

SHOP TESTED

# Ductwork-Worthy Dust Collectors



We tested nine 220-volt units priced from \$675 to nearly \$1,600, looking for the machine(s) best capable of sucking up dust through a ducted central-collection system—and then trapping it.

As your collection of woodworking machines grows, so does the amount of sawdust you create, and with it, the nuisance of rolling a portable dust collector from machine to machine. On the other hand, a dust collector that services your entire shop through a system of fixed ductwork saves you that hassle, keeps your shop cleaner, and, with good filtration, reduces the amount of airborne dust that can damage your health. To collect debris through a duct network without clogging, a collector needs to generate at least 800 cubic feet per minute (CFM) of airflow. But what type of collector—see the sidebar on the *next page*—and which models do the job best? To find out, we tested a variety of machines capable of handling a full-shop duct system. Here's what you need to know.

## Job one: gather the dust

These machines work best when hooked to a 6"-8" duct network. So we tested each collector's suction ability by measuring its airflow through 6"-diameter duct, the inlet size for four of the test units. Using a pitot tube (velocity meter) and manometer (pressure gauge), we measured each unit's airflow (CFM) at various levels of resistance, measured in

## Experts deliver tech knowledge with an eye for woodworking

To deliver the most fair and accurate testing results, we hired Tom Brumback and Doug Ley, two woodworkers who earn their living as engineers with a major agricultural seed company. They helped us procure the right testing equipment and knew how to use it to analyze the performance of the collectors under real-shop conditions.



Tom Brumback



Doug Ley

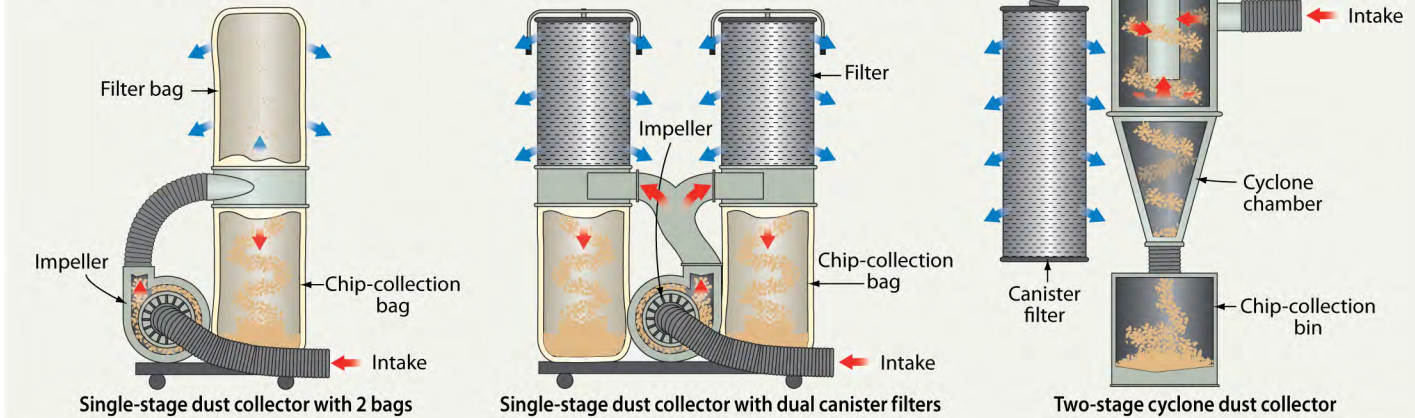
## Learn to tell dust collectors apart

A single-stage dust collector sucks dust and chips directly into its impeller, the fan that generates airflow. The impeller then blows that debris into the "containment" portion of the machine. Heavier chips settle into the bottom bag or bags, while fine dust gets forced up into the top filter, a fabric bag or pleated canister. As the air passes through the filter, most dust becomes trapped inside. Single-stage collectors have either two bags/canisters (110 volts) or four bags/canisters (220 volts), sell for less than most

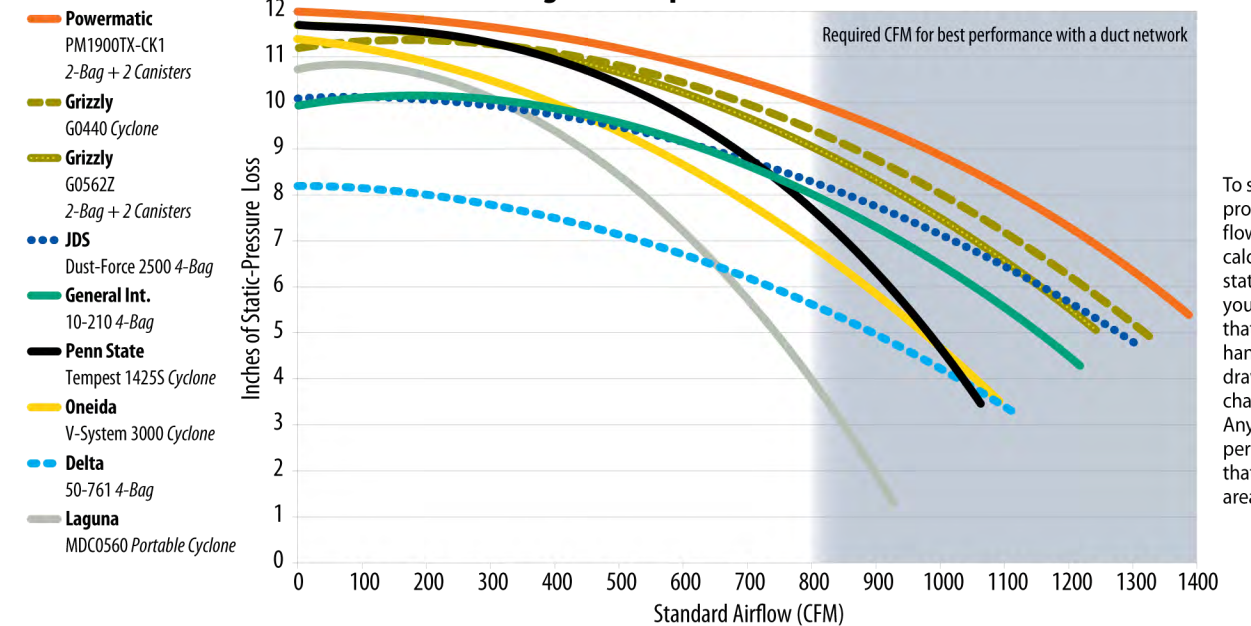
two-stage cyclones, and work great if adequately equipped with efficient filters and hose/duct setups. But because everything passes through the impeller, large pieces, such as knots, small cutoffs, nails, or screws, can damage the fan, bags, or hose.

A two-stage dust collector, also known as a cyclone, routes dust-laden air through a cone-shaped cylinder that slows the air velocity and separates the heavier debris into a collection drum before it can get to the fan. The fine dust

that remains airborne passes harmlessly through the impeller and into the filter, typically a pleated canister. Cyclones usually require 220 volts and either a wall-mount bracket or floor stand, but some smaller, portable units run on 110 volts and work best with short lengths (20' or less) of duct or flex-hose.



## Collecting the dust proves the first half of the battle



To see which collectors provide enough airflow for your system, calculate the total static-pressure loss of your ductwork, find that figure on the left-hand column, and then draw a line across the chart at that level. Any collector with a performance arc above that line in the shaded area would be suitable.

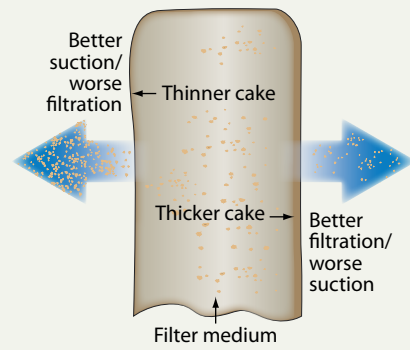
inches of static-pressure (SP) loss. This method simulates the resistance that results from adding elbows, increasing duct length, and changing duct diameter to any shop duct network. From these figures, we generated fan curves, *above*, to demonstrate each collector's performance in increasingly challenging shop settings.

All but one unit we tested easily achieved the required 800 CFM while overcoming at least 5½" of SP loss. That's what it takes to power a typical shop ceiling-mounted ductwork setup with a 25' main 6" trunk with three 90° elbows, four 45° elbows, and five 4" duct and flex-hose drops to machines. Laguna's MDC0560-0145 portable cyclone, which

overcame just 4" of SP loss at 800 CFM, would perform favorably if placed in a more central location with duct runs no longer than 15' and no more than four machine drops.

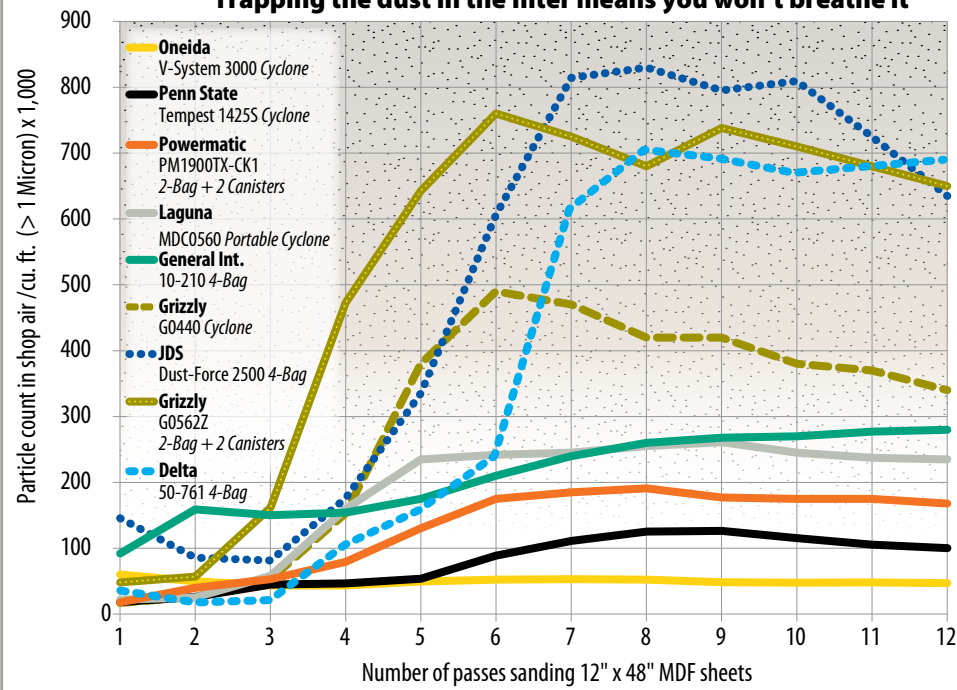
In order to select a dust collector for your shop, first calculate the amount of static-pressure loss your planned or existing ductwork will create. To do this,

## Buildup inside filters helps trap dust better



Contrary to what you might think, dust-collection filters actually perform at their worst when brand new. That's because trapped dust particles in the filter medium, called a dust cake, actually prevent larger particles from slipping through. But this also tends to reduce airflow because it forces air to pass through a thicker barrier. To improve suction that's dropped below your "normal" standard, knock the dust loose from the filters; if you're getting adequate suction, leave the filters alone.

## Trapping the dust in the filter means you won't breathe it



Although all of the filters meet industrial regulatory air-quality standards, those that keep airborne particle counts low allow you to work in the shop longer without discomfort. So the lower and flatter the collector's performance line, the better the air quality will be.

download a free article with step-by-step instructions at [woodmagazine.com/wholeshopdc](http://woodmagazine.com/wholeshopdc). Once you've calculated the total SP loss, find a collector that will overcome that much resistance while maintaining at least 800 CFM.

## Now return clean air to the shop

All the test models have filter bags or canisters rated to trap nearly all dust particles 2 microns or larger in size. To test each collector's filtering ability, we first "seasoned" all the filters by sucking

up MDF dust to fully load the filter media, replicating filter performance months or years down the road. This built up a layer of dust inside the filter known as a dust cake. (See the illustration *above left* to understand the role a

dust cake plays in a filter.) With that accomplished, we sanded MDF sheets—for material consistency—with a drum sander, and used a digital particulate meter to measure the number of dust particles larger than 1 micron floating in the shop air during and after each pass.

As shown in the chart at *left*, the Oneida V-System 3000 cyclone did the best job at trapping dust particles during use. The Penn State Tempest cyclone, Powermatic, General International 10-210, and Laguna all performed well, too.

To help interpret these filtration data, we shared our test results with Patrick O'Shaughnessy, a professor in the University of Iowa's Department of Occupational and Environmental Health. Patrick told us that all of the air-quality measurements shown are within the acceptable limits established by the National Institute for Occupational Safety and Health (NIOSH). However, our testers observed more throat and nasal irritation when testing the four units that demonstrated a steep rise in particle counts, as shown in the chart. Patrick also cautions that the performance of each collector could likely change—but still be relative from machine to machine—based on different shop conditions and the amount and length of work you do without

## So how big is a micron?

The dust-collection industry and health regulatory agencies measure air particles by microns. One micron equals .001 millimeter—far too small to see without magnification. By comparison, human hair typically measures about 40–60 microns in diameter. Dust particles smaller than 30 microns—most of them nearly invisible—can remain airborne for about 30 minutes before settling, so it's important to trap them before they get into the air. And some woodworkers are more sensitive to dust from different wood species, such as western red cedar, walnut, sassafras, and imported varieties, so for them clean air proves even more critical.

## SMALL LEAKS LET FINE DUST ESCAPE



Band clamps don't always form a tight seal when securing a bag, which is usually oversize, to the machine's rim, creating a dust leak under pressure.

clearing the air or leaving the shop to let dust settle.

But the filter media isn't necessarily the main source for dusty air. Leaks on a collector can also contribute significantly to the particle count. We found leaks around bag rims (shown *above right*), spot welds, and unsealed joints on all but the Laguna and Oneida machines. We patched these leaks by adding foam weather stripping around bag rims, and silicone caulking on other visible leaks. This improved the air-quality reading with each fix, but will need to be moni-

tored and maintained over time. And, a collector's high air velocity can *force* dust particles, especially those smaller than 3 microns, through the filter if air pressure in the filter is too great.

## Finally, dump the dust

When the collection drum or bags fill with debris, you should be able to empty them without creating a dust cloud. Unfortunately, that's seldom the case. The Grizzly and Laguna cyclones make this easiest with steel drums on casters that conveniently roll out from under



**Delta 50-761**, \$1,000  
800-223-7278, [deltamachinery.com](http://deltamachinery.com)

The only single-stage collector with its motor and impeller not positioned on the base, but rather at the height midpoint, the 50-761 demonstrated less airflow than all but one other unit. Because of this design, you'll have to add an additional 90° fitting to hook up ceiling-mounted duct, adding more resistance.



**General International 10-210**, \$870  
888-949-1161, [general.ca](http://general.ca)

The 10-210 sports a good combination of airflow and filtration. It has an adjustable vane inside the plenum (the curvy Y-shaped discharge chute) to let you control the flow of debris into each bag. It comes with two extra plastic collection bags.



**Grizzly G0562Z**, \$675  
800-523-4777, [grizzly.com](http://grizzly.com)

The G0562Z moves dust nicely, but with the most leaks around welds, connections, and bag rims of any test unit, it also sent much of the fine dust back into the air. Made of the lightest-gauge steel among the group, this machine displays more wobble than others when moving around the shop.



**Grizzly G0440**, \$1,375  
800-523-4777, [grizzly.com](http://grizzly.com)

This collector has the largest footprint of all the test machines. Its pulley-operated up-and-down filter cleaner worked well. It was loudest in the test, and so-so on dust containment. A small hose connects to the drum, providing suction to draw the disposable liner against the sidewalls, helping the bag fill better.



**JDS Dust-Force 2500**, \$970  
800-480-7269, [jdstools.com](http://jdstools.com)

Made with heavy-duty components, the Dust-Force 2500 does a good job of collecting dust. Although we sealed leaks around the bag rims with foam weather stripping, fine dust continued to escape into the shop air. If you prefer more-efficient canister filters, get this machine in that configuration for a \$400 upcharge.



**Laguna MDC0560-0145**, \$1,349  
800-234-1976, [lagunatools.com](http://lagunatools.com)

A compact, portable cyclone with limited suction ability, this machine ran the quietest, filtered dust well, and its drum proved easy to dump when full. (A wire screen sits inside the disposable bag to help it fill to capacity.) Its radio-frequency remote control lets you start the collector without aiming directly at it.



With this Grizzly G0440 and the Laguna, you empty the chips and dust by removing a disposable plastic bag inside the roll-out drum.

their separators, as shown above. Penn State and Oneida have casterless fiber drums that proved more difficult to remove from the separator because of a short length of connecting flex-hose that must be compressed and the limited space in which to lift the lid. Shortening the hose an inch or so improved this.

The single-stage collectors all use disposable plastic bags, and all but the Delta have about twice the storage capacity of the cyclones' drums. (Oneida sells an optional 55-gallon drum; ours was 35.) But removing those bags from the machines often results in dust spilled on the floor and spewed into the air.



**Oneida Air Systems V-System 3000**, \$1,595  
800-732-4065, oneida-air.com

With the smoothest-running impeller, heaviest-gauge steel, best overall fit and finish, and superior dust filtration, this 3-hp cyclone was the cream of the crop. Another plus: It's second-quietest, below the threshold of potential hearing loss (85 dB). An optional wall-mount kit would improve access to the collection drum.



**Penn State Tempest TEMP1425S**, \$1,355  
800-377-7297, pennstateind.com

At 94" tall, this Tempest managed to just fit under our 8' ceiling. It delivers a great combination of airflow and filtration, but an impeller that rattles and shakes when coasting down and a filter cleanout that's attached with just silicone causes us concerns about the machine's longevity and future maintenance.



**Powermatic PM1900TX-CK1**, \$1,300  
800-274-6848, powermatic.com

With an 8" inlet and the best suction of the group, this machine provides lots of options for setting up a ductwork system. It's well-built with heavy-duty features and nice touches, such as an electronic starter with remote, a base wide enough to support bags full of chips and dust, and handles for easier maneuvering.

## DUST COLLECTORS SUITABLE FOR A ONE-MAN SHOP

## CENTRAL-COLLECTION SYSTEM

MANUFACTURER	MODEL	PERFORMANCE RATINGS (1)						COLLECTOR TYPE (2)	RATED MOTOR HORSEPOWER	IMPELLER		COLLECTION DRUM/BAG CAPACITY, GALLONS	DIMENSIONS			ACCESSORIES (4)		CORD LENGTH	NOISE LEVEL, DECIBELS		WARRANTY, YEARS	COUNTRY OF ASSEMBLY (5)	SELLING PRICE (6)
		PRIMARY		SECONDARY						DIAMETER, INCHES	MATERIAL (3)		INLET DIAMETER, INCHES	INCLUDED INLET REDUCER	OVERALL DIMENSIONS, INCHES (WxDxH)	STANDARD	OPTIONAL		MEASURED 10' FROM COLLECTOR	MEASURED 20' FROM COLLECTOR			
<b>SINGLE-STAGE COLLECTORS</b>																							
DELTA	50-761	B-	C	B-	C+	A-	B	B	2		30	6	4"x3	57x19x87		A	12'6"	84	81	5	C	\$1,000	
GENERAL INTERNATIONAL	10-210	B+	A-	B-	C	B	C	B	3		83	6	4"x3	60x32½x76		A, C	8'	87	83	2	T	870	
GRIZZLY	G0562Z	A-	C	A	C	B-	C	F	3		73	7	4"x3	58x32x71		A	10'	87	84	1	C	675	
JDS	DUST-FORCE 2500	B+	C	B-	C	B+	C	B	3		84	8	4"x3	55x21x75		C	10'	86	84	1	T	970	
POWERMATIC	PM1900TX-CK1	A	A-	A	C+	B+	B	F	3		75	8	4"x3	60x30x72	R		6'6"	86	84	5	T	1,300	
<b>TWO-STAGE CYCLONE COLLECTORS</b>																							
GRIZZLY	G0440	A-	B	A	A	C	B-	C	2		35	7	NONE	59x37¾x93¾	F, R, S	A, N	6'	90	88	1	C	\$1,375*	
LAGUNA	MDC0560-0145	C	A-	A-	A	B-	C-	P	2		29	6	4"x2	36x26x74	R, S		10'6"	77	73	1	T	1,349	
ONEIDA AIR SYSTEMS	V-SYSTEM 3000	B	A	A-	B+	B	A	C	3		35	6	NONE	50x30x84½	D, F, N	A, R, S, W	10'	79	77	1	U	1,595†	
PENN STATE	TEMPEST TEMP1425S	B	A	B+	B	C	C	C	2.5		26	7	7" to 6"	58x26½x94	D, F	A	6'	84	82	5	C	1,355‡	

1. **A** EXCELLENT  
**B** GOOD  
**C** FAIR

2. (B) 2 filter bags, 2 collection bags  
(C) Stationary cyclone  
(F) 2 canister filters, 2 collection bags  
(P) Portable cyclone

3. (A) Aluminum  
(S) Steel
4. (A) Ductwork, flex-hose, and fittings  
(C) 1-micron canister filters  
(D) Fiber collection drum  
(F) Floor stand  
(N) Noise reducer  
(R) Remote-control starter  
(S) Steel collection drum  
(W) Wall-mount kit

5. (C) China  
(T) Taiwan  
(U) United States

6. Prices current at time of article production and do not include shipping, where applicable.  
(\* ) \$1,150 without optional floor stand (H7499)  
(†) \$1,560 without optional floor stand but with 35-gallon fiber drum; or \$1,623 with optional 55-gallon fiber drum and floor stand  
(‡) \$1,095 without optional floor stand (TEMSTAND2)

### Two types, two good choices

When making a decision on which models to recommend, we put the most emphasis on airflow and filtration. We could not identify a clear advantage for one type of collector versus the other: The two best machines—one single-stage unit and one cyclone—would be welcome additions to any shop. That's why we awarded two models our Top Tool award.

If you have or plan a duct system that demands high airflow to overcome static-pressure loss, then get the single-stage Powermatic PM1900TX-CK1. It delivered the most airflow, ranked near

the top in fine-particle filtration, and has nearly twice the chip-storage capacity of the cyclones.

If you don't require that much airflow but desire greater filtration ability, then go for the Oneida V-System 3000 cyclone. It proved best in our test at trapping dust, and its airflow should support a duct system for most typical home shops. The Oneida made an impression on us with its high-quality components, such as heavy-gauge steel and the smoothest-running impeller in the test, and seems best suited to stand up to years of use. 🌱

### More Resources

- Learn more about how to choose a dust collector for your shop at [woodmagazine.com/choosedc](http://woodmagazine.com/choosedc).
- Read editor and user reviews of these dust collectors and others, as well as accessories to improve the performance of your machines, at [toolreviews.woodmagazine.com](http://toolreviews.woodmagazine.com).



Produced by Bob Hunter with Tom Brumback and Doug Ley