UP IN THE AIR

CONFUSING AIR-PURIFIER TESTS & CLAIMS RUN RAMPANT

Plus: Exceptional Values in Portable and Whole-House Models

More manufacturers than ever before claim that their air purifiers reduce the amount of volatile organic compounds that are in a home, but no independent standard exists for verifying their claims.

A CONSUMERS DIGEST STAFF REPORT

If you want to know how efficiently that a portable air purifier reduces indoor airborne particulates, such as dust, pollen and tobacco smoke, an independent third-party metric exists for that.

Association of Home Appliance Manufacturers (AHAM), which is a trade association, measures every portable air purifier's clean air delivery rate (CADR), which is the volume of filtered air that an air purifier delivers into a room at its highest setting. AHAM says you should consider air purifiers that have a CADR score that's equivalent to at least two-thirds of your room's square footage.

Unfortunately, if you're interested in a portable air purifier that reduces indoor airborne volatile organic com-

pounds (VOCs), which commonly are found in all homes, no independent third-party metric rating exists. What's more, no standard specifies the VOCs that an air purifier should reduce or even what reduction rates and levels are considered to be "efficient."

That's problematic, because we found that almost all manufacturers now make at least one portable air purifier (starting at $140) that's touted for its capability to reduce VOCs in indoor air. Furthermore, we found that no manufacturer is clear about the VOCs that its models target and how efficiently and quickly that its models remove those VOCs.


IQAir HealthPro Plus

"What that means is that it's like the Wild West out there for claims related to volatile organic compounds," says Richard Shaughnessy, who is at University of Tulsa and is one of the foremost experts in the United States on indoor-air quality. "Given that there's no standard [testing] protocol in place for VOCs, it's very difficult to translate what an air cleaner is going to do in your home," he says.

AHAM tells Consumers Digest that the organization just started to develop a standard testing procedure for VOCs. Wayne Morris, who leads the project for AHAM and is working with manufacturers, researchers and scientists, tells us that the standard will take at

Best Buys in Portable Air Purifiers

Best Buy Categories
[P]=Premium selection
[M]=Midrange selection
[E]=Economy selection
SEE PAGE 64

Best Buys in portable air purifiers were selected based on performance, ease and cost of maintenance, quality of construction and the area that the air purifier cleans.

The area that the manufacturer claims that the air purifier cleans—the *coverage area*—is based on the appliance operating at its highest setting. With that in mind, we selected air purifiers that cover large areas to account for improved cleaning in smaller rooms if the consumer were to operate the appliance at a lower setting.

Best Price is a reflection of the lowest retail price that was available at press time and is subject to change.

[P] IQAir HealthPro Plus

MSRP: $899; Best Price: $799

>>The HealthPro Plus, which is a repeat Best Buy selection, remains the only portable air purifier that we found that has the combination of a 10-year warranty, six fan speeds and four-stage filtration. The portable air purifier's LCD screen has touch controls and a programmable timer, as well as a remote control, which is another rare combination among portable air purifiers at any price. The 1,000-square-foot-rated **HealthPro Compact** ($799) and the 1,075-square-foot-rated **HealthPro** ($849), which lack the HealthPro Plus' filter for reducing volatile organic compounds, are also Best Buys.

Features:
* Coverage area: 1,125 sq. ft.
* Fan speeds: 6
* Weight: 35.0 lbs.
* Dimensions: 28 in. (h) x 15 in. (w) x 16 in. (d)
* Warranty: 10 yrs.


Alen BreatheSmart Fit50

[M] Alen BreatheSmart Fit50

MSRP: $499; Best Price: $480

>>The BreatheSmart Fit50 is the only portable air purifier that we evaluated that has a lifetime warranty. You'd have to pay at least an additional $40 to get a portable air purifier that has a larger coverage area than does this model. The **BreatheSmart** ($599), which provides 1,100 square feet of coverage area, is also a Best Buy.

Features:
* Coverage area: 900 sq. ft.
* Fan speeds: 4
* Weight: 16.0 lbs.
* Dimensions: 16-3/4 in. (h) x 22-1/4 in. (w) x 10 in. (d)
* Warranty: Lifetime

[E] Holmes HAP756-NU

MSRP: $140; Best Price: $140

>>The HAP756-NU is a repeat Best Buy selection, because you'd have to spend at least an additional $109 to get a portable air purifier that has a larger coverage area than this model has. This model also has a digital display, a unit timer and the capability to be positioned horizontally or vertically. That combination of features is rare among portable air purifiers that are in this price range.


Holmes HAP756-NU

Features:
* Coverage area: 418 sq. ft.
* Fan speeds: 4
* Weight: 19.2 lbs.
* Dimensions: 21-1/4 in. (h) x 10-3/32 in. (w) x 9-1/16 in. (d)
* Warranty: 5 yrs.

For more information about the above Best Buys, contact the manufacturers directly. See page 63.

least 2 years to complete.

"You read that products X, Y and Z reduce chemicals and gases, and it begs the question: According to what test procedure?" Morris says. "Companies are doing their own testing, but the tests from company A and company B might be different. It's now a matter of taking the different methodologies that have been used and bringing them under the umbrella of one standard organization."

invisible agents

EPA says VOCs commonly are found indoors in concentrations that are up to 10 times higher than they are outdoors.

CHEMICAL CONCERNS. VOCs are emitted by building materials, cleaning products, fuels, furniture, paints, personal-care products, solvents and hundreds of other household products, according to Environmental Protection Agency. EPA says VOCs commonly are found indoors in concentrations that are up to 10 times higher than they are outdoors. Experts say VOCs also are common outdoors in industrial areas

Best Buys in Whole-House Air Purifiers

Best Buy Categories
[P]=Premium selection
[M]=Midrange selection
[E]=Economy selection
SEE PAGE 64

Best Buys in whole-house air purifiers were selected based on performance, features and brand reputation.

Electronic air cleaners trap pollutants by electrically charging them. Media filter cabinets snare irritants by moving air through filtering material. For media filter cabinets, the minimum efficiency reporting value (MERV) rating denotes the system's American Society of Heating, Refrigerating and Air Conditioning Engineers-tested effectiveness in trapping pollutants. Electronic air cleaners can't be tested by using the same standard, so they use a "MERV equivalent" rating.

Because manufacturers typically don't publish prices, MSRPs are based on estimates that were derived from prices that were collected from distributors and dealers.

Best Price is a reflection of the lowest retail price that was available at press time and is subject to change.

Amana/Goodman Clean Comfort AE14-5

Trion HE Plus 1400

ELECTRONIC AIR CLEANERS

[M] Amana/Goodman Clean Comfort AE14-5

MSRP: $490; Best Price: $404

>>You'd have to pay at least an additional $516 to get another electronic air cleaner that has a MERV-equivalent rating that's as high as what the Clean Comfort AE14-5 has. We found that this model's value is increased by its inclusion of a carbon prefilter and a final filter.

Features:
* Efficiency rating: MERV-equivalent 16
* Warranty: 5 yrs.

[E] Trion HE Plus 1400

MSRP: $406; Best Price: $383

>>The HE Plus 1400's combination of a MERV-equivalent rating of 11, a carbon prefilter, a carbon final filter and a 5-year warranty is unmatched among the electronic air cleaners that we evaluated in this price range. The **HE Plus 2000** ($464), which has a MERV-equivalent rating of 13, is also a Best Buy.

Features:
* Efficiency rating: MERV-equivalent 11
* Warranty: 5 yrs.

MEDIA FILTER CABINETS

[P] Lennox Carbon Clean 16

MSRP: $489; Best Price: $489

>>The Carbon Clean 16, which is a repeat Best Buy selection, is the least expensive media filter cabinet that we found that delivers a MERV rating of 16. You'd have to spend at least an additional $544 to get that level of efficiency from another media filter cabinet.

Features:
* Efficiency rating: MERV 16
* Warranty: 5 yrs.

[M] Aprilaire 3000 Series

MSRP: $310; Best Price: $140

>>The 3000 Series, which is a repeat Best Buy selection, is capable of removing at least 90 percent of airborne pollen and dust as well as permanently trapping indoor allergens, which we found is notable performance among media filter cabinets that are in this price range. This model is the only media filter cabinet that we found that has a digital control that can be mounted on the unit or in your living space. This makes it convenient for you to activate the unit when you want to operate it rather than depend on the heating/air-conditioning system that's in your home to click on and prompt air cleaning.

Features:
* Efficiency rating: MERV 13
* Warranty: 5 yrs.

[E] Trion Air Bear Supreme 1400

MSRP: $135; Best Price: $135

>>The Air Bear Supreme 1400 is a repeat Best Buy selection, because it's the lowest priced media filter cabinet that delivers a MERV rating that's as high as 13. The **Air Bear Supreme 20x20** ($135), which you can install in a heating/air-conditioning system that requires a square-shape media filter, and the **Air Bear Supreme 2000** ($150), which has a rated airflow of 2,000 cubic feet per minute, are also Best Buys.

Features:
* Efficiency rating: MERV 13
* Warranty: Cabinet, lifetime; coil, 10 yrs.

For more information about the above Best Buys, contact the manufacturers directly. See page 63.

Lennox Carbon Clean 16

and near to farms that use chemicals. At least 1,000 VOCs can be in a home at any time, according to Marilyn Black, who studies indoor-air quality for UL.

"One of the reasons that a standard doesn't exist is because of the complexity" in developing one, Black says. "Those chemicals can be at levels that are irritating to people, or they can be chemicals that have a more hazardous long-term impact, like cancer or other diseases."

Aprilaire 3000 Series

The sheer number of VOCs raises an interesting question: How will AHAM decide what VOCs that its standard will target? Morris says AHAM's standard will focus on up to 12 of the most common types of VOCs.

National Research Council of Canada (NRCC) developed a testing protocol in 2011 to measure how efficiently that air purifiers reduce three common VOCs: formaldehyde, which is found in wood products; limonene, which is found in air fresheners; and toluene, which is found in cleaning products. NRCC's method hasn't been adopted by a standard-testing organization, but NRCC is one of the groups with which AHAM is working to develop its standard testing procedure.

"Any standard that you develop has to have the following characteristics: repeatable, relevant, unbiased, informative and usable," says Greg Nielsen of NRCC. "It's a lot of work to make all these things balanced, and then you have to answer the question: How do you package the information in a meaningful way so that the consumer understands what they're buying?"

Experts say VOCs are an "invisible" problem, because they're difficult to detect. Some VOCs emit odors, but many don't.

"When you don't smell an odor, that can give you a false sense of security," Black says. "You can have chemicals that can be hazardous that have no odor associated with them."

We found 10 VOC sensors (think: carbon-monoxide detectors) that were introduced in the past 3 years and are claimed to measure the levels of VOCs—even odorless ones—that are in your home. The least expensive sensor that we found costs $200, but most models cost at least three times that much. Unfortunately, experts tell us that most under-$1,000 VOC sensors aren't sensitive enough to give you an accurate indication of the amount of VOCs that are in your home.

> **target area**
>
> AHAM's standard will focus on up to 12 of the most common types of VOCs.

In other words, your best bet to reduce VOCs that are in your home (besides trusting that the air purifiers that are on the market will make a difference) is to avoid using products that are known to emit VOCs. That includes avoiding the use of pressed-wood products, which are known to contain formaldehyde or formaldehyde-linked adhesives. Experts suggest that you choose low-VOC paints and building products if you remodel your home.

EPA recommends that you ventilate your home, but that might not be practical if it's cold outside, if the pollen count is high or if you live in an industrial part of town that has high amounts of VOCs outside.

SORBENT VS. PCO. Most VOC-reducing air purifiers use a filter media that's made of a *sorbent*, which is a material such as activated charcoal and zeolite. All experts agree that VOCs will stick to, or be absorbed by, a sorbent.

"There's data indicating that some removal can occur, but the problem is that carbon gets spent very quickly," Black says. "So carbon beds might be effective in the short term but probably have to be replaced very frequently."

Experts also say the more sorbent that an air purifier contains, the more VOCs that the air purifier will capture and the longer that the filter will last before it becomes saturated and has to be replaced. Unfortunately, no easy way exists to tell when a VOC filter becomes saturated.

"If you have an environment that's full of cleaning products and solvents, new furnishings, new home products and paint, the unit is going to get challenged at a much higher rate," Shaughnessy says.

Austin Air's HealthMate Standard ($539) has a 15-pound activated carbon-and-zeolite filter, which is the densest VOC filter media that we found in an air purifier. Most sorbent air purifiers include a thin layer of carbon. However, increasing the amount of sorbent in an air purifier adds resistance and decreases air flow through the filter. In other words, if air isn't moving through the air purifier efficiently, the air purifier won't be able to clean the air efficiently.

We found one manufacturer, Oransi, that includes a high-end motor in two of its air purifiers (starting at $899) to push air more vigorously through its models that have a VOC filter. Unfortunately, the motor adds at least $200 to the cost of the units compared with models that have a regular motor, says Peter Mann of Oransi.

"The challenge is that not everyone can spend $900 on an air purifier," Mann says.

Aside from sorbent, in the past 3 years we've seen the emergence of air purifiers that use a reactive photocatalytic oxidation (PCO) process (starting at $334), such as ultraviolet light, to destroy VOCs as they pass through the air purifier. Every expert whom we interviewed agrees that PCO air purifiers can be effective and might be the future of portable air purifiers. However, for now, experts say PCO air purifiers often convert VOCs into dangerous byproducts, such as ozone. Morris says the AHAM standard testing protocol will look at whether PCO air purifiers create byproducts.

"PCO shows a lot of promise for the future," Shaughnessy says. "You don't have to replace a media filter. Whether they can eliminate byproducts, that's an ongoing issue."

We'll stay tuned to see how the standard develops.