We tested eight cyclone dust-collectors to separate hype from reality.

In the beginning, the woodworking world was covered in sawdust. Slowly we evolved from broom-and-dustpan to shop vacuum, and eventually to bigger, more capable dust collectors with the suction to carry away wood chips as well as fine sawdust. These days, with the health hazards of wood dust making front-page news, you’re about as likely to see a dust collector in a woodworking shop as a tablesaw.

In WOOD magazine issue #140, we tested single-stage collectors best suited to gathering dust from one tool at a time. (You can go to www.woodmagazine.com/dcreview to download that review.) This time, we focus on cyclone systems capable of pulling dust through a whole-shop duct system.

How cyclones differ from single-stage dust collectors

The bag-type dust collectors most of us know and use today are basic, single-stage units. They suck wood dust and chips through an impeller that deposits the entire mess in a lower container bag, while the air—and some dust—exhausts back into the shop through an upper filter bag. Most units can be wheeled from tool to tool and then connected directly to whatever power equipment you’re using.

Cyclonic-type collectors are larger, fixed units, generally more powerful, with most requiring 220-volt service. They suck wood chips and dust into a funnel-shaped chamber (as shown at left and described in the caption below) where heavier particles—the chips and the more substantial grains of sawdust—fall into a separate drum for disposal.

Numerous advantages give cyclone collectors an edge over single-stage units. Because cyclones separate out and dispose of virtually all the debris before it passes through the impeller, engineers can design the impeller for maximum airflow, not for its ability to withstand the impact of a stray chunk of wood. The impellers of single-stage collectors, on the other hand, not only have to create suction, they also have to transport the debris passing through them, which can bog them down and clog them under heavy workload.

Cyclones also can be built with bigger impellers and motors, which create greater airflow volume (rated in standard cubic feet per minute, or SCFM), and with larger inlet ports to allow large-diameter, multi-duct runs. With the proper setup, a cyclone may be able to serve several woodworking machines operating at the same time without sacrificing performance.

Five comparison points for cyclone collectors

To ensure that our testing would be fair across a range of units with different specifications and options, we enlisted the assistance of Dr. Greg Maxwell, an airflow expert from Iowa State University. (Although our test numbers may vary from the manufacturers’ quoted specs, all of the cyclones were tested in the same manner, so our results give you a fair head-to-head evaluation of each machine.)

Three key criteria define the performance of a cyclone dust collector: airflow, filtration, and debris separation. In addition, we think the overall size of the unit, and what exactly you get for your money are important to your buying decision, so we’ll touch on those subjects as well.

Airflow. Generally speaking, your dust collector must pull a high volume (SCFM) of air at

SEPARATING BY CYCLONE. When dust and debris enters the cyclone collector through the inlet (1), it begins a spiral descent along the inside wall (2), which slows its speed. As the particles slow, larger debris falls from the air stream and into the storage drum (3). Small dust continues to flow upward through the outlet tube (4), into the impeller (5), and finally is exhausted out to the filter (6), which removes nearly all of the fine dust before returning cleaned air to the shop.
the tool despite static-pressure (SP) loss caused by ductwork between the tool and the collector. (See “What is static-pressure loss?” on page 97.) Using a pitot tube and manometer, we recorded SCFM readings at a series of SP levels in ductwork matching each unit’s inlet diameter. The Cyclone Performance Curves chart, on the next page, plots the airflow through each inlet as we gradually dialed in a funnel-shaped plug (shown in the photo above) to increase SP. All models used their factory-supplied filters, which were seasoned with 30 gallons of wood dust and then emptied prior to the test, to provide real-world results.

Reading the chart from right to left, you see that as static pressure climbs, airflow drops. Oneida’s 2 Commercial System pulled the highest volume of air across a wide range of SP, with Grizzly’s G0525 second best.

However, at very high static pressures, the Penn State TEMP142CX delivered higher airflow. So, if the SP loss on your shop’s ductwork is less than about 7”, the 2 Commercial and Grizzly perform best; ductwork with greater than 8” SP loss (a pretty extreme condition) would be better served by the Penn State cyclone. Most stationary woodworking power tools require at least 350 SCFM to adequately evacuate dust, so at over 9” of SP even the TEMP142CX becomes ineffective.

Remember, too, that opening the ductwork to two machines at a time requires twice the airflow and can nearly double the SP, depending on the configuration of your ductwork.

Filtration. When it comes to filters—the cyclone’s last line of defense against fine dust—consider both the level of filtration and the filter media itself. All of the manufacturers represented in this test have switched to high-efficiency cartridges (see photo, above) or bags that capture virtually all of the dust particles most harmful to your respiratory system—particles that range in size from 0.5 to 10 microns.

Besides protecting your lungs, these high-efficiency filters also can improve airflow through the system. For example, Bridge-wood and Grizzly first sent 30-micron bags (common on single-stage dust collectors) with their cyclones, and then changed to high-efficiency bags midway through our test. Retesting these machines with their new bags gained them an average of 175 SCFM and 1” of static pressure.

As for the filtration media itself, cellulose or paper-type cartridge filters perform as well as more costly spun polyester filters—although the synthetics have the edge in moisture- and puncture-resistance. A steel mesh protects Penn State’s cellulose filters from projectiles, such as a mitersaw-flung offcut. Cartridge filters also provide a larger surface area for filtration than cloth bags. That means they restrict the exhausted air less and take up less space in your shop.

Debris separation. To test how well each cyclone separates heavier dust and debris from fine dust, we diligently mixed and weighed equal piles of wood chips and sawdust, and then fed the same amount at the same rate to each of the collectors. Ultimately, we found negligible differences in the way each cyclone separates materials.

But what do you do with that drum when it gets full? Units that collected the debris in 55-gallon drums went longest between emptyings, but those drums are awkward and heavy to lift and dump (although both 55-gallon models in our test come with a www.woodmagazine.com
Wheeled drum dolly to ease transportation. Smaller drums are easier to manage but must be emptied more often.

- **Overall size.** Cyclone collectors are necessarily tall, and manufacturers have to work hard to make their units fit under an 8’ ceiling (the Bridgewood and Grizzly crowded even the 10’ ceiling in our test facility). Also, because space often is tight in a workshop, it helps to know a cyclone’s footprint before you buy. Those dimensions are shown in the chart on page 98.

Some units offer space-saving options, such as the internal filter that fits inside the cyclone on the Oneida Comp-Sys models. The trade-off, however, is about a 10-percent drop in airflow compared to the external filter, and more difficult—and more frequent—cleanings. Penn State’s cartridge filter can be suspended from the ceiling to save floor space.

If noise reduction is more important to you than size, Penn State’s optional exhaust muffler increases the cyclone’s overall footprint, but decreases noise by 5 to 10 dB.

- **Extras.** None of the units in our group was complete and ready to run “out of the box.” They required assembly, and we found that some key components may or may not be included in the purchase price. For example, collection drums add cost to all but the Oneida systems. Most also came without power cords and plugs, so we had

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**How the cyclones stack up**

**Bridgewood BW-CDC3, $695**  
[www.wilkemach.com, 800/235-2100]

- **High points**  
  - Three-way adapter instantly reduces 8” inlet to three 4” inlets, or can be left off for a full 8” main.  
  - Rolling drum dolly makes haul-away easier, and large drum size eliminates frequent emptying.  
  - Fairly easy assembly.

- **Low points**  
  - 10’ height means it won’t fit under a standard 8’ ceiling.  
  - Owner’s manual doesn’t list some assembly steps at all, and lists others that are no longer necessary.

- **More points**  
  - 55-gallon drum not included.  
  - Bridgewood also sells a 5-hp version (model BW-CDC5), requiring 30 amps at 220V for $1,095.

**Grizzly G0525, $725**  
[www.grizzly.com, 800/523-4777]

- **High points**  
  - The second-highest airflow and a comparatively low price make this cyclone our Top Value.  
  - Three-way adapter instantly reduces 8” inlet to three 4” inlets, or can be left off for a full 8” main.  
  - Drum dolly makes haul-away easier, and large drum eliminates frequent emptying.

- **Low points**  
  - 10’ height means it won’t fit under a standard 8’ ceiling.  
  - Owner’s manual doesn’t list some assembly steps at all, and lists others that are no longer necessary.

- **More points**  
  - 55-gallon drum not included.  
  - Although this unit appears similar to the Bridgewood BW-CDC3, its impeller pulled higher airflow.
Static-pressure loss is resistance to airflow created by “upstream” factors, such as duct length and diameter, and the number—and even the angle—of intersections, bends, and elbows. There’s a real science to minimizing SP loss (thus maximizing the performance) of dust-collection ductwork, and some of the manufacturers represented in our test provide assistance in planning or analyzing your system, for free or a nominal fee. We heartily recommend taking advantage of these services before buying a cyclone.

To help you make a meaningful comparison of the cyclones in the test, we came up with the three “typical” shop scenarios shown at left. (Note: Although there’s more ductwork in Shop #2 than Shop #1, this system’s SP loss is actually lower because of the 7”-diameter main and a shorter run of flex hose.)

It’s unlikely that any of these scenarios will match your shop exactly, but you can use them to “ballpark” the SP on your ductwork. Remember that adding length, elbows, and flexible hose will add to SP loss; removing them will reduce the loss. Collecting from two tools at once also will increase SP loss and require twice the airflow.

You can calculate more precisely the static pressure of your existing or planned ductwork by following the instructions in WOOD magazine issue #119 (page 16), or by visiting www.woodmagazine.com/spcalc for a handy worksheet.

to buy those as well. (Check the list of standard and optional accessories for each model in the chart on page 98.)

Sales tax and shipping also add cost, which can be considerable on large, heavy equipment, particularly with units shipped by a trucking line. Cyclones that are broken down for shipping by UPS can save you shipping hassles and costs, but you pay with extra assembly time. It’s worth your while to call the manufacturers or check out their Internet sites to find out, in advance, exactly what you’re getting for your money, and what shipping methods are available.

Finally, it may be important to have help when you’re setting up your system. Design information or assistance is available from Grizzly, Oneida (for a $50 fee, which can be applied toward the purchase of one of their systems), and Penn State, but not from Bridgewood or Woodsucker.
**Oneida 2 Commercial System, $1,070**
www.oneida-air.com, 800/732-4065

High points
- The highest airflow numbers in the test.
- Pleated-polyester canister filter is an efficient dust-catcher, and a clean-out at bottom of unit makes emptying it a snap.
- Ceiling-mounted the cartridge filter saves on floor space.
- The largest filter surface area—452 sq. ft.—of any cyclone in the test, means less-frequent cleanings.
- Power cord, switch, and wall-mounting brackets included in purchase price.
- Packaged for easy shipping via UPS.

Low points
- Clean-out drum is permanently affixed to the filter, so it must be vacuumed out through an access door.
- Closely spaced pleats inside the filter require patience to clean.

More points
- The photo shows a steel filter-clean-out drum, but Penn State changed to a fiber clean-out drum (and lowered the price) just before this issue went to press.
- Options abound on this cyclone, including a 5-micron bag filter that reduces unit cost to $645, an excellent value.
- We tested the 3-hp version (TEMP143CC, $995) and found its performance curve identical because the impeller and motor speed are the same as the 2-hp model. However, the 3-hp motor should last longer.
- System-design assistance is available.

**Penn State TEMPEST, $495**
www.pennstateind.com, 800/377-7297

High points
- The lowest-priced cyclone in our test.
- A clean-out zipper on the filter bag makes dust removal fast and easy.
- Optional 26-gal. drum is small, but it mounts to and dismounts from the cyclone quickly and handles easier than larger drums.
- Wall-mounting brackets come with the cyclone.
- Packaged for shipping via UPS.

Low points
- This unit pulled the lowest SCFM in the test.
- Lots of assembly work, and the manual is disorganized and confusing.

More points
- Also available with .5 micron canister filter (TEMPESTCX) for $645.

**Penn State TEMPEST, $795**
www.pennstateind.com, 800/377-7297

High points
- Started in the middle of the pack for airflow, but outsucked all the other cyclones at SP levels greater than about 8”.
- Ceiling-mounting the cartridge filter saves on floor space.
- The largest filter surface area—452 sq. ft.—of any cyclone in the test, means less-frequent cleanings.
- Power cord, switch, and wall-mounting brackets included in purchase price.
- Packaged for easy shipping via UPS.

Low points
- Clean-out drum is permanently affixed to the filter, so it must be vacuumed out through an access door.
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**Cyclone dust collectors:**
Additional information for the “Report Card”

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<thead>
<tr>
<th>Brand</th>
<th>Model</th>
<th>Inlet Diam. (inches)</th>
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<td>Grizzly</td>
<td>G0525</td>
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<td>Woodsucker</td>
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**REPORT CARD**

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<td>WOODSUCKER II</td>
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<td>11.4</td>
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</tbody>
</table>

**NOTES:**
1. Height may vary according to distance between drum and cone. (*) Alternative mounting method lowers height to 85 1/2”.
2. (S) Leg stand  (W) Wall mount  (S/W) Can be mounted either way
3. (B) Bag filter  (C) Cartridge filter  (CC) Cartridge filter with cleanout
4. (C) Cellulose with steel mesh  (P) Spun-bond polyester

**Inlet Diam.**

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The Oneida 2 Commercial has the most impressive overall performance of all the cyclones in the test, with the highest peak SCFM readings and the ability to sustain that airflow well above 6" of static pressure. This, plus effective fine-dust filtration and fast, easy clean-out earned this sucker Top Tool honors.

For about $300 less, though, Grizzly’s G0525 performed remarkably well, with a high-efficiency filter bag and airflow second only to the Oneida 2 Commercial, so we named it the Top Value. The only drawback is its towering height, which, at 10’, may be too much for many home shops. If your shop can’t handle that height, take a good look at the Penn State TEMP142. It’s the same machine as the TEMP142CX we tested but comes with a less-efficient 5-micron bag instead of the .5-micron cartridge filter, and costs only $645. And, at only 94” tall, it fits under an 8’ ceiling.

High points
◆ Unique exhaust design captures the .5-micron cartridge filter inside a clear plastic bag so you can see when the filter needs cleaning.
◆ Well-written manual made bolt-together setup easy and relatively quick.
◆ Wall-mounting brackets, power cord, and switch included in price.

Low points
◆ Large size requires shipping by trucking company.
◆ Noticeably the loudest in the test at 91 dB.
◆ Not much in support services provided by the manufacturer.

Our pick of the litter gobblers

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Written by Michael Morris with Dave Campbell and Jeff Hall
Illustrations: Tim Cahill
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FOR EIGHT CYCLONE DUST-COLLECTORS UNDER $1,100

5. From manufacturer’s specifications. We were not able to verify this in our testing.

6. A Excellent
   B Good
   C Average
   D Below average

7. Measured 8’ from machine at 5’ height.

8. (N/A) Cord not included.

9. (C) Cartridge filter
   (D) Drum
   (DD) Drum dolly
   (M) Muffler
   (O) Cleanout
   (P) Power switch
   (R) Remote power switch
   (S) Leg stand
   (U) Ceiling-mounting brackets for filter
   (W) Wall-mounting brackets

10. (T) Taiwan
    (U) United States

11. Prices current at time of article’s production and do not include shipping, where applicable.