



April 7th, 2020

Mobile Climate Control (MCC) COVID-19 Recommendations

As there is limited research published in the area of transmission of infectious diseases directly for the bus and rail industry, we rely on work published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) for the general HVAC industry in making these recommendations.

According to ASHRAE research, the "HVAC systems in most non-medical buildings play only a small role in infectious disease transmission, including COVID-19"¹ and we can extend in this case to transit vehicles. For purposes of making these recommendations close contact of passengers and touching of surfaces are more likely to spread COVID-19 versus the HVAC.

According to the World Health Organization (WHO), "The COVID-19 virus spreads primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes...." Talking and breathing can also release droplets and particles.² Droplets generally fall to the ground or other surfaces in about 1 m (3 ft), while particles (aka aerosols), behave more like a gas and can travel through the air for longer distances, where they can transmit to people and also settle on surfaces. The virus can be picked up by hands that touch contaminated surfaces, or be re-introduced into the air when disturbed on surfaces.

First and foremost, MCC recommends following all Centers for Disease Control and Prevention (CDC) guidelines for reducing the transmission of COVID-19.

Basic principles of social distancing (1-2 meters or 3-6.5 feet), surface cleaning and disinfection, handwashing and other strategies of good hygiene are far more important than anything related to the HVAC system.³

We all have a role to play to control the spread of this disease. MCC urges all transit operators and passengers to adhere to CDC guidelines when using public transportation. Although there is a possibility to transmit COVID-19 via the HVAC, the **chances are minimal**.

MCC recommends the following with regard to HVAC operation:

Recommendations for Operator Area Mitigation

- Use of fresh air for driver's defroster/AC whenever possible, and limit or disable the use of recirculated air for these types of functions
- Driver's area booster blower or vents that direct air from the main air conditioning duct should be disabled
- Use rear doors only for exit and entrance to create distance from driver
- Use windows and overhead ventilation hatch/emergency exit for fresh air when possible
- Improve return⁴ air filtration with higher rated MERV filters⁵ with sealed edges to limit air bypass[†]
- Increase frequency of filter maintenance[†]



- Caution must be exercised when servicing the filter so as not to dislodge potential biological contaminants⁶
- MCC is evaluating/developing UVGI-type air sanitizing systems, in combination with an improved return air filter. Research has shown this to be very effective in removing airborne pathogens like the Coronavirus within HVAC systems.⁷

Recommendations for Passenger Area Mitigation

- Use windows and overhead ventilation hatch/emergency exit for fresh air when possible
- Improve return⁴ air filtration with higher rated MERV filters⁵ with sealed edges to limit air bypass[†]
- Increase frequency of Return Air/Recirculate Air filtration maintenance[†]
- Caution must be exercised when servicing the filter so as not to dislodge potential biological contaminants⁶
- Prohibit seating or standing within 6.5 feet (2 m) of HVAC system intake points – rear seats for rear-mounted HVAC units, and under return air grilles for roof-mounted HVAC units
- MCC is evaluating/developing UVGI-type air sanitizing systems, in combination with an improved return air filter. Research has shown this to be very effective in removing airborne pathogens like the Coronavirus within HVAC systems.⁷

Citations

1. According to the WHO, COVID-19 is the name given on February 11, 2020 by the ICTV (International Committee on Taxonomy of Viruses) to the disease caused by SARS-CoV-2, aka the novel coronavirus. Hospitals and health-care facilities are beyond the scope of this article, though many of the same principles apply to them.
2. Bischoff 2013. References cited with only a name and date in this article are taken from [ASHRAE Position Document on Airborne Infectious Diseases](#), 2014, 2020 (“PD”). According to the PD, there is no exact size demarcation between droplets and particles, and this “... is less important than knowing that large droplets and small particles behave differently and that the latter can remain airborne.”
3. Non-health care workplaces fall into the medium and lower exposure risk categories described in *Guidance on Preparing Workplaces for COVID-19*, U.S. Department of Labor, Occupational Safety and Health Administration OSHA 3990-03 2020.
4. This applies to systems that deliver air to the occupied space and, to a lesser extent, room air returned to rotary heat exchangers, in order to reduce cross contamination.
5. MERV-13 Is approximately equivalent to F7, a rating used in the EU. More effective filters with reasonable pressure drop are available, and some increased pressure drop often results in an acceptably small effect on system performance.
6. Consider the filters contaminated, protect personnel changing them, and seal them in plastic bags for disposal.
7. There is research that shows UVGI in both the upper-room and in-duct configurations can inactivate some disease-transmitting organisms. Either of these takes time to plan and install. For more information, see the ASHRAE PD previously cited and Chapter 62 Ultraviolet Air and Surface Treatment of *2019 ASHRAE Handbook—HVAC Applications*.

† Maintenance departments should check with their HVAC manufacturer for system specifications

*This document is subject to change as new information becomes available