

# Ventilation and Air Quality for Reducing Transmission of Airborne Illnesses

Good ventilation and indoor air quality are important in reducing airborne exposure to viruses and other disease vectors, chemicals, and odors. Buildings vary in design, age, heating, ventilation, and air conditioning (HVAC) systems, and their ability to provide adequate ventilation and air filtration.

Because each building and its existing HVAC systems will be different, **consult a professional engineer or HVAC specialist to determine the best way to maximize the system's ventilation and air filtration capabilities for each specific room in the building.** For more detailed guidance, see the [Clean Air in Buildings Challenge, EPA \(PDF\)](#).

## General Considerations

- Upgrade filters to MERV 13 if the system can handle the air resistance.
- Change filters as needed. Clogged filters decrease HVAC operation, stress the fan motors, and decrease their ability to improve indoor air quality. Visually inspect monthly.
- Reduce recirculation of indoor air, maximize outside air.
- Monitor CO2 levels with the goal of keeping levels below 800 ppm.
- Maintain humidity of 40 to 60 percent.
- Ventilate the building 1 hour before occupancy and 2 hours after custodial activities.
- Inspect and maintain local exhaust ventilation in restrooms, kitchens, cooking areas, and labs. Increase exhaust ventilation from restrooms above code minimums.
- Work with building engineer or HVAC specialist to generate air movement that goes from clean-to-less-clean air by positioning air supply and exhaust air dampers.

## Buildings that DO NOT have an Existing HVAC System

- Open windows and doors to create a cross draft. Even a few inches of opening will help with ventilation.
- Reduce occupancy in areas where outdoor ventilation cannot be increased to the optimal amount.
- Use fans to increase the effectiveness of open windows. Position fans securely and carefully in or near windows. Window fans positioned to blow air out of a window can help draw fresh air into the room through other open windows and doors.
- Using fans for cooling is acceptable.
- Avoid blowing respiratory aerosols from one person to another.

## Portable Air Filtration

- Portable HEPA air cleaners can supplement ventilation and are most critical in rooms with poorer ventilation or in isolation areas.
- Unit air ratings are based on the square footage of the room and the Clean Air Delivery Rate (CADR). Harvard’s School of Public Health offers a [guide to calculate ventilation rates for indoor spaces](#).
- The equivalent of at least 5–6 air changes per hour is recommended.
- Consider the noise rating because some units can be quite loud. Consult with the manufacturer before purchasing. The CADR is at the highest speed, which will be too loud for some environments. Choose one rated for a larger room and run it on the low fan speed to reduce the noise or use two air cleaners for the room.
- The ventilation system should run 1 hour before and 2 hours after occupancy.
- Choose HEPA air cleaners that meet the UL 2998 standard of less than 5 ppb ozone.
- Do not use ozone generators, electrostatic precipitators and ionizers, or negative ion air purifiers because they can produce harmful by-products.
- Replace HEPA filters regularly as recommended by the manufacturer. The unit should be vacuumed and cleaned on a regular schedule; do this outside. Filter disinfection is not needed or recommended.
- For more information:
  - [Selection and Use of Portable Air Cleaners to Protect Workers from Exposure to SARS-CoV-2, NIH \(PDF\)](#)
  - [Guide to Air Cleaners in the Home, EPA](#)
  - [Air Cleaner Information for Consumers, California Air Resources Board](#)

## Additional Considerations

### Restrooms:

- Ensure restroom exhaust fans are functional and operate at full capacity during occupancy.
- Install paper towels to dry hands, disconnect hand dryers (blowers).
- Ensure that all drain traps are primed (water flow maintained regularly).

### Wildfire Smoke:

For ventilation guidance during wildfire smoke see: [Improving Ventilation and Indoor Air Quality during Wildfire Smoke Events \(PDF\)](#)

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