

# AIR CLEANERS

## Some do little cleaning

**Even the best air cleaners could be a frivolous investment, according to medical experts. Our tests also show that a few produce significant levels of ozone, an irritant that can worsen asthma and decrease lung function.**

Market leader Sharp Image's Professional Series Ionic Breeze Quadra SI737 is among the ionizing room models that did a poor job of cleaning dust and smoke from the air in our May report. All ionizing models produce some ozone, but those poor performers emitted enough of it to fail the industry-standard Underwriters Laboratories test that we replicated.

For this report, we expanded our air-cleaning and ozone tests to include room as well as whole-house models, which replace the filter in a forced-air heating or cooling system. All whole-house and most room models we tested were well within the 50-parts-per-billion ozone threshold. But Sharp Image's Ionic Breeze Quadra SI637 room model, a sibling of the SI737, exceeded the UL ozone limit, while the LakeAir Maxum room model came close.



**DUST BUSTER** This \$15 3M filter installs easily, but you needn't pay for clean air.

Sharp Image began offering an ozone-reducing catalyst for its SI737 and SI637 models as this issue went to press. We are currently testing it. But even if it reduces ozone, you'd still have an air cleaner that does little to clean the air.

Our latest tests point to other room air cleaners that performed poorly, along with low-cost, whole-house filters that rivaled professionally installed models.

**Small ionizers come up short.** Some of the most effective room air cleaners use

electrostatic precipitators, which trap charged particles on oppositely charged plates or filters. Several small, quiet ionizing models such as those from Sharp Image and Oreck use the same basic technology, yet were far less effective.

Ads claim that Oreck's XL Professional "cleans the air in your home of allergens, dust, and dirt" and include a Seal of Truth from the Asthma and Allergy Foundation of America. But the Oreck performed as poorly as other small ionizing models. As we noted in May, the AAFA's seal means little, since it is neither an endorsement nor a statement of clinical efficacy.

**Large models can be pricey.** Whole-house electronic precipitators emitted little ozone and performed well. But the best cost \$500 to \$700 and must be professionally installed. Two pop-in filters we tested cleaned well and cost \$15 to \$30, though they must be replaced regularly.

### HOW TO CHOOSE

Don't assume that any air cleaner will improve your health. "There's no defini-

**First things first** Try these simple indoor air-cleaning steps before you consider buying an air cleaner.

**Medical experts as well as the federal Environmental Protection Agency agree that an air cleaner won't alleviate carbon monoxide, viruses, and dust mites. While capable air cleaners can trap**

**dust, smoke particles, pollen, and pet dander, you can reduce all of those allergens without opening your wallet. Here are some low- and no-cost steps to follow before buying an air cleaner:**

### ELIMINATE CAUSES

**Remove or reduce pollution sources.** Ban indoor smoking. Avoid candles, incense, air fresheners, wood-burning fires, and scented cleaners. Vacuum often, using a low-emissions machine (see vacuums report on page 43). Keep dust-sensitive people out of the area when vacuuming. Don't get pets if you're allergic; if you already have them, keep them out of the bedroom.

**Minimize dust mites.** Encase pillows (as shown above), mattresses, and box springs in mite-proof covers. Wash laundry in the hottest water you can. Avoid carpeting and other furnishings that accumulate dust and harbor mites.

**Control harmful gases.** Test for radon with a kit (about \$15). Minimize carbon-monoxide risks; don't idle cars or fuel-burning equipment in garages or basements. Don't store or use chemicals, solvents, glues, or pesticides in the house.



### VENTILATE ROOMS

**Open windows and doors.** Do both based on weather and outdoor air quality.

**Use outdoor-venting fans.** Putting these fans in the kitchen, bathroom, and laundry areas

helps expel combustion gases, odors, and excessive moisture, which can breed mold and other allergens.

**Vent heating equipment and appliances properly.** This includes maintaining heating equipment, chimneys, and vents to properly remove combustion gases such as carbon monoxide from indoors. Install carbon-monoxide alarms (see our report "CO Alarms," September 2005).



tive proof that air cleaners improve air quality in any way that benefits the health of those with or without allergies or asthma," says Rebecca Bascom, M.D., professor of medicine at the Penn State medical center's division of pulmonary, allergy, and critical care medicine. The American Lung Association and medical societies such as the American Academy of Allergy Asthma and Immunology also say there's little evidence that air cleaners alone will reduce the effect of indoor pollutants for those with asthma or allergies.

See First Things First, page 39, for low- and no-cost cleaning methods before buying an air cleaner. If you buy one, check our Ratings for top performers. Then keep these points in mind as you shop:

**Decide on whole-house or room.**

Whole-house models are the only sensible choice for forced-air heating or cooling. Room models are the only option for other homes; the best performed at least as well on Low as most others did on High, minimizing noise and energy use.

**Choose a type.** Electronic-precipitator air cleaners worked best overall and restricted airflow least among whole-house models. But we suggest avoiding room versions without a fan, which have cleaned poorly in our tests and can emit significant amounts of ozone. Also avoid dedicated ozone generators. Unlike electrostatic precipitators, which emit ozone as a by-product of their cleaning process, these niche products produce large amounts of ozone by design.

Whole-house filters tend to cost the least up front. But they can cost more than electrostatic precipitators over time, since you usually must replace such filters every one to three months.

**Check efficiency.** Most room air cleaners are certified by the Association of Home Appliance Manufacturers as part of a voluntary program that includes appropriate room size and clean-air delivery rate (CADR), a measure of cleaning speed on High. We judge CADR above 350 excellent and below 100 poor. Choose a model certified for a larger area than you require for better cleaning at a quieter speed.

Many whole-house filters have a minimum efficiency reporting value (MERV). The top-performing models we tested have a MERV of 11 to 13.



1 Friedrich



3 Whirlpool

# Ratings room air cleaners

• **Availability** Most models available through December 2005.

● Excellent  
◐ Very good  
○ Good  
◑ Fair  
● Poor

In performance order. **Blue** key numbers indicate Quick Picks; see box on facing page.

Key number	Brand & model	Price	Type	Annual cost	Overall score	Test results							
						Energy	Filter	Dust removal		Smoke removal		Noise	
								High speed	Low speed	High speed	Low speed	High speed	Low speed
1	<b>Friedrich</b> C-90A <b>D</b> C-90B	\$500	EP	\$60	\$72	—	—	●	○	◐	○	◑	●
2	<b>Kenmore</b> (Sears) 83202 83200, Whirlpool AP51030R	350	F	90	220	—	—	●	○	◐	○	◑	○
3	<b>Whirlpool</b> AP45030R	250	F	69	130	—	—	◐	○	◐	○	◑	◐
4	<b>Honeywell</b> 50250 50251	180	F	124	157	—	—	◐	◑	◐	◑	●	○
5	<b>Vornado</b> AQS35	200	F	133	43	—	—	◐	◑	◐	◑	●	○
6	<b>Blueair</b> 501	500	F	55	176	—	—	◐	◑	◐	◑	●	●
7	<b>Hunter</b> QuietFlo 30401	230	F	127	120	—	—	○	◑	○	◑	◑	◐
8	<b>Holmes</b> Harmony HAP750-U	160	F	67	105	—	—	○	◑	○	◑	◑	◐
9	<b>Bionaire</b> Galileo BAP1250-U	200	F	67	102	—	—	○	◑	○	◑	◑	◐
10	<b>LakeAir</b> Maxum Electronic Air Cleaner	340	EP	38	76	—	—	○	◑	○	◑	◑	●
11	<b>TrueAir</b> Ultra 04163	180	F	96	118	—	—	○	◑	○	◑	◑	○
12	<b>Blueair</b> 601	600	F	62	176	—	—	●	●	●	●	●	●
13	<b>Electrolux</b> Brisa Z7040	400	EP	45	150	—	—	○	◑	○	◑	◑	●
14	<b>Hunter</b> QuietFlo 30170	180	F	62	88	—	—	○	◑	○	◑	◑	◐
15	<b>Holmes</b> Harmony HAP650	170	F	48	95	—	—	○	◑	○	◑	◑	◐
16	<b>Honeywell</b> Enviracaire IFD 60001 <b>D</b> IFD HFD-130	220	EP	36	①	—	—	◐	◑	◐	◑	◑	●
17	<b>Sharp</b> Plasmacluster FP-N60CX	400	F	21	37	—	—	○	◑	○	◑	◑	●
18	<b>Holmes</b> Harmony HAP422-U	75	F	49	160	—	—	◐	◑	◐	◑	◑	◐
19	<b>IQAir</b> HealthPro Plus	800	F	106	230	—	—	○	◑	○	◑	◑	●
20	<b>Kenmore</b> (Sears) EnviroSense 85500	300	F	27	90	—	—	○	◑	○	◑	◑	●
21	<b>Austin</b> Health Mate HM400	400	F	100	30	—	—	◐	◑	◐	◑	◑	◐
22	<b>Honeywell</b> 18150 <b>D</b> 18155	150	F	46	100	—	—	◐	◑	◐	◑	◑	◐
23	<b>Honeywell</b> 17000 17005	130	F	58	125	—	—	◐	◑	◐	◑	◑	◐
24	<b>Bionaire</b> Tower BAP825-U	80	F	56	160	—	—	◐	◑	◐	◑	◑	◐
25	<b>Soleus Air</b> SA-150R	200	F	38	18	—	—	◐	◑	◐	◑	◑	●
26	<b>Zojirushi</b> PA-MTC14	160	F	30	24	—	—	◐	◑	◐	◑	◑	●
<b>NOT RECOMMENDED</b> These were poor at cleaning, and some exceeded the UL ozone standard.													
27	<b>Oreck</b> XL Professional Signature Air8S	370	EP	28	38	—	—	●	●	●	●	○	●
28	<b>Sharper Image</b> Professional Series Ionic Breeze Quadra S1737 S1637 <sup>②</sup>	450	EP	7	①	—	—	●	●	●	●	●	●
29	<b>Ionic</b> Pro CL-369 <sup>②</sup>	150	EP	9	①	—	—	●	●	●	●	●	●
30	<b>Surround Air</b> XJ-2000 <sup>②</sup>	80	EP	2	①	—	—	●	●	●	●	●	●

**D** Discontinued, but similar model is available. Price is for similar model. <sup>①</sup> Washable filter. <sup>②</sup> Exceeded the Underwriters Laboratories ozone standard. Note that the Sharper Image (28) was tested without its new ozone catalyst.



1 Aprilaire



2 Carrier



9 American Air Filter

# Ratings

## whole-house air cleaners

• **Availability** Most models available through December 2005.



Within types, in performance order. **Blue** key numbers indicate Quick Picks; see box at right.

Key number	Brand & model	Price	Annual cost	Type	Overall score	Test results		
	Similar models, in small type, comparable to tested model.					Dust removal	Smoke removal	Airflow resistance
					0 100 P F G VG E			

**PROFESSIONALLY INSTALLED** These performed best overall, but cost roughly \$200 to install.

1	Aprilaire 5000 <sup>①</sup>	\$600	\$44	EP/F	Excellent	Excellent	Excellent	Fair
2	Carrier AIRA	500	30	EP	Very good	Very good	Very good	Fair
3	Trion SE1400	700	32	EP	Very good	Very good	Very good	Fair
4	Trane Perfect Fit TFE210A9FR3	600	19	EP	Very good	Very good	Very good	Fair
5	Honeywell F50 <b>D</b> F300	600	21	EP	Very good	Very good	Very good	Fair
6	Lennox Healthy Climate EAC-14 EAC-16, EAC-20	400	13	EP	Very good	Very good	Very good	Fair
7	Lennox PureAir PCO-12C PCO-20C <sup>①</sup> <sup>④</sup>	1,100	309	F	Very good	Very good	Very good	Fair
8	Aprilaire 2200 <sup>②</sup> 2400 <sup>①</sup>	350	33	F	Very good	Very good	Very good	Fair

**DO-IT-YOURSELF** These replace existing filters; annual cost reflects replacement intervals.

9	American Air Filter Dirt Demon Ultra High Efficiency <sup>②</sup>	30	120	F	Very good	Very good	Very good	Good
10	Filtera MERV 13 Mini Pleat <sup>②</sup>	57	228	F	Very good	Very good	Very good	Good
11	3M Filtrete Ultra Allergen Reduction 1250	15	60	F	Very good	Very good	Very good	Good
12	3M Filtrete Micro Allergen Reduction 1000	12	48	F	Very good	Very good	Very good	Good
13	3M Filtrete Dust & Pollen Reduction 600	10	40	F	Very good	Very good	Very good	Good
14	Precisionaire NaturalAire Elite Lysol Elite, Arm & Hammer Elite	13	52	F	Very good	Very good	Very good	Good
15	The WEB Hepa-Pure	30	30	F	Very good	Very good	Very good	Good
16	Purolator PuroPleat Ultra (PPD)	7	28	F	Very good	Very good	Very good	Good
17	American Air Filter Dirt Demon UltraPleat <b>D</b> Ultra Shield	9	20	F	Very good	Very good	Very good	Good
18	American Air Filter Dirt Demon Pleated <b>D</b> Dirt Demon Dust Shield	5	8	F	Very good	Very good	Very good	Good
19	Precisionaire NaturalAire Plus Ace Pleated	4	20	F	Very good	Very good	Very good	Good
20	American Air Filter Strata Density Premium	1	11	F	Very good	Very good	Very good	Good
21	Precisionaire EZ Flow	2	22	F	Very good	Very good	Very good	Good
22	The WEB Original	20	③	F	Very good	Very good	Very good	Good
23	Purolator PuroPleat (Pur 40)	6	24	F	Very good	Very good	Very good	Good
24	American Air Filter ElectroKlean	10	③	F	Very good	Very good	Very good	Good

**D** Discontinued, but similar model is available. Price is for similar model. <sup>①</sup> Uses disposable filter insert. <sup>②</sup> 4 in. thick (1 in. for others tested). <sup>③</sup> Washable filter. <sup>④</sup> Cost includes UV lights, which were not tested for performance.

### Guide to the Ratings

**Overall score** is mainly how well models removed dust and smoke from a test chamber; quietness for room models; and airflow resistance for whole-house. Under **type**, **EP** is an electrostatic precipitator, **F** is a filter that can include HEPA for room, and flat or pleated for whole-house. **Dust** and **smoke** are how well models cleared the air of fine clay dust and cigarette smoke; measurements include High and Low speed for room models. Dust scores also denote performance with other large particles such as pollen. **Noise** for room models denotes instrument and panel judgments at highest and lowest speeds. **Airflow resistance** for whole-house models reflects how freely air passed. **Annual cost** is our estimate based on energy and/or filter costs under continuous operation. **Price** is approximate retail. Scores for previously tested models may have changed based on the performance of newly tested models.

## CR Quick Recommendations

Relatively few air cleaners excelled in our tests, especially among room models, which account for the most sales in dollars.

Many room air cleaners scored fair or poor in at least one of our four cleaning tests for dust and smoke. Tests confirmed that dust performance is also a good indicator of pollen performance, which is why we don't score it. Several small ionizing models scored poorly in air cleaning, and some failed the voluntary Underwriters Laboratories ozone test we replicated; all of these models are Not Recommended.

The Bionaire (9), TrueAir (11), Electrolux (13), Sharp (17), Kenmore (20), Soleus Air (25), and Zojirushi (26) room models have dust or odor sensors that automatically adjust fan speed. But most didn't kick in until levels were high, then shut off before levels dropped sufficiently.

A better bet: Run room models on Low and raise the fan speed only during dusting, vacuuming, or other situations that may increase airborne particles.

The **Ratings** rank air cleaners by overall performance. **Quick Picks** lists models that perform well at a reasonable price.

## QUICK PICKS

### ROOM AIR CLEANERS

1 Friedrich \$500

3 Whirlpool \$250

Both can cover up to 500 square feet, cleaned effectively, and cost less to run than the Kenmore (2). The Friedrich (1) costs twice as much as the Whirlpool (3) but requires less per year to run.

### WHOLE-HOUSE AIR CLEANERS

1 Aprilaire \$600 (pro-installed)

2 Carrier \$500 (pro-installed)

9 American Air Filter \$30 (do-it-yourself)

11 3M Filtrete \$15 (do-it-yourself)

The Aprilaire (1) and Carrier (2) are top performers. Units of the Aprilaire (1) made from June 2000 through December 2004 were recalled to replace the plastic inner housing and filter with flame-resistant units (see page 11). The do-it-yourself American Air Filter (9) and 3M Filtrete (11) cost less per year than the Filtera (10), based on three-month replacement. Choose the American Air Filter (9) for systems that accept filters 4 inches thick, the 3M (11) for systems that use 1-inch filters.

## Free at ConsumerReports.org

Our May 2005 report "New Concerns About Ionizing Air Cleaners" is available free from Sept. 7 to Nov. 2. Click on "Home & garden," then select "Ionizing air cleaners."