Tool Test

by Ed Krause
and Dave Munkittrick

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DUST CONTROL SPECIAL ISSUE

DUST COLLECTORS

for the Small Shop

A PRESSURE GAUGE was used to determine the air flow performance of each machine in cubic feet per minute (cfm).

Wood dust is a health hazard, and the worst dust is the stuff you can't see. Dust collectors seem like an easy answer to the problem. But do they do the job? Most of the collectors we tested collected chips just fine, but instead of collecting the fine dust, most of them actually emitted it! We'll tell you which collectors made the grade at collecting dust, and why. We'll also show what can be done to transform a dust spewer into an effective dust collector.

Only a few collect the most hazardous dust.

There are a lot of dust collectors out there. We limited this test to machines most likely to be used in a small shop—1- to 2-hp models costing less than $1,000.

We examined two crucial aspects of dust collection: 1. How well the machines pull in dust and chips at the source (air volume as measured in cubic feet per minute or cfm) and 2. How well the collectors contain the dust they collect.

CFM

Our chart includes two cfm readings; "Max" cfm and "Under Load" cfm.

To determine Max cfm we hooked up a 10-ft. section of maximum-diameter, smooth-walled duct to each machine and used clean bags.

Under Load cfm represents the real-world performance you can expect when the collector is hooked up to a small central system with bags that have developed a dust cake. Some collectors performed much better than others under these conditions.

The central system we set up for testing consisted of 20 ft. of maximum-diameter straight pipe, a 90-degree bend, all the appropriate step-downs and 6 ft. of 4-in. flex hose with a 90-degree bend. (We assumed the system would collect from one machine at a time.) A dust cake develops on all filters and bags as soon as they begin to collect dust. The dust cake actually improves filtering performance but it also cuts down on the airflow and thus the cfm of your machine. In addition to the effects of dust cake, the cfm performance of single-stage collectors drops another 20 percent as the lower bag gets full. (This is not true of cyclones.)

Dust Collectors

THE FILTER IS THE MAIN THING

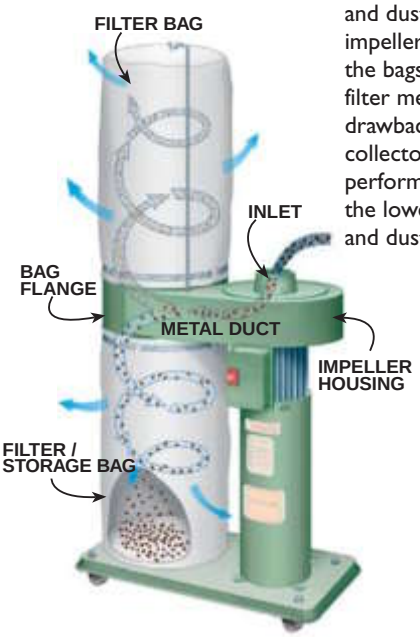
The collection bags of single-stage collectors are expected to do double duty as filters. Unfortunately, most collector bags are made from woven fabric which is not particularly good at capturing fine particles (Photo 1). The best bags are made from 16-ounce polyester felt which is a "rated" filter material designed to remove 99 percent of particles 1 micron or larger (Photo 2). But, this rating only holds true if one square foot of felt is used for every 10 cfm of airflow. In other words; if your collector is pulling 500 cfm, you need 50 sq. ft. of 16-ounce polyester felt. The Penn State machines come closest to this ideal by using felt for both the top and bottom bags (32 sq. ft. for the DC2-5 and 22 sq. ft. for the DC1B-XL). (Aftermarket bags designed to handle 500 cfm are available from Oneida Air Systems; see Sources, page 85 and Product Review page 88.)

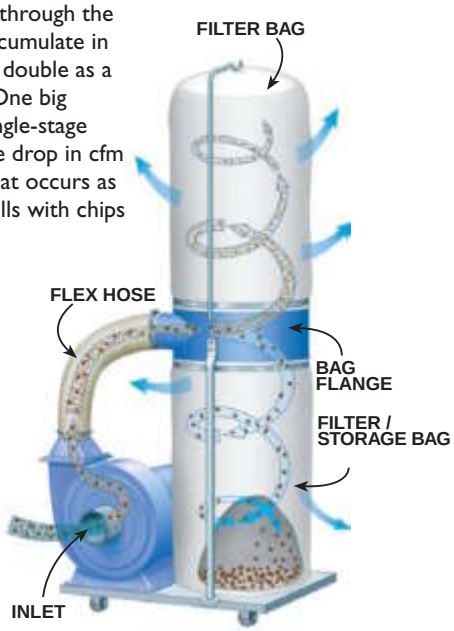
A few collectors get it half right with a felt top bag. But these collectors have a plastic bottom bag, which filters no air, leaks at the bag flange (see Photo 4) and is a nightmare to attach.

Of all the collectors that come with a felt bag(s), only Felder and Penn State use double or triple stitching on all seams. The others used single stitching to attach the round piece at the top of the bag. Single stitching can be stressed by the air pressure in the bag and open up escape routes for the dust-laden air. (See Sources, page 85, for suppliers of aftermarket bag upgrades with double stitching.)

Oneida Air Systems cyclone collector is unique in that it uses a pleated filter cartridge instead of a bag. The cartridge is made of non-woven, spun-bonded polyester that outperforms even 16-ounce polyester felt.

IN A SINGLE-STAGE COLLECTOR the chips and dust travel through the impeller and accumulate in the bags, which double as a filter medium. One big drawback to single-stage collectors is the drop in cfm performance that occurs as the lower bag fills with chips and dust.

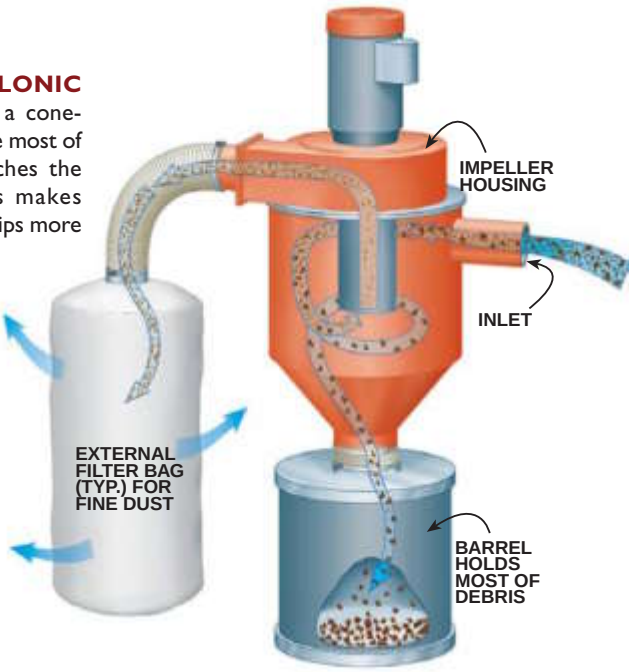




1-HP, SINGLE-STAGE COLLECTORS have smaller bags that require more frequent emptying. But their small size is an asset in a shop where floor space is at a premium. The impeller housing is connected directly to the bag flange via a short metal duct. We found this design to be far less prone to dust leaks than the larger 1-1/2-hp and 2-hp models with a flex-hose attachment. The 1-hp collectors perform best when connected directly to a machine.

1-1/2 AND 2-HP SINGLE-STAGE COLLECTORS are better able to handle the cfm demands of a small central system. The Delta, Jet and Penn State 1-1/2-hp collectors provide the most cfm for the buck when compared to the 2-hp models. Having a large, 6-in. inlet dia. appears to be more important than horsepower when it comes to cfm performance. The 1-1/2 hp can also run on any standard 20-amp household circuit while the 2-hp models need special wiring.

A TWO-STAGE CYCLONIC COLLECTOR employs a cone-shaped canister to separate most of the debris before it reaches the impeller and filter. This makes removal of the dust and chips more efficient and convenient. Also, because the filter on a two-stage cyclone does not act as a container for chips, there is no subsequent drop in the cfm performance as the barrel fills with debris.



1 **WOVEN BAGS** are poor filters. The pinholes you see here allow the most hazardous fine dust to blow right back into your shop.

2 **FELT FILTERS** are comprised of dense layers of polyester fibers, which trap most of the finest dust, while letting air pass back into the room.

3 **ATTACHING A COLLECTOR BAG** after it has been removed for emptying is a fact of life with single-stage collectors. Getting the bag off isn't so tough, but putting it back on can be a real challenge. We found adjustable spring clamps provide the best combination of seal and ease of use for single-stage collectors.

4 **DUST LEAKS** were common around bag flanges and duct welds. Plastic bags are a pain in the sitter to seal even when using spring clamps. Tip: A couple of 20-in. bicycle inner tubes can be stretched around the bag flange to help form a good seal for the bags. Silicone caulk can be used to seal any duct leaks.

IMPELLERS

The collectors we tested had impellers made of steel, cast aluminum and plastic. Aluminum and plastic impellers are safest because they won't produce sparks when struck by metal accidentally vacuumed into the collector. Fires started this way are rare but be mindful that there is a risk.

RECOMMENDATIONS

EDITORS' CHOICE

The Oneida 1.5 hp Cyclonic Collector is our Editors' Choice. Its unique design replaces the external bag with a high-quality, internal pleated filter. This not only saves floor space, but unlike single-stage collectors, the Oneida can use the most efficient fan design possible because it's required to handle only filtered air. The Oneida is the only machine that seems to do everything right. It performs well Under Load (see chart), its high-efficiency filter captures the fine dust and is easy to clean, rubber gaskets insure against leaks, the barrel is far easier to empty than any bag system and it uses a high-quality, American-made motor. It's expensive ($695), but once you figure in the bag upgrades and reduced efficiencies of single-stage collectors, the Oneida makes sense for woodworkers who spend a lot of time in the shop.

BEST BUY

Our Best Buy award goes to the Penn State DC1B-XL. A real standout among the single-stage collectors, the DC1B-XL is an excellent value for $210. If you're on a budget and want a collector to use on one machine at a time or in a small, carefully designed central system, the Penn State is a great choice.

Dust Collectors

ONEIDA AIR SYSTEMS 1.5 HP CYCLONIC COLLECTOR ($695) is clearly the best collector for a central dust collection system. It brings the superior engineering of industrial collectors to the small shop.

PENN STATE INDUSTRIES 1-HP, SINGLE-STAGE COLLECTOR comes with 16-oz. felt bags, a 5-in. inlet, is powerful for its size and had no visible leaks. It's our Best Buy at $210.

				CFM		BAGS and FILTERS		
	Brand / Model	Price	Inlet Dia.	Max.*	Under Load†	Material	Spring Clamps	
SINGLE-STAGE 1 HP	Bridgewood BWO15A	$159+	4"	455	350	F/P	Y	
	Delta 50-840	$229	4"	440	365	W	Y	
	General 10-010	$275	4"	410	350	F/W	Y	
	Grizzly G1028	$239+	4"	515	410	W	N	
	Jet 650	$229	4"	455	365	W	Y	
	Penn State DC1B-XL	$210+	5"	665	420	F	Y	
	Reliant NN720	$179+	4"	480	350	W	N	
	Ridgid DC2000	$249	4"	380	290	W	Y	
	Sears 29978	$300	4"	410	350	W	Y	
	Sunhill UFO-90	$159+	4"	490	380	W	N	
	Woodcraft	$215+	5"	665	345	W	Y	
	Woodtek 802-124	$229+	4"	455	330	W	Y	
SINGLE-STAGE 1-1/2 HP	Delta 50-850	$299	6"	895	495	W	Y	
	Felder AF-10	$559+	4.5"	420	345	F/P	N	
	Jet DC-1100	$300	6"	860	495	W	Y	
	Penn State DC2-5	$300+	6"	860	610	F	Y	
	PowerMatic 073	$350+	2-4"	560	290	W/P	Y	
SINGLE-STAGE 2 HP	Bridgewood 002A	$259	5"	770	515	F/P	Y	
	General 10-110	$435	5"	825	515	F/P	Y	
	Grizzly G1029	$249+	5"	825	485	W	N	
	Jet DC-1200	$400	6"	1025	555	W	Y	
	Reliant NN-820	$299+	5"	790	420	W	N	
	Seco UFO-101	$288	5"	790	485	W	N	
	Sunhill UFO 101	$275+	5"	790	515	W	N	
	Woodcraft	$350+	5"	825	485	W	Y	
	Woodtek 805930	$399+	5"	770	455	W	Y	
CYCLONE 1-1/2 HP	Oneida Cyclone	$695+	6"	745	702	SB	NA	
	Penn State Tempest	$500+	5"	420	381	F	NA	

Cfm Requirements

TOOL	cfm
15-in. Planer	500
Radial-Arm Saw	450
Drum Sander	450
6-in. Jointer	400
12-in. Planer	350
Tablesaw	350
Bandsaw	350
Drill Press	350
Floor Sweep	350
Disc sander	350

OTHER RECOMMENDATIONS

Penn State's DC2-5 is a 1-1/2 hp collector, outstanding in every respect from felt bags to cfm Under Load. Its only failing was a leaky fitting where the exhaust port changes from a square to a round duct. A little judicious caulking would solve the problem and make the DC2-5 an excellent choice for those seeking the most cfm for the buck. It's a bargain at $300.

The Delta 50-850, the Jet DC-1100 and 1200 were also excellent performers with well-sealed housings and ductwork. Their only failing was the woven bag material that came with the collectors. You'll need to spend an extra $60 to $100 to upgrade the bags to felt (see Sources, at right). AW

	MOTORS					
Brand	**AMPS**	**Volts****	**Size WxLxH**	**Impeller**	**Dust Leak**	**Comments**
Bridgewood	16/8	115/230	16x29x56	Steel	Y	Plastic bag is difficult to attach.
Delta	9/4.5	115/230	16x29x60	Steel	N	Minimal setup.
General	7	115	16x29x60	Alum.	Y	Includes handle for mobility; bag clamp sewn into bottom for easy attachment.
Grizzly	14/7	115/230	22x38x76	Steel	Y	Steel-strap bag clamps make for a tight seal but require a screwdriver to adjust.
Jet	11/5.5	115/230	14x27x57	Steel	Y	Bag clamps sewn into each bag for easy attachment; no inlet grate prevents clogging but exposes impeller to damage from large debris.
Penn State	16/8	115/230	17x29x59	Steel	N	Large-size bags; convenient handle; window on bottom bag.
Reliant	11.5/5.5	115/230	14x28x53	Steel	Y	Minimal setup; cinch-strap bag clamps don't seal well; no inlet grate prevents clogging but exposes impeller to damage from large debris.
Ridgid	7	115	16x28x60	Steel	Y	Shop vacuum hose adapter; small top bag; quick-change bottom bag; handle for mobility.
Sears	7	115	16x28x60	Steel	Y	Quick-change bottom bag; small top bag; handle for mobility.
Sunhill	12/6	115/230	14x27x55	Steel	Y	Cinch strap bag clamps don't seal well; no inlet grate prevents clogging but exposes impeller to damage from large debris.
Woodcraft	16	115	16x29x57	Steel	Y	Easy setup.
Woodtek	16/8	115/230	15x29x60	Alum.	N	Easy setup; well-sealed housing was leak-free.
Delta	12/6	115/230	21x37x83	Steel	N	Easy setup; well-sealed housing was leak-free.
Felder	7.2	230	16x31x78	Steel	Y	In-line casters don't swivel; designed for 5-in. flex hose attachment; loud; plastic bags are extremely difficult to attach.
Jet	11/5.5	115/230	22x36x79	Steel	N	Easy setup; quick-change bottom bag.
Penn State	18/9	115/230	20x37x73	Steel	Y	Quiet, incomplete manual led to difficult setup; window on bottom bag.
PowerMatic	15/7.5	115/230	18x33x73	Steel	Y	Gaskets on bag housing create a good seal; incomplete manual led to difficult setup; handle for mobility; plastic bag is difficult to attach.
Bridgewood	24/12	115/230	22x37x76	Steel	Y	No instructions for converting to 115V; power cord is undersized for 115V application; plastic bag is difficult to attach.
General	9	230	23x37x76	Alum.	Y	Well-sealed, square metal duct between bag housing and impeller housing was leak-free; plastic bag is difficult to attach and leaked at attachment flange.
Grizzly	24/12	115/230	23x38x76	Steel	Y	Steel strap bag clamps make for a tight seal but require a screwdriver to adjust; power cord is undersized for 115V application.
Jet	15	230	21x38x79	Steel	N	Well-sealed housing was leak-free; manual not up to Jet's normal standards.
Reliant	24/12	115/230	23x38x76	Steel	Y	Easy setup; power cord is undersized for 115V application.
Seco	12	230	23x38x76	Plastic	Y	Easy setup.
Sunhill	24/12	115/230	23x38x77	Steel	Y	Easy setup; power cord is undersized for 115V application.
Woodcraft	24/12	115/230	23x38x77	Steel	Y	Easy setup; comes without a plug; power cord is undersized for 115V application.
Woodtek	24/12	115/2330	22x37x77	Alum.	N	Easy setup; well-sealed housing was leak-free; power cord is undersized for 115V application.
Oneida	17.2/8.6	115/230	24x24x84	Plastic	N	Quiet; includes barrel and fittings; mobile stand available; manual difficult to follow; comes without a power cord. Free central system design service.
Penn State	18/9	115/230	20x20x90 +bag	Steel	Y	Quiet; good manual; does not include barrel; mounting bracket needs to be constructed by owner (requires one sheet of plywood).

\+ Shipping and handling not included.

* With clean bags and 10 ft. of straight pipe.

** Motor voltages vary from 110/220 to 220/240.

W=Woven fabric

F/P=Felt top/plastic bottom

F=Felt

SB=Spun-bonded filter media cartridge

† With dust-caked bags and a small central system.

SOURCES

Wilke Machines of Bridgewood, (800) 235-2100

Craftsman (Sears), (800) 377-7414

Delta, (800) 438-2486, www.deltawoodworking.com

Felder, (800) 572-0061 www.felderusa.com

General, (514) 326-1161, www.general.CA.com

Grizzly, (800) 523-4777, www.grizzlyindustrial.com

Jet, (800) 274-6848

Oneida Air Systems, (800) 732-4065, www.oneida-air.com

Penn State Industries, (800) 377-7297, www.pennstateind.com

Powermatic, (800) 248-0144

Ridgid, Home Depot stores (888)-743-4333 www.ridgid.com

Seco, (888) 558-4628

Sunhill, (800) 929-4321

TrendLines (Reliant), (800) 877-7899, www.trend-lines.com

Woodtek (Woodworker's Supply), (800) 645-9292

FILTER (BAG) UPGRADES

American Fabric Filter Co. (custom felt bags), (800) 367-3591, sift@aol.com

Oneida Air Systems, Inc., (800) 732-4065, www.oneida-air.com

Penn State Industries, (800) 377-7297, www.pennstateind.com

FOR MORE INFORMATION

Woodshop Dust Control, by Sandor Nagyszalanczy, Taunton Press, 1996, (800) 243-7252, $20.

Dust Collection Basics: Recommendations for Home Shop Systems, Woodstock International, Inc., 1995, (800) 840-8420, P.O. Box 2309, Bellingham, WA 98277, #W1050, $6.

Tool Test:

Shop Air Cleaners

by Dave Munkittrick

Take dust control to the next level

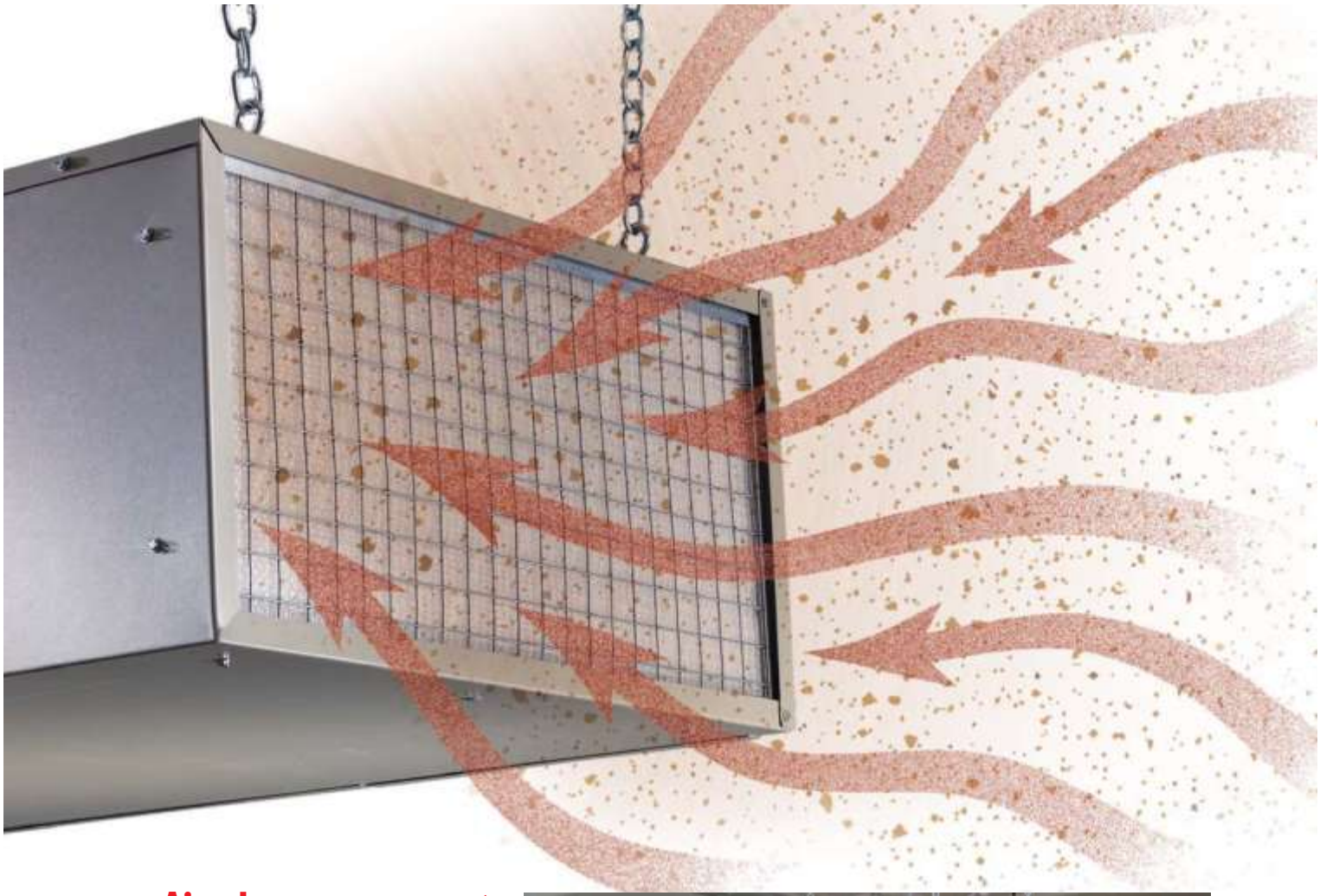
Gone are the days when a dusty shop was considered a productive shop. Now, a dusty shop is a hazardous shop. Fine dust makes a mess of everything, including your lungs. Due to this heightened awareness, dust collection has become a fast-growing area for manufacturers of woodworking equipment. Air cleaners are designed to hang from the ceiling where they can reduce the amount of fine dust suspended in your shop's air (Fig. A).

Common Misconceptions About Air Cleaners

Air cleaners are not dust collectors. They are simply not designed to collect large quantities of dust. Most air cleaners use disposable heating and air conditioning filters. These filters are designed for relatively clean, slow moving air. Filters on dust collectors are designed to take heavy dust loadings and repeated cleaning.

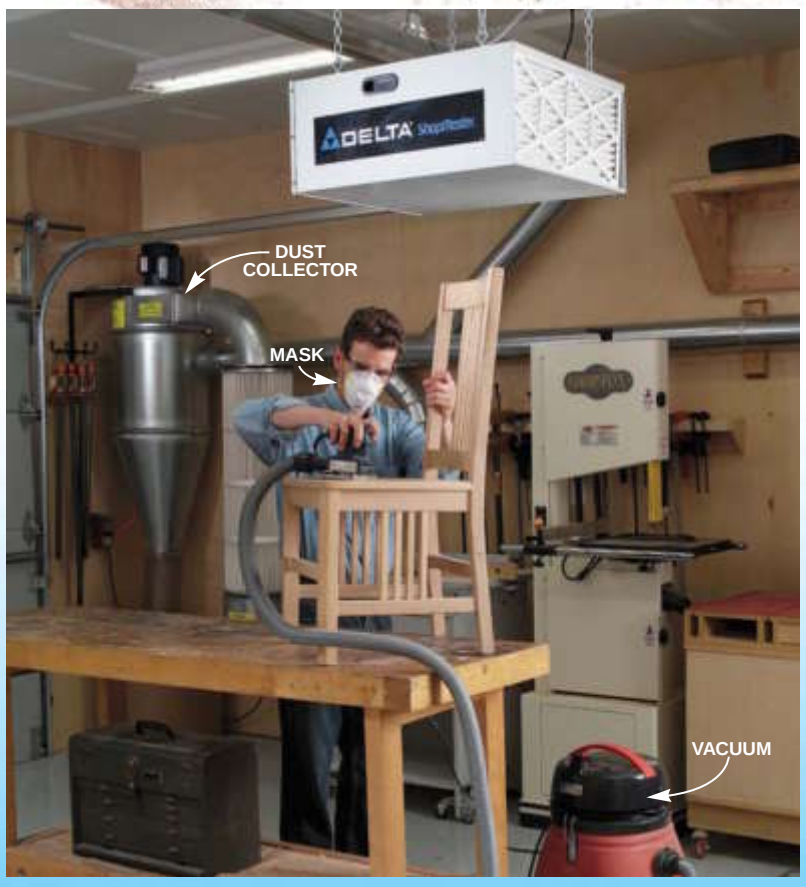
Don't Put the Cart Before the Horse

Before rushing out to buy an air cleaner, get a high-quality dust collector with proper filters first (for more on this, see AW #80, "Tool Test: Dust Collectors," page 80 and AW #100, "Central Dust Collection," page 54). Add a shop vacuum to collect from your hand-held power tools (see AW #80, "Tool Test: Shop Vacuums," page 69). Together, these two systems will capture the vast majority of the dust your shop produces. An air cleaner



Air cleaners are not dust collectors. They are designed to filter small amounts of fine dust from the air in your shop.

EDITOR: DAVE MUNKITTRICK • ART DIRECTION: VERN JOHNSON • LEAD SPREAD PHOTOS: RAMON MORENO, ALL OTHERS: STAFF, UNLESS OTHERWISE INDICATED • ILLUSTRATION: FRANK ROHRBACH



Air cleaners are the last line of defense in the war on wood dust. First comes a high-quality dust collector that captures the dust directly from your machines. Next comes a vacuum to capture the clouds of dust from your hand-held power tools. Finally, add an air cleaner to get what's left. Don't forget a dust mask to protect your lungs from the dust that's on its way to your air cleaner.

How Do They Work?

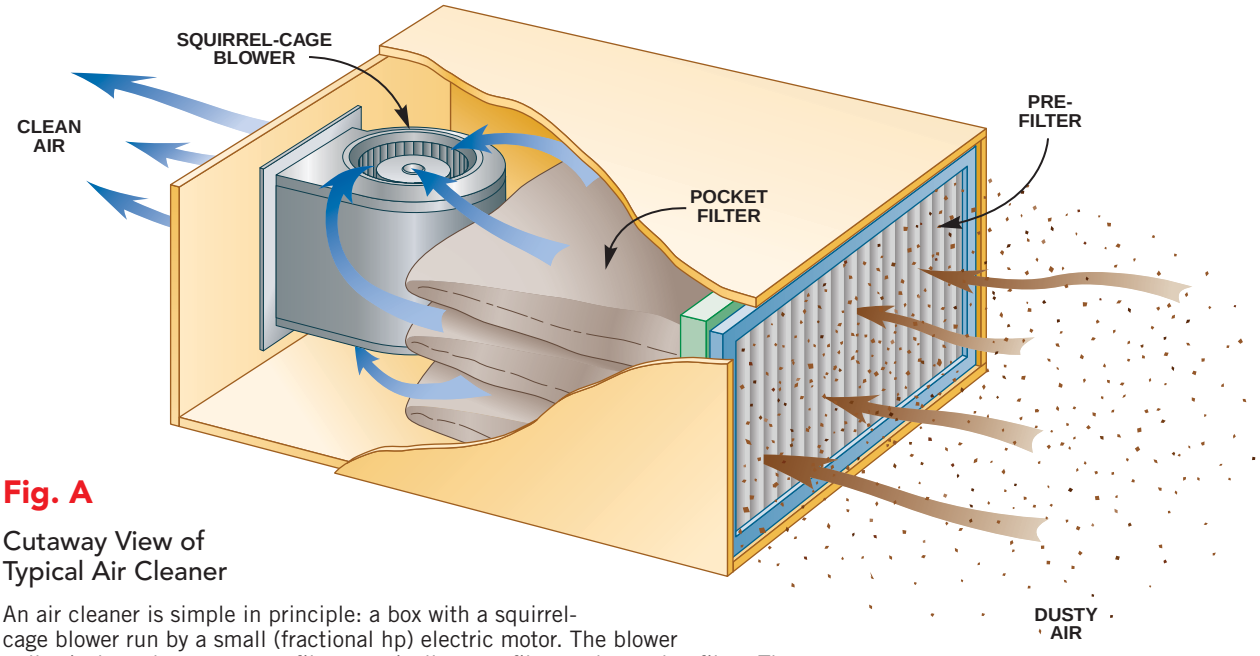


Fig. A

Cutaway View of Typical Air Cleaner

An air cleaner is simple in principle: a box with a squirrel-cage blower run by a small (fractional hp) electric motor. The blower pulls air through two or more filters, typically a pre-filter and a pocket filter. The pre-filter protects the more expensive pocket filter from getting prematurely plugged with debris. The pocket filter captures the finest particles.

The amount of air that passes through an air cleaner is measured in cubic feet per minute (cfm).

will help capture the fugitive dust that escapes your other systems.

The Balance of Air Flow and Filtration

Effective air cleaning is a race against time. Once a dust particle becomes airborne, it's only a matter of time before it settles in your shop or lungs. To get the dust before it can settle, an air cleaner must circulate *all* the air in your shop every six minutes.

So, lots of airflow, measured in cubic feet per minute (cfm), is a good thing. But the cfm capacity of an air cleaner is only half the equation. You also need a top-notch filter to capture the fine dust. Only a few of the machines in our test successfully combined good cfm and good filtration (Fig. B).

Some machines have great filters but are less than robust in the cfm department (Fig. C). Others had lots of airflow but less efficient filters (Fig. D).

Testing Air Cleaners

Because of the technical expertise required to accurately test air filters, we took all the cleaners to Particle Tech, Inc., a professional testing lab in Minneapolis. Before the test we installed self-stick weather strip on the filter flanges of each machine to reduce leaks (see "Air Cleaner Tips" page 81). Each machine was set in a sealed test chamber where a total of 80 grams of standardized test dust was introduced in 16-gram increments called "loadings." The standardized dust we used was made up of particles that ranged in size from 100 microns to less than 1 micron. Dust that got through the machines was captured and weighed to determine how much dust the air cleaner let through.

With each loading, cfm readings were also taken to track how the airflow degraded as the filter got dirty.

Filtration

The "Blow Through" heading in the chart, page 82, tells you how many grams of the test dust got through each machine. It is a direct measure of filtration performance.

The blow through numbers are quite small, but keep in mind that this represents the smallest, most harmful particle sizes. So, a small difference in weight is actually a big difference in performance. For example, our worst performing machine let 68 times as much harmful dust through as our best performing machine. That's huge.

Manufacturers often use percentages to rate filter performance but this is misleading. In our test, the worst performer captured 91.5 percent of the dust and the best captured 99.875 percent. Long years of schooling have conditioned us to look on a 90 percent score as a great success. But that's just not the case with filtration.

Balancing Air Flow with Filter Efficiency

Fig. B

High CFM/ High-Efficiency Filter

The most effective air cleaners strike a balance between high airflow (cfm) and high-efficiency filters. The higher the airflow, the faster your shop air will be cleaned. High-efficiency filters complete the equation, capturing almost all of the airborne dust sucked into the air cleaner.

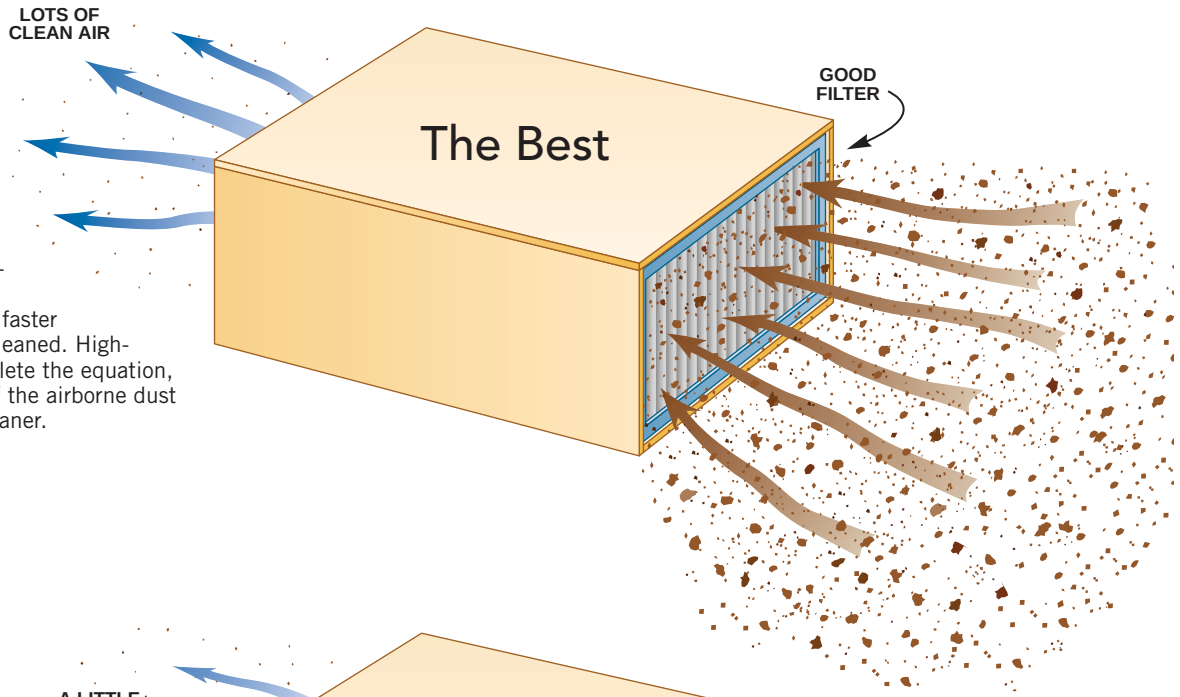


Fig. C

Low CFM/ High-Efficiency Filter

Air cleaners with low cfm can't get all the dust before it settles out of the air. Even the best filter is useless if the blower fails to bring in enough air.

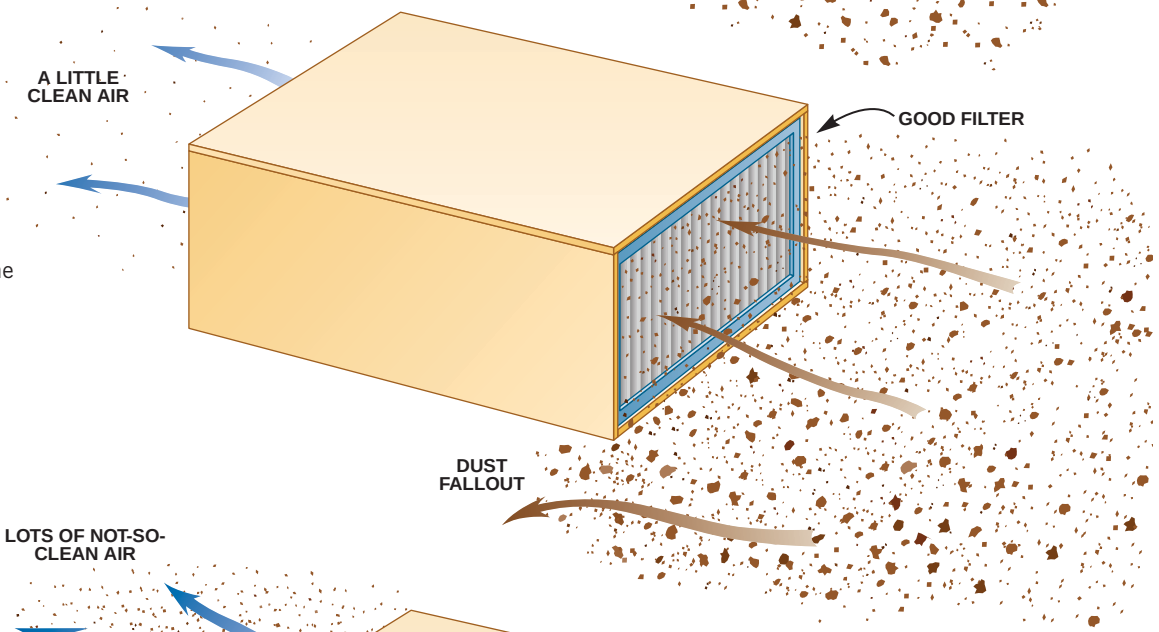
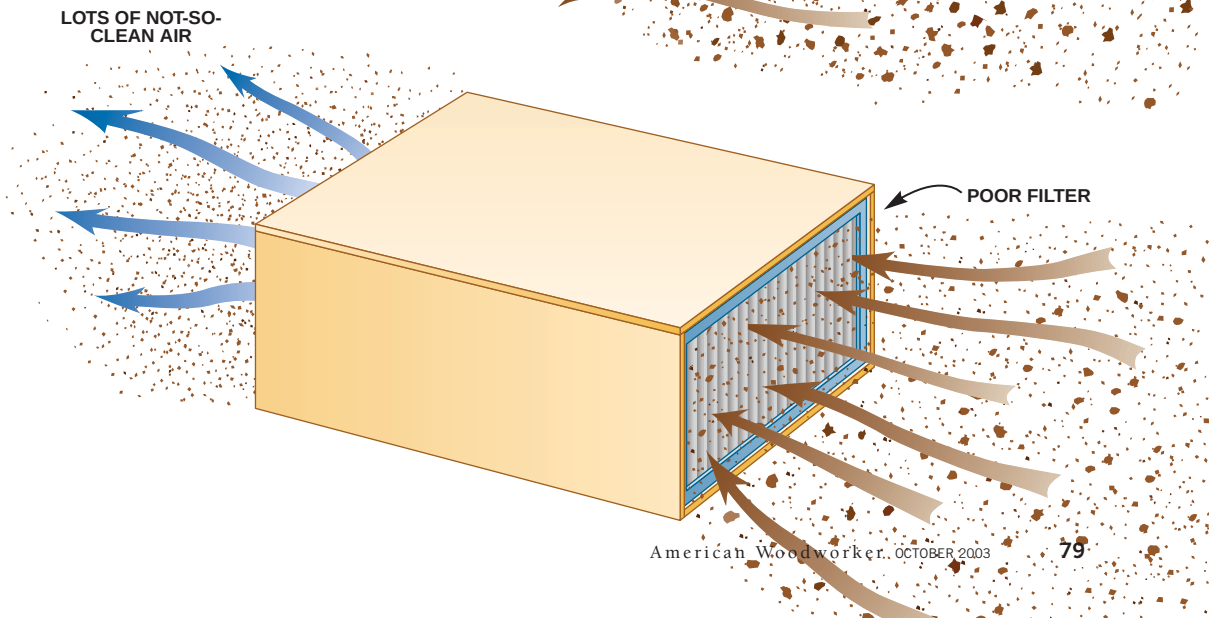


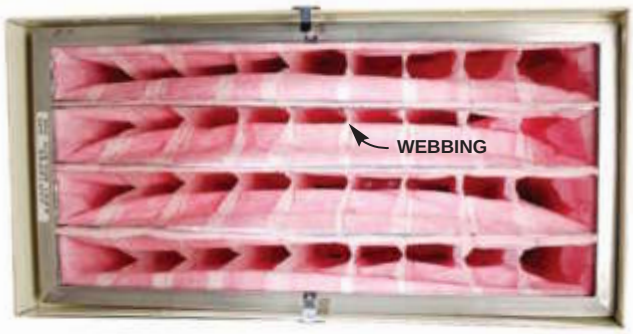
Fig. D

High CFM/ Low-Efficiency Filter

Air cleaners with low-efficiency filters allow too much dust-laden air to be circulated back out into your shop and lungs.



1 **Disposable pre-filters** do a better job than washable pre-filters. However, washable pre-filters offer greater convenience: simply wash clean with water, dry and reuse.



2 **Webbing or stitching** is used on the best performing pocket filters, allowing the filter to open up like a parachute into the air stream. The webs also prevent the individual pockets from contacting each other for uniform airflow through the filters.

Real World CFM

Avoid using the manufacturer's cfm numbers when comparing air cleaners. These are often based on the blower running without the filters installed. Not a very realistic number.

We took a total of six cfm readings on each machine, starting with clean filters and once for each 16-gram loading of test dust. As the filter loads with dust, the cfm decreases. The "Dirty Filter CFM" rating in the chart is the last reading taken after all 80 grams of dust have been run through the machine. The "Average CFM" in the chart represents the average of all six readings and is a good working number to use when determining what size machine you need for your shop.

What Size Air Cleaner Do I Need?

As a rule of thumb, your air cleaner should filter all the air in your shop every six minutes. This is a minimum. An air cleaner that can do the job in less time is better because it will clean the contaminated air in your shop that much more quickly. To determine the size or how many cleaners you need, start by calculating the cubic feet of your shop (L x W x H). Divide that number by 6 and you'll have the minimum number of cubic feet per minute, or cfm, the air cleaner needs to pull through it's filters. Use the "Average CFM" number from the chart to see if the collector you're looking at is right for your shop space.

For example, if your shop measures 15 ft. x 20 ft. x 8 ft., it contains 2,400 cubic feet of air. Divide by 6 to get the minimum cfm required, in this case 400.

Features

Pre-filters

Air cleaner pre-filters are either disposable or washable (Photo 1). The choice is yours. A disposable pre-filter will be replaced many times before the pocket filter behind it needs replacement. You may be tempted to vacuum off a disposable pre-filter, but don't. This can damage the fabric and reduce the filter's efficiency.

Washable pre-filters, on the other hand, offer convenience and long-term cost savings. When they get dirty, you simply rinse them out, let them dry and put them back into service. The money you save using a washable filter may get spent in more frequent pocket filter changes, however, because the washables let more dust through.

Remote Control

A remote control may be important if your machine is going to be out of reach (Photo 3). On some machines the remote control is the only way to adjust speed or set the timer (a bad deal if you run out of batteries or lose your remote).

Timer and Variable Speeds

A timer and/or variable speeds are available on some machines (Photo 4). Timers are great and allow the machine to keep cleaning your shop air when you're not there. Variable speeds allow you to run your machine at a lower cfm. This reduces the noise you have to put up with, but the lower cfm also reduces the effectiveness of your cleaner.

Noise

These machines are running for long periods of time, so noise can be an issue. All the machines were relatively quiet (we're talking about a woodshop here). The trade-off for a quiet machine is lower cfm. You just can't have your cake and eat it, too.

3 **Remote controls** let you operate your machine when it's out of reach. We liked radio-controlled remotes the best. They don't require you to aim the remote or have a clear shot at the control panel. They even come with key slots in the back so they can be hung on the wall.

4 **Timers** allow you to clean the air when you're not around. Just set the air cleaner to run a few hours after you're done and you'll return to a clean shop. Variable speeds are of less value. The machine is quieter on a low setting, but for best performance, it needs to be circulating as much air as possible.

CFM numbers provided by manufacturers are often unrealistic. They're based on running the blower without the filters!

AIR CLEANER TIPS

BILL ZUEHLKE

Telltale Filter Monitor

Ribbons on the exhaust port are a visible cue that it's time to change your filters. With a clean filter installed, tie a few long ribbon "telltales" onto the exhaust grate. Then, turn on the machine and shorten them until they flutter horizontally. They'll begin to droop at about a 45-degree angle when it's time to change the filters.

Prevent Leaks

Add a gasket on the filter flange to prevent air from bypassing the filters. Some models come with a gasket on the filter flanges, but all the ones we saw were poorly installed, leaving large gaps. You can apply your own gaskets using self-stick weather strip available at hardware stores.

Where to Locate Your Air Cleaner

Locate your machine as centrally as possible but cheat it toward areas where the dust is created. For example, a good location is over an assembly table where you do hand sanding.

For best results, especially in larger shops, buy two smaller units rather than one big one. That's because your air cleaner tends to pull hardest on the air around it leaving the far corners of your shop virtually untouched. Two cleaners can be set up to create a current around the shop to maximize the circulation of air through the machines.

Recommendations

Our picks represent the optimal combination of cfm and filtration. Units that allowed more than a gram of dust through were excluded from consideration. At first glance, this may seem overly restrictive, but a small difference in efficiency can make a huge difference in effectively capturing small, health-damaging dust particles.

Runners Up

A couple of models would have made Best Buy and Editors' Choice had filtering or cfm performance been better.

The Delta 50-875 was a top Editors' Choice contender. It has great filtration but about 11-percent less cfm than the Editors' Choice, the JDS 750-ER.

Jet put up some strong cfm numbers, but both Jet machines let more than twice as much dust through as the JDS 750-ER.

The General Int'l 10-550 comes with a remote and good cfm, all at a great price. It would have been a strong Best Buy candidate if it hadn't let through four times more dust than the Delta AP-200, our Best Buy. The same thing can be said for the Shop Fox: great cfm and good features, but it fell down on filtration. The Lee Valley 03J05.20 took top honors in filtration, but was weak on the cfm side. *AW*

Note:
An air cleaner from Harbor Freight (800-423-2567), model #46361, arrived too late to include in the laboratory testing. At $170, it is the lowest priced machine in the group. It's quiet, and includes a radio remote control and hanging hardware. However, the filters are only capable of filtering to 20 microns.

Craftsman and Grizzly declined to participate in this tool test.

Brand & Model	Contact Phone Number	Street Price	Clean Filter CFM / Dirty Filter CFM	Average CFM	Blow Through (in grams)	Washable (W) Disposable (D)	Remote Control	Variable Speeds *Remote Only	
Delta AP-200	(800) 438-2486	$230	582/402	498	0.2	D	none	N	
Delta 50-875	(800) 438-2486	$270	594/437	523	0.3	W	infrared	Y	
General Int'l 10-600 M1	(514) 326-1161	$320	402/242	331	3.8	D	radio (†)	Y	
General Int'l 10-550 M1	(514) 326-1161	$220	641/383	523	1.2	D	infrared	N	
JDS 750-ER	(800) 480-7269	$289	664/514	589	0.3	W	infrared	Y	
Jet AFS-1000B	(800) 274-6848	$240	674/383	528	0.8	D	infrared	Y *	
Jet AFS-1500	(800) 274-6848	$325	899/737	823	0.65	D	infrared	Y *	
Lee Valley #03JO5.01 AB 500	(800) 871-8158	$195	271/242	257	0.3	W	none	N	
Lee Valley #03JO5.20 AB 760	(800) 871-8158	$279	402/297	351	0.1	W and D	none	Y	
Penn State AC620	(800) 377-7297	$240	242/45	139	2.05	W	radio (†)	Y *	
Shop Fox W1690	(800) 840-8420	$265	685/484	596	1.8	D	infrared	Y *	
Woodtek 923-838	(800) 645-9292	$200	171/99	146	3.6	W	none	N	
Woodtek 923-859	(800) 645-9292	$250	271/223	241	6.8	W	radio (†)	N	

(†) manual switch to select remote or manual operation.

PHOTO COURTESY OF MANUFACTURER

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2003 AMERICAN WOODWORKER EDITORS' CHOICE

JDS 750-ER

This is a great all-around air cleaner. The JDS has the two basic requirements sewn up: excellent cfm and great filter performance. Plus, the 750-ER adds an infrared remote, timer and variable speed. We wish it had a radio remote, but that's our only complaint.

2003 AMERICAN WOODWORKER BEST BUY

Delta AP-200

The Delta AP-200 has all the basic requirements at a low price: excellent filtering performance and high cfm. There's no remote control if you're thinking of hanging your machine up out of reach, but the switch is located on the power cord for easy access.

	Timer (R)= Remote only	Ceiling Mounting Hardware Included	Size H x W x L (in ")	Decibels (dB)	Comments and Features
	N	Y	12 x 24 x 28	65	Built-in switch in power cord. Electrostatic or charcoal pre-filter available.
	Y	Y	12 x 24 x 28	68	3-speed motor. Timer settings at 1/2 to 7-1/2 hour settings in 1/2 hour increments. Built-in dirty-filter indicator. Gaps in filter-flange gasket. Switch on power cord.
	Y/R	Y	14 x 24 x 30	64	Timer settings at 2, 4, 6 and 8 hours. 3-speed fan.
	Y	Y	12 x 24 x 28	65	Single speed. Timer settings at 2, 4 and 8 hours. Gaps in filter-flange gasket.
	Y	Y	12 x 24 x 34	65	3 speeds. Timer settings at 1, 2, 3 and 4 hours. Electrostatic or charcoal pre-filter available.
	Y/R	Y	12 x 24 x 30	66	Timer settings at 2, 4 or 8 hours. 3-speed fan. Electrostatic or charcoal pre-filter available. Gasket around pocket filter frame.
	Y/R	Y	16 x 20 x 32	68	2" thick pre-filter. Timer settings at 2, 4 or 8 hours. 3-speed fan. Comes with two filters, but has the capacity for three. Electrostatic or charcoal pre-filter available.
	N	Y	11 x 20 x 32	60	Filter change not tool-free. Small opening makes changing pocket filters difficult. Loose screws for filter access panel are easy to lose.
	N	Y	11 x 20 x 32	61	2 pre-filters. 2 speeds. Small opening makes changing pocket filters difficult. Loose screws for filter access panel are easy to lose.
	Y/R	Y	12 x 24 x 30	57	5 speeds. Gaps in filter-flange gasket. Higher efficiency pocket-filter upgrade available. Timer settings at 2, 4, 6 and 8 hours.
	Y/R	Y	12 x 24 x 30	66	3-speed fan. Gasket around pocket filter frame. Timer settings at 1, 2 and 4 hours.
	N	N	12 x 12 x 30	57	Polyester pocket filter is washable. Switch on power cord.
	N	N	12 x 24 x 30	57	Polyester pocket filter is washable. No pull chain or cord switch for manual operation. 1-micron upgrade filter available.