

Browse more than 1,300 woodworking project plans, DVDs, back-issue collections, videos, tool reviews, books, & more.

Thank You!

Thank you for ordering this *WOOD*® magazine download. We hope you enjoy being part of our online experience and that you have fun expanding your woodworking skills.

Please remember that this copyrighted material is for your use only. It is unlawful to share this file with someone else or to reprint it in any form.



Dave Campbell
Editorial Content Chief, *WOOD* magazine



Adobe Acrobat Reader Troubleshooting Guide

If you can read this page, your Acrobat Reader program is working correctly! But you may still have problems or specific issues, such as printing and saving your downloadable file.

My printer won't print the text correctly

Almost all printing problems are due to not enough free system resources memory. The files are very memory intensive because they include graphics, text, and photos. Close all other programs/applications and print directly out of the Acrobat Reader program, not your Web browser.

Patterns are not printing full-size

Make sure your printer is set to print at 100 percent, "print to fit" is not checked and "page scaling" is set to "none". These settings are selected in the printer setup or printer options.

I can't find my file now that it's downloaded

Rather than viewing the plan in your browser, you must save it to your hard drive. Download the file again, except this time try right-clicking on the red download button. A menu window will open. Select "Save target as" or "Save link as" to save the file to your hard drive. Once saved, you can open it up with Adobe Acrobat Reader.

For more details on using Adobe Acrobat Reader please visit our online help section at:

woodmagazine.com/adobe

WOOD Store

Customer Favorites

Shop Tools & Accessories



Indoor Furniture



Outdoor Furniture



Mission Furniture



Visit the WOOD Store at:

WOODStore.net

DUST MART

MEGA \$ALE!!!



Clearing the Air: How to Buy a Dust Collector

No charts, no math, no bull.

A dust collector has two simple jobs: pulling debris away from your machines and filtering out tiny, unhealthy dust particles before sending the air back into your shop. (See **Dust filtration: The little things matter**, right.)

However, choosing a dust collector has been anything but simple. Doing so typically involves deciphering airflow charts, calculating static pressure losses, analyzing fan curves and graphs, finding reliable performance data for a given collector...no wonder even the experts have trouble explaining it all.

Well forget that. We've stripped away the mumbo-jumbo and the need for a calculator. Here's what you really need to know about those two simple dust-collector functions and how to find the right unit for your shop.

Dust filtration: The little things matter

Dust particles smaller than 10 microns pose a health hazard because they slip past the natural defenses in your nose and throat, and lodge in your lungs. Because of their tiny size, the slightest breeze stirs these particles into the air, where they float for extended periods, presenting even more chances for you to breathe them in.

To work effectively, a dust collector must generate enough suction to pull away these particles at the tool before they become airborne. And if the unit's filter doesn't contain them, the dust collector may help your shop look cleaner, but not protect your lungs.

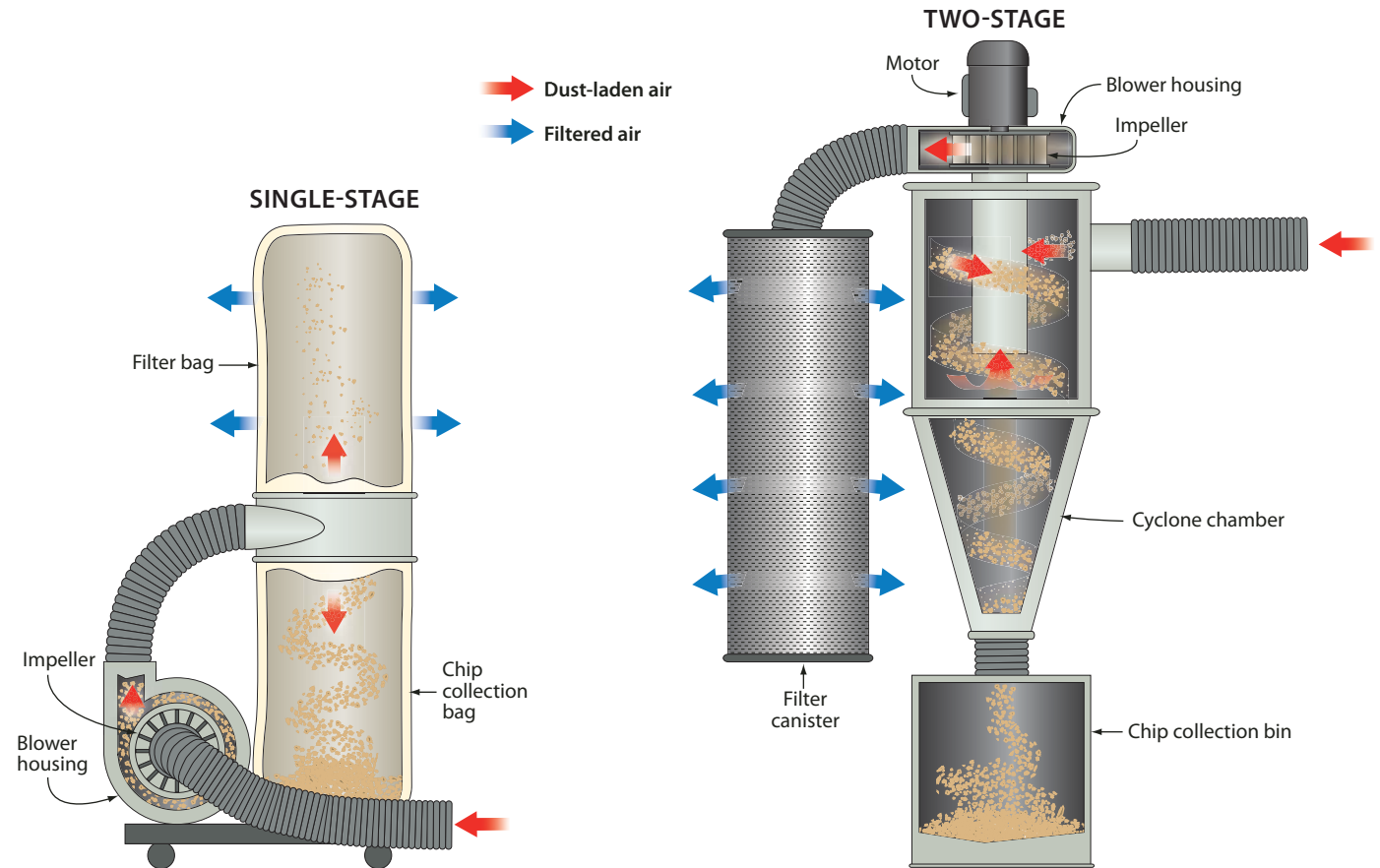
How big is a micron?

Human hair
.0035 inch
.0889 mm

10 microns
.00039 inch
.01 mm



1 micron
.000039 inch
.001 mm



Take it in stages

The heart of a dust collector consists of a circular, motor-driven impeller with vanes, below, that spins inside the blower housing creating suction that pulls air through an inlet (removed in the photo to show the impeller). Connect a duct or hose between the inlet and a woodworking machine, and the suction draws the sawdust into a collection bag or barrel.

Probably most familiar to woodworkers is the two-bag, **single-stage** collector [left in drawing], where sawdust and chips pass through the impeller on their way to the collection bag. The air exhausts through the filter bags (or canister, in some cases) as the heavier debris settles into the lower bag. With this system, all that debris takes a toll on the impeller as it passes through the blower.

In a **two-stage** collector, chips and heavier debris fall out of the airflow in the first stage so only the finest dust passes through the impeller and on to the second stage, the filter. A two-stage collector can be as simple as a garbage can with a special snap-on lid, placed in-line before a single-stage collector, below, or as elaborate as a cyclone separator [right in drawing].



Removing a cover reveals the impeller. This one spins clockwise, pulling air and chips in, and pushing them out through the top.



As chips fill the garbage can, collector efficiency drops, so a separator like this one needs to be emptied frequently. However, dumping sawdust from a can like this one is often easier and faster than wrestling with the collection bag of a single-stage collector.

Assess your space

Before deciding which type of collector works best for you, evaluate how much room you have in your shop. A single-stage model may take as little as 3½ square feet of floor space. Adding a separator in-line before the collector adds another few square feet. A large cyclone may have a 4×4' footprint and exceed 8' in height.

If you plan to move a portable dust collector from machine to machine, determine if you have room to maneuver it around the shop and park it and its hose out of the way while you work. If you decide on a stationary collector, is there room along the walls or ceiling to run ductwork to each machine and keep it from underfoot? (See **Get your ducts in a row**, right.) And take time to assess the placement of each of your woodworking machines. For best results, place those that require the most airflow (thickness planer, jointer, stationary sander) closest to the collector.

Finally, evaluate your shop's electrical system. A 1½-hp dust collector may require its own 15-amp/110V circuit; a 2-hp collector requires a minimum 20-amp/110V circuit; and some units require a 220V circuit.

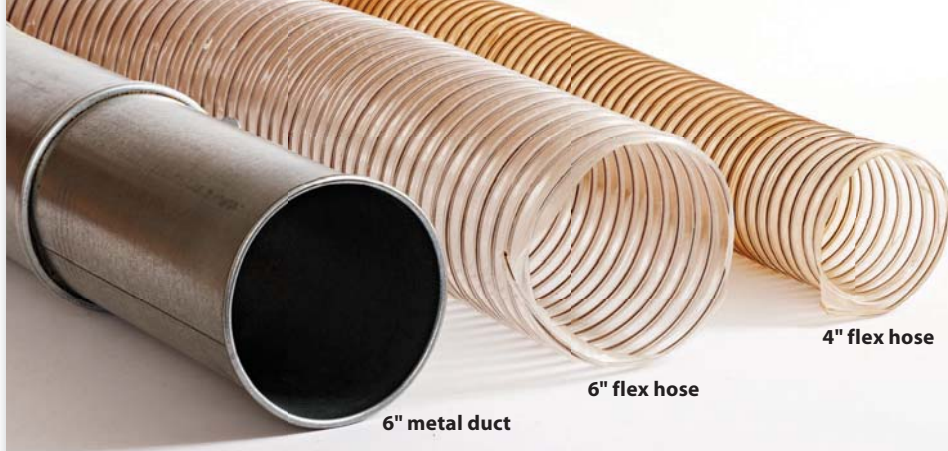
Determine the type of collector you need

Put simply, you need a dust collector that pulls more air (expressed in cubic feet per minute, or cfm) than your most demanding tool—and its ductwork—require. You can run calculations to figure out airflow. (Find information in **More Resources** on page 37.) But a few basic guidelines will get you close.

Any dust collector that meets the needs of your most demanding machine will easily handle the others. In a typical home woodshop, the most air-hungry machines (a 6" stationary belt sander and an 8" jointer) require about 550 cfm. Even if you don't have these tools, purchasing a dust collector that would work for them allows for adding them (or other tools) later.

For connection to only one machine at a time with less than 8' of 6" flex hose, a 1½-hp, single-stage collector will handle the job. Expect to pay between \$200 and \$450.

A whole-shop, fixed-ductwork system requires, at minimum, a 2-hp motor turning a 12–13" impeller connected to 6"-diameter smooth-wall duct. Prices start around \$280 for a two-bag model



Get your ducts in a row

A large-diameter, straight, smooth path between the dust collector and a woodworking machine provides optimal airflow. Think of it as driving a car: You can move faster on a smooth four-lane freeway with wide, gentle curves; a bumpy, narrow road with tight turns forces you to slow down. Narrow ductwork, changes in duct direction, and rough surfaces (like the inside of a flex hose) increase the resistance the impeller must overcome. Duct length adds resistance too, so keep runs as short as possible.

For a whole-shop system with fixed ducts, run smooth-wall PVC or metal duct, *above*, in the largest diameter your collector will accept, as far as possible. Use flex hose only for making final connections to machines, and consider enlarging machine collection ports to accept 6" fittings.

Mobile collectors hooked to only one machine at a time can usually get by with just flex hose, but use the shortest length possible and the largest diameter that fits the collector. (See photo, *next page*.)

DOUBLED-UP COLLECTOR PROVIDES MORE SUCTION



This 3-hp, single-stage collector features two canisters that provide double the filter area of a typical single-stage collector, while two lower bags increase chip-holding capacity.

in this range. But if your shop layout requires more than 20' of ductwork, choose a 2-hp or larger single-stage dust collector, *previous page*, or a cyclone. Single-stage prices range from \$475 to \$1,200. Portable cyclones begin at about \$650; stationary units at around \$900, and go north of \$2,000 depending on motor size, filtering, and other features.

In return for the higher price, cyclones offer two major advantages: efficiency and durability. A 2-hp motor and impeller can pull 20 percent more air when installed on a cyclone than on a two-bag collector. And because a cyclone removes chips and much of the fine dust before it reaches the filter, a cyclone maintains airflow, unlike a single-stage collector, where suction drops as the filter clogs.

Without the constant shower of debris, a cyclone's impeller and motor last longer than those of a single-stage collector. This also allows impeller designs that maximize airflow instead of impact resistance.

If you have any doubts when choosing the appropriate collector size, go with the larger cfm model. The second-biggest mistake you can make is buying a too-small collector. The *biggest* mistake is not using the best filtration you can get—more on that in the next section.

Now choose the specific collector

Consider the following as you shop:

- Our tests of dust collectors show that true airflow typically runs about half of manufacturers' claims. Using this more conservative number gets you a machine that will truly serve your needs.

- Some collectors come with 30-micron bags—far too porous to protect your lungs. Insist on 1-micron filters, whether bags or canisters, with 98 percent or better efficiency. If the manufacturer doesn't offer them, aftermarket suppliers do (**Sources**). But even then, the filter must provide enough surface area for air to flow out freely. Otherwise, pressure builds inside the collector, reducing its suction. The high pressure that makes bags on some collectors puff up taut, like balloons, also forces fine dust through the filter.

As a rule of thumb, divide the actual airflow (measured in cubic feet per minute or cfm) of the collector by 10 to find the recommended surface area in square feet of the filter medium (i.e. a 600-cfm unit needs 60 square feet of filter area).

OPEN IT UP AND LET IT BREATHE



Instead of connecting a hose to each 4" port, increase the dust collector's airflow by connecting ductwork that matches the larger-diameter port hidden behind the wye.

- Impeller size matters. Given a choice between same-size motors with different impellers, choose the larger one.

- Choose a collector with a 5" or larger port. Most portable models come with a wye with two or three 4" ports; removing the wye reveals a larger port that allows air to flow more freely, *above*.

- A collector that moves from machine to machine must move easily without tipping, with casters that roll over chips, floor mats, and other obstacles.

- On single-stage collectors, take a test-run at removing and reinstalling the lower bag. Some snap in and out. On others, it can take three hands to hold the bag, the band clamp that secures it, and cinch the band clamp. 🌳

Produced by **Craig Ruegsegger**
Illustrations: **Tim Cahill**

Sources: Filter bags—American Fabric and Filter 800-367-3591, americanfabricfilter.com; Oneida Air Systems, 800-732-4065, oneida-air.com.

MORE RESOURCES

FREE VIDEO

- See how we test dust collectors at woodmagazine.com/dctest.

MORE ARTICLES

- "Dust Collection that Evolves with Your Shop," issue 198, July 2010
- "Figure Dust-Collection Needs," issue 119, Dec. 1999
- "Guide to Workshop Dust Control," issue 143, Sept. 2002 \$
- "Two Fast Fixes for Dust Collection" (capturing dust from tablesaws and mitersaws), issue 133, June 2001 \$
- "Dust-Defying Cyclone" (shop-made cyclone), issue 100 Nov. 1997 \$
- Visit our forums to learn more about reader modifications to the cyclone in issue 100: woodmagazine.com/cyclonemods

\$ = Download these articles for a small fee at woodmagazine.com/plans. Type the article title in the search box.

Visit the **WOOD**[®] family of helpful Web sites!

WOODStore.net

Browse more than 1,300 woodworking project plans, DVDs, back-issue collections, videos, tool reviews, books, & more.



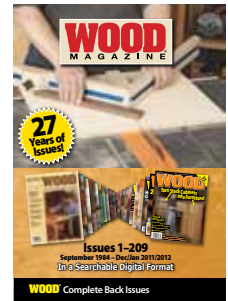
Plans



"Complete Guide" DVD-ROM's



Videos



Back-Issue Collections

WOODmagazine.com/videos

DVDs or downloads



The biggest names in woodworking help you build your skills with affordable videos (up to 2 hours long). Save money by doing the download.

FREE magazine support 24/7



WOOD magazine editors provide videos that enhance the content in the magazine. New videos added regularly.

By woodworkers, for woodworkers



Watch free videos of other woodworkers showing their stuff, from shop tips, to favorite jigs, to... well, just about anything!

Watch a demo before you buy



Don't spend a penny on a tool until you learn how it works. Tool School is like having a free woodworking show on your desktop!

WOODmagazine.com

A wealth of information just a click away.

WOODmagazine.com speaks to woodworkers of all skill levels with free woodworking plans, helpful forums, hundreds of articles, and more services to help you become a better woodworker.



toolreviews.woodmagazine.com

Everybody's a tool critic. Now it's your turn!

Readers rely on WOOD magazine for unbiased reviews of woodworking tools and accessories. You'll find them here, all in one place. While you're there, add reviews about the tools in your shop. Just click to compare specs, prices, and more.

