

Guidance on Using Heating, Ventilation, and Air Conditioning (HVAC) Systems During the COVID-19 Pandemic

People who have, or are at risk of getting, COVID-19 should not be exposed to extreme heat. Using an effective HVAC system prevents individuals from developing heat stress or other heat-related illness.

Heat stress can aggravate existing conditions related to COVID-19 morbidity and mortality such as diabetes, cardiovascular disease, asthma, and psychological distress. Heat stress can also aggravate symptoms of infectious diseases due to heat discomfort and dehydration and reduces immune function, potentially leading to higher risk of illness.

Many businesses, healthcare facilities, and homes use air conditioning to keep indoor temperatures comfortable and to reduce humidity levels. The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) has guidance for the use of HVAC systems during the COVID-19 pandemic to supplement standards that ASHRAE developed before the epidemic.

Air Flow Pattern

If it is practical, fans and airflow systems should direct air in a **clean to less clean** fashion. This means that the air should flow from an uninfected individual/group to a sick individual/group. This is one of the most important HVAC techniques to mitigate the spread of airborne infectious diseases. Fans should also direct air upward, such as by running ceiling fans counterclockwise to help lift the potentially infected air out of people's breathing zone. In short, air should move up and away from uninfected groups of people.

Ventilation and Pressure Management

Air changes per hour (ACH) is the number of times indoor air is replaced by outdoor air every hour. The higher the ACH, the faster the system can remove airborne pathogens. Some HVAC systems allow for adjustment of the amount of external air provided to the building. As much fresh air should be incorporated as possible while maintaining a comfortable environment. A room's ACH can be increased by installing supplemental exhaust ventilation through dedicated exhaust portals or by inexpensive approaches such as opening windows during comfortable weather and using portable fans.

In long-term care facilities, a negative pressure system should be maintained to prevent infectious particles from spreading from the room of someone who is sick to other areas in the facility. Negative pressure can be accomplished by closing all doors that lead to hallways or connected rooms and exhausting air via bathroom or other exhaust fans, window fans, or other approaches. For buildings not utilized for long-term care, pushing additional air into the space to create a slightly positive pressure compared to the outdoors will help remove air from inside the building and replace it with fresh air from outside.

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Temperature and Humidity

RIDOH recommends that the indoor temperature be kept between **70°-75° F**, and the relative humidity (RH) should be between **40%-60%**. Relative humidity below 40% increases the spread of COVID-19 because dryer air can:

- Dry out and potentially damage respiratory linings and skin, which reduces the ability of immune cells to function at the site of contact with the virus;
- Promote the formation of small, infectious droplets that can be more easily inhaled;
- Increase survival rate of viruses and bacteria; and
- Decrease effectiveness of hand hygiene and surface cleaning because sanitizers and disinfectants dry faster, reducing contact time with the surface that is to be cleaned and disinfected.

Filtration and Disinfection

HVAC systems have air filters to clean the air that comes through them. These filters have a Minimum Efficiency Reporting Value (MERV), and the higher the MERV, the more efficient the filter is. A filter should have a MERV of at least 13 to effectively remove viral particles. High Efficiency Particulate Air (HEPA) filters have a MERV higher than 16 and will remove almost 100% of viral particles. Most systems are limited in the type of filter that can be installed. RIDOH recommends that **the highest-rated filter a system can accommodate should be used**. The capacity of the system should not be exceeded in an attempt to increase air filtration because it will keep the system from providing sufficient ventilation and can damage the system. Portable HEPA air purifiers are likely to provide a good option for reducing the presence of viral particles in a room, supplementing the benefits of the existing HVAC system. Adding ultraviolet germicidal irradiation (UVGI) to an HVAC system may also help to increase the effectiveness of the HVAC system at removing viral particles, although further research is needed to show if that translates into reduced disease transmission.

System Maintenance and Filter Replacement

- The risk of infection from performing HVAC system maintenance is low. However, workers engaging in maintenance or filter replacement may want to wear proper personal protective equipment (PPE), such as an N-95 respirator (if available), disposable gloves, and goggles/safety glasses.
- To help prevent bacteria from growing in cooling towers, when the cooling towers are shut down, drain the water to minimize any stagnant water. During startup of cooling towers, pre-treat the water with hyper-chlorination methods.

Additional Guidelines and Resources

- Operate systems continuously.
- Turn on bathroom exhaust fans and keep toilet lids closed.
- Seal any chases, bypasses, or entrances that may upset the pressure systems.
- ASHRAE has compiled a variety of [technical documents and links to resources](#) providing more detailed guidance about HVAC systems and COVID-19.