stand. While the Bridgewood's price is small, its physical stature is not. Since it's 121 in. tall, you need a shop ceiling higher than 10 ft. to house it.

Bridgewood uses a high-quality singed felt to construct the bag filter. This type of material does a decent job of filtering the fine dust and shedding dust buildup on the inside of the bag.

Pros

- Price is great.
- Filter bag is good.
- Drum dollies are included.

Cons

- Height reaches over 10 ft. with filter bag.

Others You Should Know About



Delta 50-901, 3 hp,
\$2,150

Height less than 8 ft.
Neutral-vane design
Cartridge filter
Backwardly inclined impeller

The Delta is by far the quietest machine we tested and it's built like a tank. The 50-901 uses an acceptable filter bag, although it's not as efficient as a felt bag. The Delta comes with its own, sturdy tripod floor stand, but you must provide a drum for both the cyclone and filter. The Delta is primarily made in the United States.

Pros

- Quietest cyclone in our test.

Cons

- Height is high.
- You must wire in your own switch.



General International
10-810, 3 hp,
\$1,449 with bag filter,
\$1,999 with cartridge filter

Height less than 8 ft. (with cartridge filter only)	✓
Neutral-vane design	
Cartridge filter	Opt.
Backwardly inclined impeller	✓

We tested the General cyclone with the basic bag filter. We strongly recommend going for the cartridge filter, because the dust literally blew through the thin, woven fabric filter.



Cons

- Bag filter is a real dust spewer.

Pros

- This model holds a 55-gal. collection drum and still fits under an 8-ft. ceiling.
- Drum dollies are included.



Jet JC-3BF, 3 hp, \$1,300,
JC-3CF, 3 hp, \$1,700



Woodtek 961-948, 3 hp,
\$1,400

Jet and Woodtek have each come out with 3-hp cyclones. This is a first for both companies and reflects cyclones' growing popularity. Unfortunately, these machines are so new that we were unable to get them in time for our test.

Jet states that its cyclone features a cartridge filter. Woodtek tells us its new models are designed to fit under an 8-ft. ceiling. The companies have provided information for these new models; see Chart, page 88.