

COVID-19 Winter Indoor Air Guidance for Public and Private Sectors

Because of the nature of how the virus spreads and how it survives, being indoors increases the risk of people getting or spreading COVID-19. In general, the more people there are in an indoor environment, the more need for ventilation with outdoor air. When temperatures are cold outside, buildings are more closed up, which leads to less ventilation. The guidelines listed below are for all indoor environments in both the private and public sectors. All guidance should be used in addition to people taking general [prevention measures](#), such as wearing a face mask and keeping a 6 foot distance from others.

This guidance is flexible since each facility is different in terms of structure and use. Please follow all instructions provided by the manufacturer of any indoor air quality products you use and consult professionals if you need to modify any of the building's indoor air quality systems.

The guidance is based on information from the Centers for Disease Control and Prevention and the American Society of Heating, Refrigerating and Air-Conditioning Engineering (ASHRAE) and was compiled by the Health Department, Vermont's Buildings and General Services Department, and Efficiency Vermont. If you are a school administrator, contact Efficiency Vermont about the [School Indoor Air Quality Grant Program](#).

Simple Ventilation Measures

Simple steps can improve ventilation inside buildings, including:

- changing the filters in your heating, ventilation and air condition (HVAC) system
- keeping your HVAC system properly maintained
- running your bathroom exhaust fan throughout the day and for two hours before and after someone has used it
- opening windows and doors a little bit or for short durations
- using window fans to blow the indoor air outside

Do not use fans that can move air from one person to another, ceiling fans, or fans that blow air into or around the room. These types of fans and air movement could keep the virus in the air for longer or increase the possibility of moving the virus between people, even if they are 6 feet apart.

Additional Measures for Ventilation Systems

If you have additional resources to enhance your ventilation system, follow the guidelines listed below. These guidelines are technical, and are for general purposes only.

Every building or space is unique in its physical layout, ventilation system characteristics, and usage. We advise you to consult with a professional if you choose to do any of these enhancements. The professional should follow ASHRAE and other industry-specific guidance. Additionally, make sure any routine servicing and maintenance, as well as any upgrades, are done by HVAC professionals. If you are a renter, be sure to talk to the building owner first.

1. **Determine the optimal outside air ventilation rate.** ASHRAE recommends increasing outdoor air to the maximum possible while maintaining indoor conditions. For new construction and retrofits, design for 30% more ventilation than the minimum requirement described in the most current version of [ASHRAE Standard 62.1 \(commercial\) and 62.2 \(residential\)](#) adopted by the State of Vermont.
2. **Ensure optimal outside air introduction** while keeping heating, cooling, and energy impacts in mind. The most current version of ASHRAE 62.1/62.2 provides a minimum value for outdoor air which is calculated for each space.
3. **Maintain optimal relative humidity (RH).** Recent science suggests no less than 40% and ASHRAE recommends a range of 40 to 60%.
 - Room humidification may be advisable when reviewed by a design professional to verify that minimum RH set points will not create condensation, mold, or other moisture problems in the building.
 - A maintenance plan must be followed for portable humidifiers, which can quickly grow mold, bacteria, and cause other issues. Maintenance primarily consists of periodic inspection and cleaning (at least weekly) in accordance with the manufacturer's instructions.
 - An RH of 40 to 60% is difficult to maintain during winter in Vermont. There is no need to close your facility if you cannot meet this recommendation. It is important to have outside fresh air ventilation, so it is not recommended to close off outside air to increase the RH inside.
4. **Increase the outside air rate** up to 100% based on space use and the overall ventilation plan. The total ventilation rate is commonly calculated as Air Changes Per Hour (ACH) with a target of 6 to 12 ACH depending on space use, while accounting for energy consumption and maintaining indoor space conditions.
5. **Filter all return air.** Aim for minimum MERV 13 ([Minimum Efficiency Reporting Value](#)) filtration as long as it does not decrease the total ventilation rate as specified by the manufacturer or as recommended by an HVAC professional.
 - Replace existing return air filters with filters that have MERV 13 to 16 ratings.
 - MERV 13 ratings and higher capture 75% or more of airborne viruses. Note that not all filters are labeled with their MERV rating.
6. **Provide unoccupied periods when the room air can turn over.** This is more important when the calculated air change rate (calculated ACH) is at the lower end of our recommended range.
7. **Consider using ultraviolet germicidal irradiation (UVGI)** if there is still concern for viral spread after you have addressed ventilation, filtration and ACH.
 - UVGI can be very effective if it is used at the right wavelength (260 nanometers), right power density (1500 microwatts per square centimeter) and if it is installed at the upper height of the room to prevent harmful skin or eye irradiation.

- UVGI may also be effective if it is installed inside the air handling unit for both viral control and to keep biological growth on coils to a minimum to maintain the effectiveness of the cooling coil. Viral control requires engineering to ensure adequate UVGI contact time.
8. **Monitor for carbon dioxide (CO₂)**, if available, to use as a proxy measure of ventilation in fully occupied spaces.
- Recommend CO₂ of 800 to 1200 parts per million (PPM). Higher CO₂ concentrations suggest further professional evaluation, not that a space cannot be occupied.
 - CO₂ monitoring is common to many commercial or government buildings, usually as local or spot monitoring, but occasionally it is automated.
 - Check sensor calibration per manufacturer specification and avoid auto recalibration. An HVAC professional must be consulted to optimize outside air ventilation rates using this CO₂ information.
9. **Use portable air cleaners** in rooms that have HVAC limitations.
- Air cleaners must be used in accordance with manufacturer's instructions and the building manager must be consulted for potential interference with other HVAC objectives.
 - Look for ENERGY STAR rated equipment or equipment UL 2998 standard certification (Environmental Claim Validation Procedure for Zero Ozone Emissions from Air Cleaners).
10. If you need an **isolation room**, the HVAC performance standards should be enhanced to negative pressure relative to adjacent zones, air exhausted directly to the outdoors or passed through HEPA filter, and 6 to 10 ACH (12 ACH for new construction).

References

- [CDC on ventilation](#)
- [CDC on office buildings](#)
- [CDC on hand hygiene recommendations](#)
- [ASHRAE coronavirus resources](#)
- [ASHRAE on re-opening buildings](#)
- [ASHRAE on residential structures](#)
- [EPA on Indoor Air and Coronavirus](#)
- [Efficiency Vermont on balanced ventilation](#)
- [Efficiency Vermont on high efficiency products](#)
- [Building Science](#)
- [For Health](#)
- [Rhode Island Department of Health on indoor air circulation](#)