

IN-ROOM AIR CLEANER GUIDANCE FOR REDUCING COVID19 IN AIR IN YOUR SPACE/ROOM

What is an In-Room Air Cleaner? An in-room air cleaner is installed within occupied space rather than in an HVAC system. They are also known as portable, stand-alone, plug-in, or room air cleaners or as air purifiers. In-room air cleaners come in several types and sizes ranging from miniature desktop units to portable units designed to be operated on the floor or tabletop, to larger fixed units that can be permanently installed on ceilings, walls, or floors. In some cases, larger fixed units use ducts for air distribution across larger spaces.

In-room air cleaners may contain one or more technologies designed to remove or inactivate air contaminants. Media filters, including high efficiency particulate air (HEPA) filters, can remove particles, including those containing viruses and other microorganisms. UV-C (ultraviolet light in the germicidal wavelengths) kills or inactivates viruses and microorganisms to make them non-infectious but does not remove them from the air. Technologies such as ionizers, UV-PCO, and many called by other names may claim to remove or destroy multiple types of contaminants but may convert them to other compounds that might be harmful. These technologies are designated by CDC as emerging technologies without an established body of evidence reflecting proven efficacy under as-used conditions. For more information, see the Epidemic Task Force [Filtration & Disinfection Guide](#).

When should in-room air cleaners be used? When HVAC equipment does not meet ASHRAE recommendations for ventilation and filtration, removal of contaminants near a source is needed, or where higher risk activities occur.

What do I need to know to choose an In-Room air cleaner?

1. Contaminant(s) to be controlled – Airborne virus particles can be captured or inactivated.
2. Space size – How much floor area is served? What is the ceiling height?
3. Space layout – How is the space arranged? Is there power access? Are there safety issues?
4. Noise – How much noise is acceptable? Is a noise rating at a specific fan speed reported for the device?
5. Air distribution – How is air distributed in the space? Can the air cleaner be placed so its air intake is unobstructed by furniture and its outlet is able to move air as far as possible before being deflected or drawn into a return or exhaust grille. Multiple units may be a better option than one.
6. Ventilation (outdoor air) – How much comes in through HVAC system or windows? If unknown, assume none.
7. Amount of clean air needed – What flow rate of clean air is needed? Is there a target for the clean-air equivalent number of air changes per hour (ACH) needed between ventilation and filtration combined (e.g., 3, 6, or 12 ACH equivalent)?

Example of how to choose the right size: A 45 x 20 ft (14 x 6 m) room (900 ft² [84 m²]) classroom with 9 ft (3 m) ceilings (8100 ft³ [229 m³]) has a HVAC system with a supply airflow rate of 1,200 cfm (0.57 m³/s) of which 350 cfm (0.17 m³/s) is outdoor air and a MERV 8 filter. The HVAC system provides 2.6 ACH of outdoor air. Since the MERV 8 is ~35% efficient for 1-6 µm particles (where most SARS-CoV-2 is assumed to be present), the HVAC system airflow of 850 cfm of recirculated air provides 2.2 equivalent ACH. The owner wants 6 equivalent ACH total. Therefore, the in-room device needs to provide about 1.2 equivalent outdoor ACH, which for this space would need to be 165 cfm (0.08 m³/s) clean air delivery rate (CADR) at a fan speed that meets the space noise level target of < NC 30/40 dBA for a classroom.

How do I select the right one? In the preceding example, a small device will do. Search for an in-room air cleaner that:

- 1) Confirm the CADR of the unit is equal to or higher than needed (165 cfm in the example above) at the fan speed and associated noise level that is acceptable in the space.
- 2) Removes particles or inactivates viruses. A HEPA air cleaner or high MERV (Minimum Efficiency Reporting Value) of 13 or more is recommended.
- 3) Check for additional technologies you do not want or need. Avoid added technologies that may cause problems or costs more to maintain.
- 4) Check for noise/sound levels (decibel or DB_A). The unit may have a high speed and lower speed options. You may consider buying one to run at a lower speed some or most of the time.
- 5) Confirm that you can locate the unit in your space without the air inlet or outlet being blocked or causing gusts of air that may reintroduce previously settled dust from surfaces or cause discomfort.
- 6) Look for prices and availability. Be sure to check on the prices and expected lifetimes for replacement filters.

FOR MORE INFORMATION: <https://www.epa.gov/indoor-air-quality-iaq/air-cleaners-and-air-filters-home>

Noise Calculation Tools: <https://www.noisemeters.com/apps/db-calculator/> and <http://www.sengpielaudio.com/calculator-spl.htm>