

Air Purification Technology: What actually cleans the air.

A U.S. EPA technical review of residential air cleaners evaluated every common purification technology on the market. Its conclusion was direct: **HEPA** combined with sorbent media such as **activated carbon** — the exact pairing Austin Air uses — are **generally the most effective, with the fewest limitations or adverse consequences**.¹ Other “active” technologies remove little of what matters and can release harmful byproducts into the air you breathe.²

PROBLEM 1 — THE PARTICLES

Fine particulate matter (**PM2.5**) penetrates deep into the lungs and the bloodstream. Capturing it requires a true mechanical filter. Medical-grade HEPA removes fine and ultrafine particles at **99% or higher** efficiency.¹

PROBLEM 2 — THE CHEMICALS, GASES & VOCS

Smoke carries chemicals, gases, odors, and VOCs. A particle filter **cannot remove them** — only **sorbent media** (activated carbon and zeolite) adsorb gases, and they do so **without creating byproducts**.^{1,4}

THE TECHNOLOGIES, SIDE BY SIDE — AS ASSESSED BY THE EPA

TECHNOLOGY & MECHANISM	REMOVES FINE PARTICLES	REMOVES GASES & VOCS	EMITS HARMFUL BYPRODUCTS	KEY LIMITATION (EPA REVIEW)
AUSTIN AIR Medical-Grade HEPA + Activated Carbon + Zeolite Mechanical particle capture paired with gas-phase adsorption	✓ 99%+	✓ carbon + zeolite	No	Replace media on schedule. The EPA names this combination most effective with the fewest adverse consequences. ^{1,4}
HEPA / Fibrous Media (alone) Fibers physically capture particles	✓	✗	No	Cannot control gases, VOCs, or chemical odors. Particles only. ¹
Activated Carbon / Sorbent Media (alone) Gases adsorb into the media's pores	✗	✓	No	Finite capacity; must be replaced. Pair with HEPA for particles. ⁴
Electrostatic Precipitator (ESP) Charges particles onto collector plates	△ drops as plates load	✗	⚠ ozone, nitrogen oxides	Efficiency falls as plates load; high power draw; plates require cleaning. ^{2,3}
Ionizer / Ion Generator Charges particles so they attach to surfaces	△ low airflow / CADR	✗	⚠ ozone	Low effectiveness; charged particles attach to room surfaces and can resuspend. ^{2,3}
UV / UVGI UV light aims to deactivate microbes	✗ does not remove	✗	⚠ ozone (uncoated lamps)	Residential doses too low; inactivates but does not capture; dead particles stay allergenic. ³
Photocatalytic Oxidation (PCO) UV + catalyst tries to convert gases	✗	△ low, variable	⚠ formaldehyde, acetaldehyde, ozone	Can generate the very gases it aims to destroy; finite catalyst life. ⁴
Plasma Electric arc ionizes and breaks gas bonds	△	△	⚠ particles, ozone, CO, formaldehyde, NOx, chloroform	Numerous byproducts; wide variation in how products actually work. ⁴

✓ Effective & designed for it △ Limited / inconsistent ✗ Not designed for it ⚠ Releases byproducts

AN AIR CLEANER SHOULD NOT POLLUTE

Ozone is a **well-documented lung irritant**. The EPA review found that many electronic devices — ESPs, ionizers, uncoated UVGI lamps, and products marketed with “plasma” or “ions” — can generate **high amounts of ozone**. PCO and plasma units have been shown to form formaldehyde, carbon monoxide, nitrogen oxides, and other gases as byproducts.^{2,4}

NO FEDERAL APPROVAL FOR OZONE IN OCCUPIED SPACES

The EPA states plainly: **no federal agency has approved the use in occupied spaces of air cleaners that intentionally emit ozone**. A device that adds pollutants to the air is working against the very reason it was purchased.²

THE AUSTIN AIR APPROACH — BUILT AROUND WHAT THE EVIDENCE SUPPORTS

Austin Air does not chase trends or rely on reactions that create new chemistry indoors. Every unit is engineered around the two technologies the EPA found **most effective with the fewest adverse consequences**: true mechanical HEPA for particles, and a deep bed of sorbent media for gases.¹

Austin Air uses **60 square feet of medical-grade HEPA** and up to **15 pounds of activated carbon and zeolite** — more combined filter material than anyone else in the industry. Carbon adsorbs most hydrocarbons, many aldehydes, and organic acids, and captures ozone through chemisorption; **zeolite** extends the sorbent blend toward gases such as ammonia and nitrogen compounds that carbon alone handles poorly.^{4,5}

Because adsorption capacity grows with depth, more media means effective gas control **for longer** — which is why Austin Air filters carry a five-year service life rather than a seasonal one.^{4,5}

- 1 Medical-Grade HEPA**

Captures fine & ultrafine particles, including PM2.5 from smoke, at 99%+ efficiency.
- 2 Activated Carbon**

Adsorbs hydrocarbons, aldehydes, organic acids, VOCs, and odors — no byproducts.
- 3 Zeolite**

Broadens gas capture across compounds carbon alone removes less effectively.

10 INDEPENDENT CLINICAL TRIALS	35+ YEARS HAND-BUILT IN BUFFALO, NY	5-yr FILTER SERVICE LIFE	FEMA & RED CROSS DEPLOYED
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THE BOTTOM LINE

Every other technology either leaves half the problem untouched or introduces a new one. Medical-grade HEPA paired with activated carbon and zeolite does neither — it captures the particles, adsorbs the gases, and adds nothing harmful back to the air.



The most tested. The most trusted.

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REFERENCES

1. U.S. EPA, *Residential Air Cleaners: A Technical Summary*, 3rd Edition (EPA 402-F-09-002, July 2018) — overall conclusions on effectiveness, particle vs. gas control, and HEPA performance (pp. 6–7, 10–11, 19–20).

2. Ibid. — byproduct emissions and ozone; no federal approval of ozone-emitting devices in occupied spaces (p. 9; technology table, pp. 17–18).

3. Ibid. — electrostatic precipitator, ionizer, and UVGI technologies (technology table p. 17; pp. 25–28).

4. Ibid. — sorbent media (activated carbon), photocatalytic oxidation, and plasma technologies (technology table pp. 17–18; pp. 29–31).

5. Austin Air Systems — product and company specifications: filter media volumes, independent clinical testing, five-year filter life, and Buffalo, NY manufacture (“HEPA and Activated Carbon,” austinairsystems.com/blogs/blog/hepa-and-carbon).

The EPA neither certifies nor recommends particular brands of air cleaners. References to EPA findings describe the agency's assessment of air-cleaning technologies, not any endorsement of Austin Air products. Marks (✓ / △ / ✗ / △) summarize the EPA review's technology assessments for general comparison.