COVID-19 HVAC Guidelines for University of Michigan Facilities

Per the CDC, reoccupying a building during the COVID-19 pandemic should not, in most cases, require new building ventilation systems. However, ventilation system upgrades or improvements can increase the delivery of clean air and dilute potential contaminants. CDC recommends a layered approach to reduce exposures to SARS-CoV-2, the virus that causes COVID-19. In addition to ventilation improvements, the U-M layered approach includes vaccination, wearing face masks, conducting daily health checks, hazard assessments of the workplace, surface cleaning and disinfection, and hand hygiene. The most important layer is vaccination.

U-M Facilities & Operations has formed a cross-functional HVAC Task Force comprised of registered Professional Engineers, Certified Industrial Hygienists, building code officials, and operations managers to conduct ongoing reviews of CDC recommendations, best practices and standards for the design, maintenance, and operation of U-M’s HVAC systems for the duration of the pandemic. U-M also has a building automation system (BAS) monitored 24/7 by technicians who ensure HVAC systems are operating as designed.

The Task Force reviewed current CDC recommendations for building ventilation systems. These include:

1. **Increase the introduction of outdoor air.**

   **U-M Response:** Where possible and while maintaining temperature and humidity control, U-M is doing this. Minimum outside air introduction in our spaces is at least 20-25% and often more. In addition, U-M Design Guidelines already require labs to be 100% outside air.

2. **Rebalance or adjust HVAC systems to increase total airflow to occupied spaces when possible.**

   **U-M Response:** Our systems currently meet or exceed the Michigan Building Code (MBC) requirements for outside air (fresh air) per person at maximum occupancy of spaces. When outside temperatures don’t require excessive heating and cooling, return air systems are designed to open to 100% outside air, far exceeding the code requirements. Our lab systems are designed without any return air. Therefore, they use 100% outside air filtered, heated or cooled to the lab spaces; then the air is exhausted from the building.

3. **Turn off any demand-controlled ventilation (DCV) controls that reduce air supply based on occupancy or temperature during occupied hours.**

   **U-M Response:** Where our ventilation systems have demand-control options for occupied and unoccupied mode, Facilities & Operations (F&O) and other campus groups have changed the systems to stay in occupied operation.
4. Open windows and doors, when weather conditions allow, to increase outdoor air flow.

**U-M Response:** This is not recommended. Without using the HVAC systems, outside air is not filtered and control of room temperature and humidity are lost when the windows are opened. In addition, it can create other risks such as fall hazards, pest control problems, and hazards for occupants with asthma, allergies, etc.

5. Increase air filtration to as high as possible (Minimum Efficiency Reporting Value [MERV] 13 or 14) without significantly diminishing design airflow.

**U-M Response:** U-M’s current standard filters air twice. U-M uses a MERV 8 or MERV 10 pre-filter and a MERV 13 final filter in its air handling systems.

6. Inspect filter housing and racks to ensure appropriate filter fit and check for ways to minimize filter bypass.

**U-M Response:** U-M maintenance teams perform this routinely during preventive maintenance. F&O and other campus groups are also performing engineering audits as an additional step.

7. Consider running the building ventilation system even during unoccupied times to maximize dilution ventilation.

**U-M Response:** U-M has altered fan schedules to start 2 hours before building opening and run 2 hours after building closing.

8. Generate clean-to-less-clean air movement by evaluating and repositioning as necessary, the supply louvers, exhaust air grilles, and/or damper settings.

**U-M Response:** Building designs already balance the building and the direction of airflow through the buildings and rooms.

9. Consider Using portable high-efficiency particulate air (HEPA) fan/filtration systems to enhance air cleaning (especially in higher risk areas such as a nurse’s office or areas frequently inhabited by people with a higher likelihood of having COVID-19 and/or an increased risk of getting COVID-19).

**U-M Response:** This is unnecessary in most spaces because of the present air exchange rates already designed into the HVAC systems. Some possible exceptions include non-hospital clinical spaces that may conduct procedures that result in aerosols, such as dental procedure areas and UHS clinical spaces. U-M is evaluating these on a case-by-case basis at the request of the users of these facilities. Considerations for the use of portable HEPA units include
a) Improper placement of the unit has the potential to create air patterns that flow directly across one person onto another due to airflow from the exhaust.
b) Increased air movement can also make staff uncomfortable.
c) Portable HEPA units can be noisy and may make communication difficult.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7711180/
d) These units require proper preventive maintenance, including filter changes. Maintenance may require personal protective equipment, trained staff and specialized procedures.
e) They add electric load to circuits in locations where they are in use, and cords have the potential to be trip hazards.

10. Ensure exhaust fans in restroom facilities are functional and operating at full capacity when the building is occupied.

**U-M Response:** U-M maintenance teams perform preventive maintenance on exhaust fans in these areas at prescribed intervals. Maintenance performs repairs as concerns are discovered.

11. Consider using ultraviolet germicidal irradiation (UVGI) as a supplemental treatment to inactivate SARS-CoV-2 when options for increasing room ventilation and filtration are limited.

**U-M Response:** This may be appropriate in some high risk, clinical care environments. However, the CDC has advised that, “if the HVAC system allows for efficient filtration or provides outdoor airflow above minimum code requirements, it will remove most airborne virus particles and upper-room UVGI would not add as much benefit.”