

HVAC & COVID-19 - DIOCESE OF DAVENPORT: 5/29/20

An enclosed environment with limited ventilation to the outside facilitates transmission. Therefore, to increase circulation of outdoor air as much as possible, if it is safe to do so open doors and windows are recommended (<https://www.cdc.gov/coronavirus/2019-ncov/community/office-buildings.html>).

If an HVAC system is in use, please consider the following:

Re-Opening Buildings

As buildings are re-opened, HVAC systems should be cleaned, serviced, and checked for mold. Please see: <https://www.cdc.gov/coronavirus/2019-ncov/php/building-water-system.html>. An on-going program of cleaning and servicing is recommended.

From the Archdiocese of Baltimore:

One mechanical system of great importance in addressing and working to avoid spread of the COVID-19 is the heating, ventilation and air conditioning system. Both contractors and medical experts are encouraging facility operators to examine both the appropriate filter for your system to help increase your rate of filtration as well as increasing fresh air intake in your facilities. It is important to use a properly installed, higher-efficiency filter that can remove particles of relevant size.

Caution must be used as high-efficiency filters may have a high initial pressure drop and/or load with dust and particles accumulating very quickly, thus requiring frequent filter changes. A high-pressure drop filter (either because it is that way when it is new or because it loads quickly) can also cause more air to bypass the filter if it is not properly installed and well sealed.

Mechanical Filter Ratings

The fraction of particles removed from air passing through a filter is termed “filter efficiency” and is provided by the Minimum Efficiency Reporting Value (MERV) under standard conditions.

- MERV ranges from 1 to 16; higher MERV = higher efficiency
- MERV ≥13 (or ISO ePM1) are efficient at capturing airborne viruses
- MERV 14 (or ISO equivalent) filters are preferred**
- High efficiency particulate air (HEPA) filters are more efficient than MERV 16 filters.

Due to high pressure drops, HEPA filters may not be able to be retrofitted into HVAC systems. To function properly, HEPA filters must be sealed properly in filter racks. Filters are often delicate and require careful handling to prevent damage and preserve performance.

[N.B. Higher MERV filters that are above the rating for the air handler can cause evaporator coils and even condenser coils to freeze, potentially damaging equipment and resulting in no air exchange. Please discuss your options with your HVAC professional.]

Other modes of disinfection that are effective include electronic air filters/cleaners and UV-C systems—including banks of UV-Lamps installed inside HVAC systems or associated ductwork. These do not replace mechanical filters but work with them. Other UV-C systems are mounted in occupied spaces at heights 7' and above, and may be helpful if there is limited mechanical ventilation in congregate settings. For details, see:

<https://www.ashrae.org/file%20library/about/position%20documents/filtration-and-air-cleaning-pd.pdf> and [https://www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-filtration disinfection-c19-guidance.pdf](https://www.ashrae.org/file%20library/technical%20resources/covid-19/ashrae-filtration%20disinfection-c19-guidance.pdf)

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Seating

Based on a case report of spread of COVID-19 in an air-conditioned restaurant in China, we do not recommend seating persons in the immediate proximity of AC vents (especially intake but outflow as well if not properly filtered) if this can be avoided.

Updated Information from the CDC (first link above)

- Take steps to improve ventilation in the building:
 - Increase the percentage of outdoor air (e.g., using economizer modes of HVAC operations) potentially as high as 100% (first verify compatibility with HVAC system capabilities for both temperature and humidity control as well as compatibility with outdoor/indoor air quality considerations).
 - Increase total airflow supply to occupied spaces, if possible.
 - Disable demand-control ventilation (DCV) controls that reduce air supply based on temperature or occupancy.
 - Consider using natural ventilation (i.e., opening windows if possible and safe to do so) to increase outdoor air dilution of indoor air when environmental conditions and building requirements allow.
 - Improve central air filtration:
 - [Increase air filtration](#) to as high as possible (MERV 13 or 14) without significantly diminishing design airflow.
 - Inspect filter housing and racks to ensure appropriate filter fit and check for ways to minimize filter bypass
 - Consider running the building ventilation system even during unoccupied times to maximize dilution ventilation.
 - [Generate clean-to-less-clean air movement](#) by re-evaluating the positioning of supply and exhaust air diffusers and/or dampers and adjusting zone supply and exhaust flow rates to establish measurable pressure differentials. Have staff work in areas served by “clean” ventilation zones that do not include higher-risk areas such as visitor reception or exercise facilities (if open).
- Consider using portable high-efficiency particulate air (HEPA) fan/filtration systems to help [enhance air cleaning](#) (especially in higher risk areas).
- Ensure exhaust fans in restroom facilities are functional and operating at full capacity when the building is occupied.
- Consider using [ultraviolet germicidal irradiation \(UVGI\)](#) as a supplement to help inactivate the virus.

More Detailed Research

DOI: <https://doi.org/10.1016/j.envint.2020.105832>